PROCEEDINGS
OF THE

NINETY EIGHTH SESSION OF THE

INDIAN SCIENCE CONGRESS

CHENNAI, 2011

PART II

SECTION OF
ENVIRONMENTAL SCIENCES

President : **Dr. G. Bagyanarayana**

CONTENTS

98th Indian Science Congress
January 3-7, 2011, Chennai

I

PRESIDENTIAL ADDRESS

President : **Dr. G. Bagyanarayana**

PRESIDENTIAL ADDRESS

BImpact of anthrapogenic activities on Biodiversity and Climate Change

Dr. G. Bagyanarayana

SECTION OF ENVIRONMENTAL SCIENCES

INTRODUCTION :

Climate change is a long-term change in the weather patterns over periods of time that may range from decades to thousands of years. It may be a change in the weather conditions or a change in the distribution of weather events viz, greater or fewer extreme weather events, like flooding and drought. Climate change may be limited to a specific region, or may occur across several regions or itself the whole Earth.

The **United Nations Framework Convention on Climate Change** defines climate change as **"**a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods**".** Alternately climate change is synonymous with **global warming or anthropogenic global warming (AGW).**

Ecological changes and global warming are the changes brought about by man. Ecological changes such as deforestation, reforestation, urbanization, changes in water resources pattern, changes in agricultural patterns etc. an increase in temperature due to increased concentration of green house gases(GHG) in the atmosphere has resulted in the global warming.

The earth receives energy from the sun and it reradiates energy into the atmosphere in the form of long radiation. This long wave radiation is absorbed more effectively by the atmosphere. Some of the atmospheric gases like CO2, methane

*Professor and Co-ordinator, UGC-SAP
Dept. of Botany, Osmania University, Hyderabad-500007 (AP).

and water vapor absorbs this long wave radiation. The reemission of this long wave radiation back to the earth surface warms the atmosphere. The effect of green house gases estimates are water vapor 36-70% CO_2 9-26%, methane 4-9% and ozone 3-7%.

Various human activities have caused and will continue to cause a loss in biodiversity through, land use and land-cover change; soil and water pollution and degradation including desertification, and air pollution; habitat fragmentation; selective exploitation of species; the introduction of non-native species; and stratospheric ozone depletion. The current rate of biodiversity loss is greater.

The atmospheric concentrations of green house gases have increased since the re-industrial era due to human activities, primarily the combustion of fossil fuels and land use and land cover change. Climate change is projected to affect all aspects of biodiversity

As per intergovernmental panel on climate change (IPCC) the earth's mean surface temperature is projected to warm 1.4 to 5.8° C with land areas warming more than the oceans, and the high latitudes warming more than the tropics. The associated sea-level rise is projected to be 0.09 to 0.88m.

Globally by the year 2080, about 20% of coastal wetlands could be lost due to sea-level rise. The impact of sea-level rise on coastal ecosystems (e.g. mangrove/coastal wetlands, sea grasses) will vary regionally and will depend on erosion processes from sea and depositional processes from land.

CAUSES OF CLIMATE CHANGE

Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to **natural internal processes or external forcings**, or to **persistent anthropogenic changes** in the composition of the atmosphere or in land use.

Changes in the state of this system can occur **externally** (from extraterrestrial systems, solar output, Earth-Sun geometry, Interstellar Dust) or **internally** (from ocean, atmosphere and land systems) through any one of the described components. Factors that can shape climate are climate forcings. These include such processes as variations in **solar radiation**, **deviations in the Earth's orbit**,

mountain-building and **continental drift**, and changes in **greenhouse gas concentrations**. Some parts of the climate system, such as the **oceans and ice caps**, respond slowly in reaction to climate forcing because of their large mass. Therefore, the climate system can take centuries or longer to fully respond to new external forcings.

HUMAN INFLUENCES :

Human influence on the climate is direct and unambiguous for example, the effects of **irrigation on local humidity**. Presently the scientific consensus on climate change is that human activity of most concern in these anthropogenic factors is the increase in **CO2 levels** due to **emissions from fossil fuel combustion**, followed by aerosols (particulate matter in the atmosphere) and cement manufacture. Other factors, including **land use**, **ozone depletion**, **animal agriculture** and **deforestation**, are also of concern in the roles they play - both separately and in conjunction with other factors - in affecting climate, microclimate, and measures of climate variables.

The **Intergovernmental Panel on Climate Change (IPCC)** is a scientific body set up by the UN to look at climate change. It says that human activity is the main cause of the changes seen in climate. The people are changing the climate with actions that create emissions of **greenhouse gases** like **carbon dioxide** (CO2) and **methane** (CH4), **nitrous oxide and fluorocarbons**. In the UK, 40% of CO2 emissions are caused by individuals, mostly from **energy used in the home, driving and air travel.**

Greenhouse gases occur naturally in the atmosphere and their presence results in what atmospheric scientists call the **greenhouse effect**. It is important to remember that the greenhouse effect is what keeps the earth warm enough to be habitable. The current concern is directed at an **enhanced** greenhouse effect, one that would put more heat-absorbing gases into the atmosphere, thereby increasing global temperatures. The enhanced greenhouse effect has been linked to increased GHG emissions from human activities. Nitrogen (78%) and oxygen (21%) constitute 99% of the dry atmosphere. The rest of the gases, including GHGs, are collectively classified as “trace” gases due to their low concentrations.

Water vapor is the most important GHG on the planet. Unlike most of the other atmospheric gases, water vapor is considered to be a ‘variable’ gas; that is,

the percentage of water vapor in the atmosphere can vary greatly depending on the location and source of the air. For example, over the tropical oceans, water vapor may account for 4% of the total volume of gases, while over deserts or at high altitudes, it may be nearly absent. Water vapor absorbs heat readily. Although other GHGs are individually less important than water vapor, increasing their concentrations may affect global climate in significant and measurable ways.

Carbon dioxide (CO_2) is considered the most important human-influenced GHG. Scientific measurements reveal an unmistakable global increase that is rapid and escalating. This increase arises primarily from the burning of fossil fuels (motorized vehicles, electric power plants, and homes heated with gas or oil) and the burning and clearing of forest land for agricultural purposes.

Methane (CH_4) is largely a product of natural biologic processes, but its output can be accelerated by human activities. CH_4 is emitted from the decay of organic matter in waterlogged soils (for example, wetlands and water logged rice fields) and from the digestive tracts of grazing animals (for example, ruminants). The additions from human activities include the expansion of rice agriculture, the increased number of livestock, the increased number of landfills, and leakage from natural gas pipelines.

Chlorofluorocarbons (CFCs) have no natural source; they are produced entirely by human activity. CFCs have historically been used widely as refrigerants in air conditioners, refrigerators, freezers, and heat pumps. They are found in some foam plastics and used in some electronics manufacturing. Even though CFC production has been vastly reduced, these compounds remain in the atmosphere for a long period of time; with their effects as GHGs lasting for many years.

Nitrous oxide (N_2O) is a naturally occurring GHG, which has increased significantly in recent years due to human activity. N_2O is emitted from coal-burning power plants and can be released from the breakdown of chemical fertilizers in the soil.

Ozone (O_3) is also a greenhouse gas. It is important in the troposphere (a bad thing). In the troposphere, ozone can be a major component of urban smog - damaging crops and aggravating respiratory problems as well as enhancing the greenhouse effect.not to confuse the presence of the ozone in the stratosphere (a good thing) with the presence of ozone.

The concentrations of these GHG are increasing (although, thanks to recent global agreements, CFCs are being largely eliminated and their concentrations have begun to drop in the lower atmosphere). The emissions are not uniformly distributed globally. Most of the emissions come from the more developed countries, where power generation, power consumption, and living standards are highest.

ADVERSE IMPACT OF CLIMATE CHANGES :

The Earth is the only planet in our solar system that supports life. The complex process of evolution occurred on Earth only because of some unique environmental conditions that were present: **water**, an **oxygen-rich atmosphere**, and a **suitable surface temperature**.

Mercury and Venus, the two planets that lie between Earth and the sun, do not support life. This is because Mercury has no atmosphere and therefore becomes very hot during the day, while temperatures at night may reach -140ºC. Venus, has a thick atmosphere which traps more heat than it allows to escape, making it too hot (between 150 and 450ºC) to sustain life.

Only the **Earth has an atmosphere of the proper depth and chemical composition**. About 30% of incoming energy from the sun is reflected back to space while the rest reaches the earth, warming the air, oceans, and land, and maintaining an average surface temperature of about 15ºC.

The chemical composition of the atmosphere is also responsible for nurturing life on our planet. Most of it is **nitrogen (78%); about 21% is oxygen, which all animals need to survive**; and only a small percentage **(0.036%) is made up of carbon dioxide which plants require for photosynthesis**.

The atmosphere carries out the critical function of maintaining life-sustaining conditions on Earth, in the following way: each day, energy from the sun (largely in the visible part of the spectrum, but also some in the ultraviolet and infra red portions) is absorbed by the land, seas, mountains, etc. If all this energy were to be absorbed completely, the earth would gradually become hotter and hotter. But actually, the earth both absorbs and, simultaneously releases it in the form of infra red waves (which cannot be seen by our eyes but can be felt as heat. All this rising heat is not lost to space, but is partly absorbed by some gases present in very small (or trace) quantities in the atmosphere, called **GHGs** (greenhouse gases).

Greenhouse gases (for example, carbon dioxide, methane, nitrous oxide, water vapour, ozone), re-emit some of this heat to the earth's surface. If they did not perform this useful function, most of the heat energy would escape, leaving the earth cold (about -18 ºC) and unfit to support life.

However, ever since the Industrial Revolution began about 150 years ago, man-made activities have added significant quantities of GHGs to the atmosphere. The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have grown.

An increase in the levels of GHGs could lead to greater warming, which, in turn, could have an impact on the world's climate, leading to the phenomenon known as climate change. Indeed, scientists have observed that over the 20th century, the mean global surface temperature increased by 0.7°C (IPCC 2010). They also observed that since 1860 (the year temperature began to be recorded systematically using a thermometer), the 1990's have been the warmest decade.

The Earth's climate system constantly adjusts so as to maintain a balance between the energy that reaches it from the sun and the energy that goes from Earth back to space. This means that even a small rise in temperature could mean accompanying changes in cloud cover and wind patterns. Some of these changes may enhance the warming (positive feedback), while others may counteract it (negative feedback). Negative feedback (causing a cooling effect) may result from an increase in the levels of aerosols (small particles of matter or liquid that can be produced by natural or man-made activities). Positive feedback may result from an increase in water vapour (because of greater evaporation with temp rise), which itself is a GHG and can further add to the warming effect.

The **Third Assessment Report published by the IPCC states, 'there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities'.**

By combining social and economic factors (population and carbon emissions). with an understanding of global and regional climate scene, climate scenarios have been developed that express the potential for different behaviors to impact climate patterns. Climate scenarios have the ability to inform about the likely impacts of temperature, precipitation, and seasonality on food production. They also guide

agricultural sectors on the best methods to adapt to various climate consequences by evaluating impacts and identifying tradeoffs.

Hydrologic : The hydrologic cycle now includes more frequent and intense droughts and floods in many agricultural regions. These events can damage and at times even destroy crops.

Heat : Over the next 30-50 years, average temperatures will likely increase by at least 1.0 °C. Anticipated regionally-dependent changes include increase number of heat waves and warm nights, a decreasing number of frost days, and a longer growing season in temperate zones.

CO2 : Over the next 30-50 years, CO2 concentrations will increase to about 450 parts per million by volume (ppm). The CO2 response is expected to be higher on C3 species (wheat, rice, and soybeans), which account for more than 95% of world's species than on C4 species (corn and sorghum). C3 weeds have responded well to elevated CO2 levels, symbolizing the potential for increase weed pressure and reduced crop yields.

Crop Biodiversity : The distribution of wild crop relatives, an increasingly important genetic resource for the breeding of crops, will be severely affected leading to fragmentation of the distribution and even extinction.

Economic Consequences : Prices will rise for the most important agricultural crops–rice, wheat, maize, and soybeans. This, in turn, leads to higher feed and therefore meat prices. As a result, climate change will reduce the growth in meat consumption slightly and cause a more substantial fall in cereals consumption, leading to greater food insecurity.

IMPACT OF BIODIVERSITY :

Biodiversity that occurs in both intensively (agriculture, plantation forestry, and aquaculture) and non-intensively (e.g. pastoral lands, native forests, freshwater ecosystems, and oceans) managed ecosystems. It also recognizes the intrinsic values of biodiversity, irrespective of human needs and interest.

Virtually all of Earth's ecosystems have been dramatically transformed through human actions and ecosystems continue to be converted for agricultural and other uses. The current loss of biodiversity and the related changes in the environment are now faster than ever before in human history and there is no sign

of this process slowing down. Many animal and plant populations have declined in numbers, geographical spread, or both. Species extinction is a natural part of Earth's history. Human activity has increased the extinction rate by at least 100 times compared to the natural rate.

Biodiversity is declining rapidly due to factors such as land use change, **climate change**, invasive species, overexploitation, and pollution. Such natural or human-induced factors – referred to as drivers – tend to interact and amplify each other. While changes in biodiversity are more clearly linked to direct drivers such as habitat loss, they are also linked to indirect drivers that are at the root of many changes in ecosystems. The main indirect drivers are changes in **human population, economic activity, and technology, as well as socio-political and cultural factors**.

Changes in climate had significant impacts on biodiversity and ecosystems in certain regions. As climate change will become more severe, the harmful impacts on ecosystem services are expected to outweigh possible benefits, such as a longer growing season, in most regions of the world. Climate change is expected to **exacerbate risks of extinctions, floods, droughts, population declines, and disease outbreaks.**

PRESSURES ON BIODIVERSITY FROM HUAMAN ACTIVITIES :

The earth is subjected to many human- induced and natural pressures, collectively referred to as global change. These include pressures, increased demand for resources; selective exploitation or destruction of species; land-use and land-cover change; the accelerated rate of anthropogenic nitrogen deposition; soil, water, and air pollution; introduction of non native species; diversion of water to intensively managed ecosystems and urban systems. Climate change constitutes an additional pressure on ecosystems, the biodiversity within them.

EFFECT OF CLIMATE CHANGE ON BIODIVERSITY AND AGRICULTURE :

Agriculture and climate change are inextricably linked—crop yield, biodiversity, and water use, as well as soil health are directly affected by a changing climate. The distribution of wild crop relatives, an increasingly important genetic resource for the breeding of crops, will be severely affected leading to fragmentation of the distribution and even extinction.

ECOSYSTEM SERVICES PROVIDED BY AGRICULTURAL BIODIVERSITY :

Agricultural biodiversity provides a number of benefits within production systems. These include benefits associated with production and productivity, agro-ecosystem function, and human well-being,

Thus agricultural biodiversity contributes directly to production and productivity, ecosystem function and human well-being.

THE AGRICULTURAL IMPACTS AND CLIMATE CHANGE

- The net effect of climate change on world agriculture is likely to be negative. Although some regions and crops will benefit, most will not.
- While increases in atmospheric CO2 are projected to stimulate growth and improve water use efficiency in some crop species, climate impacts, particularly heat waves, droughts and flooding, will likely dampen yield potential.
- Indirect climate impacts include increased competition from weeds, expansion of pathogens and insect, pest ranges and seasons, and other alterations in crop agro-ecosystems.

Agricultural biodiversity has never been properly integrated in agricultural adaptation strategies to climate change, which creates a challenge for the future. Enhancing ecosystem services through use of agricultural biodiversity will be crucial, given that it contributes to adaptation, mitigation and resilience.

- **Adaptation :** good management of agricultural biodiversity allows production systems to adapt to changing conditions while maintaining productivity. Enabling the sustainable use of agricultural biodiversity has a huge potential with multiple benefits such as coping with climate change, conserving biodiversity and improving human well-being.
- **Mitigation :** Agricultural soils are important carbon sinks with great potential to mitigate climate change and soil biodiversity plays an important role in soil carbon cycles. Better understanding and management of soils have potential to bring important conservation and use benefits, mitigate climate change, avoid land degradation, and improve water

retention and productivity. Biologically based agricultural systems that require less external energy input could also contribute to mitigating climate change.

- **Resilience :** extreme climate events will increase disturbance of agro-ecosystems, which can be buffered through the sustainable use of agricultural biodiversity.

GENETIC RESOURCES FOR FOOD AND AGRICULTURE :

The IPCC asserts that roughly 20 to 30 percent, varying from 1 percent to 80 percent among regional biotas of species assessed so far (in an unbiased sample), are likely to be at increasingly high risk of extinction as global mean temperature exceed 2 to 3° C above pre-industrial levels. Loss of biodiversity will affect food and agriculture, and may well lead to significant losses of genetic diversity within the species most important for food and agriculture. Genetic resources are the living material that local communities, breeders and researchers use to adapt to changing socio-economic needs and ecological challenges. Maintaining and using a wide basket of genetic diversity at a time of climate change will be an essential insurance policy for the food and agriculture sectors. With climate change, the value of genetic resources for food and agriculture will increase in the near future. Many of these resources will become more threatened, as global climate change will erode genetic diversity and destabilize food ecosystems significantly.

POTENTIAL IMPACTS ON BIODIVERSITY OF ACTIVITIES UNDERTAKEN TO MITIGATE CLIMATE CHANGE

Mitigation is defined as an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases. Actions that reduce net greenhouse gas emissions reduce the projected magnitude and rate of climate change and thereby lessen the pressure on natural and human systems from climate change, providing environmental and socio-economic (including biodiversity) benefits. Some activities have positive or negative impacts on biodiversity, independent of their effect on the climate system.

These activities include, among others, carbon sequestration and emission avoidance from land management activities.

Increased energy efficiency or generation efficiency; increased use of low-carbon or carbon-free energy systems, including biomass energy, solar-, wind-, and hydropower; and biological uptake in the oceans.

Forests, agricultural lands, and other terrestrial ecosystems offer significant carbon sinks mitigation potential through changes in land use (i.e., afforestation and reforestation), avoided deforestation, and agriculture, grazing land, and forest management. The estimated global potential of biological mitigation options is on the order of 100 Gt (cumulative) by the year 2050, equivalent to about 10-20% of projected fossil-fuel emissions during that period. The largest biological potential is projected to be in subtropical and tropical regions.

POTENTIAL IMPACT OF AFFORESTATION, REFORSTATION AND AVOIDED DEFORESTATION ON BIODIVERSITY

The global mitigation potential of post-1990 afforestation, reforestation, and slowing deforestation activities is projected to be 60-87 Gt C on 700 Mha between 1995-2050, with 70% in tropical forests, 25% in temperate forests, and 5% in boreal forests.

Afforestation, reforestation, and avoided deforestation projects with appropriate management, selection criteria, and involvement of local communities can enhance conservation and sustainable use of biodiversity. There are management options to realize the synergies between carbon sequestration and biodiversity, such as adopting longer rotation periods, altering felling unit sizes, altering edge lengths.

POTENTIAL IMPACTS OF REDUCING DEFORESTATION ON BIODIVERSITY

In addition to climate change mitigation benefits, slowing deforestation and / or forest degradation could provide substantial biodiversity benefits. Primary tropical forests contain an estimated 50-70% of all terrestrial species. Tropical forests are currently experiencing significant rates of deforestation of forests which turns to be one of the major causes of global biodiversity loss. They also reduce the availability of habitats and cause local loss of species, population, and genetic diversity. The mitigation potential of slowing rates of tropical deforestation has been estimated to be about 11-21 Gt C over 1995-2050.

Afforestation and reforestation projects can have positive, neutral, or negative impacts on biodiversity depending on the level of biodiversity of the non-forest ecosystem being replaced, the scale being considered (e.g., stand versus landscape), and other design and implementation issues (e.g., non-native versus native species, single versus multiple species). Afforestation and reforestation activities that replace native non-forest ecosystems (e.g., species-rich native grasslands) with non native species, or with a single or few species of any origin, reduce the on-site biodiversity.

Afforestation and reforestation can be neutral, or can increase or benefit biodiversity when replacing a land use that is degraded with regard to biodiversity or promoting the return, survival, and expansion of native plant and animal populations.

Afforestration that results in water use greater than that by the existing vegetation can cause significant reduction of stream flow, which could have a negative impact on in stream, riparian, wetland, and floodplain biodiversity.. Although plantations usually have lower biodiversity than natural forests, they can reduce pressure on natural forests by serving as sources of forest products, thereby leaving greater areas for biodiversity and other environmental services**.** At the site level, plantations can negatively affect biodiversity if they replace species-rich native grassland, wetland, or shrub land habitats, but plantations of non-native forests. or native species can be designed to enhance biodiversity by encouraging the protection or restoration of natural forests.

POTENTIAL IMPACTS OF AGROFORESTRY

Agro forestry activities can sequester carbon and have beneficial effects on biodiversity. Agroforestry (i.e the combination trees with agricultural crops to form complex, multi-species production systems) can increase carbon storage on the land where it replaces areas with only annual crops or degraded land. Where agroforestry replaces native forest, biodiversity is usually lost; however, agroforestry can be used to enhance biodiversity on degraded sites, often resulting from prior deforestation. Agroforestry systems tend to be more biologically diverse than conventional croplands, degraded grasslands or pastures, and the early stages of secondary forest fallows.

POTENTIAL IMPACTS OF CHANGING ENERGY TECHNOLOGIES ON BIODIVERSITY

Mitigation options in the energy sector that may affect biodiversity include increasing the efficient use of fuelwood and charcoal as energy sources; renewable energy sources such as biomass energy; wind-, solar-, and hydropower. Increased efficiency in the generation or use of fossil-fuel-based energy will reduce fossil-fuel use, thereby reducing the biodiversity impacts caused by the mining, extraction, transport, and combustion of fossil fuels.

EFFICIENT WOOD STOVES AND BIOGAS FOR COOKING AND THEIR POTENTIAL IMPACTS ON BIODIVERSITY

Fuelwood conservation measures, such as efficient cook-stoves and biogas, have the potential to reduce pressure on forests and thus conserve biodiversity. Fuelwood in many regions is traditionally the dominant biomass extracted from forests, with significant implications for biodiversity. The fuelwood used from forests is largely for subsistence activities such as cooking and can be reduced substantially through improved wood- burning stoves and more efficient charcoal-making technology.Wood is also used to generate charcoal for industrial applications. Fuelwood and charcoal consumption in tropical countries is estimated to increase from 1.3 billion m3 (0.33 Gt C yr-1) in the year 1991 to 3.4 billion m3 (0.85 Gt C yr-1) by the year 2050. Biogas derived from anaerobic decomposition of crop waste and cattle dung can be a potential substitute for fuelwood at the household or community levels.

POTENTIAL IMPACTS OF INCREASED USE OF BIOMASS ENERGY

The potential mitigation and socio-economic benefits of modern bioenergy technologies are large, but without appropriate site selection and management practices biodiversity could be threatened**.** Biomass energy from plantations and use of residues and thinning of existing forests could reduce CO2 emissions by displacing the use of fossil fuels. Positive environmental impacts can include reduced emission of atmospheric pollutants, reclamation of degraded land, and potentially a reduction of pressure on forests to the extent that fuelwood derived from such sources is replaced by other energy sources.

Agricultural intensification practices that enhance production and the input of plant-derived residues to soil include crop rotations, reduced bare fallow, use of cover crops, high-yielding varieties, integrated pest management, adequate fertilization, organic amendments, irrigation, water table management, and site-specific management. These have numerous ancillary benefits including an increase in food production, erosion control, water conservation, improved water quality, and reduced siltation of reservoirs and waterways benefiting fisheries and biodiversity. However, soil and water quality is adversely affected by indiscriminate use of chemical inputs and irrigation water, and the increased use of nitrogen fertilizers will increase fossil energy use and may increase N2O emissions.

Erosion control practices which include water conservation structures, vegetative strips used as filter strips for riparian zone management, and shelterbelts for wind erosion control can reduce the global quantity of soil organic carbon displaced by soil erosion, which has been estimated to be in the range of 0.5 Gt C yr-1. There are numerous ancillary benefits and associated impacts, including increased productivity, improved water quality, reduced use of fertilizers (especially nitrates), decreased siltation of waterways, reduced CH4 emissions, associated reductions in risks of flooding, and increased biodiversity in aquatic systems, shelter belts, and riparian zones.

POTENTIAL IMPACTS OF HYDROPOWER

Large-scale hydropower development can have high environmental and social costs such as loss of biodiversity and land, generation of CH4 from flooded vegetation, and displacement of local communities. Hydropower could make a substantial contribution to reducing the greenhouse gas intensity of energy production. Currently, ~19% of the world's electricity is produced from hydropower. Greenhouse gas emissions from most hydropower projects are relatively low, with the one of the social and environmental implications of hydropower developments dam reservoirs result in loss of land, which may result in loss of local terrestrial biodiversity, and dams may prevent fish migration (which is an essential part of life cycle of some fish species) and stop water flow, as well as reduce aquatic and terrestrial biodiversity as a result of changing the timing, flow, flood pulse, and oxygen and sediment content of water. Disturbing aquatic ecosystems

can increase pathogens and their intermediate hosts may lead to an increase in human diseases such as malaria, *Schistosomiasis*, *Filariasis*, and yellow fever. Small- and micro-scale hydroelectric schemes normally have low environmental impacts.

ADAPTATION ACTIVITIES AND BIODIVERSITY

Climate change is occurring and it has been observed to affect ecosystems and their biodiversity. This means mitigation options alone are not adequate to avoid impacts of climate change. Thus, adaptation activities (projects and policies) specifically designed to reduce the impact of climate change have to be considered along with mitigation options. Adaptation options can be applied to both intensively and non-intensively managed ecosystems. Adaptation activities can have adverse or beneficial impacts on biodiversity.

POTENTIAL ADAPTATION OPTIONS TO ALLEVIATE CLIMATE CHANGE IMPACTS ON ECOSYSTEMS AND BIODIVERSITY

Appropriate monitoring systems will help detect potential trends in changes in biodiversity and help to plan adaptive management. In conservation planning, it may be necessary to realize that certain genotypes, species, and ecosystems could no longer be conserved in a particular area or region due to the impacts of climate change, thus efforts should be directed towards actions to increase the resiliency of biodiversity for future climate change, including:

Captive breeding for animals, ex situ conservation for plants, and translocation programs can be used to augment or reestablish some threatened or sensitive species. Captive breeding and translocation, when combined with habitat restoration, may be successful in preventing the extinction of small numbers of key selected taxa under small to moderate climate change. Captive breeding for reintroduction and translocation is likely to be less successful if climate change is more dramatic as such change could result in large-scale modifications of environmental conditions, including the loss or significant alteration of existing habitat over some or all of a species' range.

Some natural pest control, pollination, and seed dispersal services provided by wildlife can be replaced, but the alternatives may be costly. There are

many examples of species introduced to provide ecosystem services such as soil stabilization, pollination, or pest control. Loss of natural biological control species could also be compensated by the use of pesticides and herbicides. While replacing these services may sometimes be technically possible, could also be costly and lead to other problems. For example, introduction of a pollinator or a pest control may itself result in a pest, and use of pesticides may cause soil and water pollution. In other cases, such as biogeochemical cycling, such services would be very difficult to replace.

Greater use of pesticides and herbicides in response to new pest species may lead to damage to existing plant and animal communities, to water quality, and to human health. Climate hange could affect many of these systems by decoupling predators from their prey and parasites from their hosts. If new pest outbreaks are countered with increased pesticide use, non-target species might have to endure both climate- and contaminant-linked stressors. In addition, non-target species could include natural predators of other pests thus creating more problems.

Areas allocated to conserve biodiversity represent long-term stores of carbon. Maintenance of biodiversity leads to the protection of a larger gene pool from which new genotypes of both domesticated and wild species adapted to changed climatic and environmental conditions can arise**.** Conservation reserves can contribute to the maintenance of a diverse gene pool, but there are also significant contributions from native species growing among agricultural land or in pastures.

HOW CAN AGRICULTURE ADAPT?

Adaptation strategies are short and long-term changes to human activities that respond to the effects of changes in climate. In agriculture, adaptation will require cost-effective investments in water infrastructure, emergency preparation for and response to extreme weather events, development of resilient crop varieties that tolerate temperature and precipitation stresses, and new or improved land use and management practices.

TOOLS FOR ADAPTATION :

- Crop breeding for development of new climate tolerant crop varieties is a key tool for adapting agriculture to a changing climate. History and

current breeding experience indicate that natural biodiversity within crops has allowed for plant adaptation to different conditions, providing clear evidence that plant breeding has great potential to aide in the adaptation of crops to climate change.

- Cropping system development is another tool that can help agriculture adapt. For example the use of crop mixtures that have several crops growing at one time can help systems exhibit greater durability during periods of high water or heat stress.

SUGGESTIONS FOR FUTURE ACTION :

- Analyze the effects of climate change, in particular in centers of origin and diversification of genetic resources of relevance to food and agriculture, to inform national conservation strategies.
- Improve monitoring methods of genetic resources being managed *in situ*, to increase understanding of threats and vulnerability due to climate change.
- Promote the collection and *ex situ* conservation of genetic resources for food and agriculture most threatened by climate change, and most potentially useful in adaptation.
- Develop robust programmes and strategies for sustainable use of genetic resources for food and agriculture, so that breeders, farmers and rural communities can have available a wide range of genetic diversity to adapt to climate change.
- Support farmers to continue developing locally adapted genotypes through on-farm management.
- Improve rehabilitation strategies after climate-change related disasters to ensure that locally adapted genotypes are re-introduced.
- Integrate climate change dimensions into the relevant international policies and programmes for the conservation and sustainable use of genetic resources for food and agriculture, and the fair and equitable sharing of the benefits arising out of their use.

- Strengthen international cooperation to build capacities in developing countries to conserve and sustainably use genetic resources for food and agriculture to respond to climate change.

Adaption to climate change requires both short and long term strategies. In short term, we must make use of the available knowledge base to formulate and implement crop contingency plans for aberrant weather conditions. In the long term, however, strategic research on development of drought and heat tolerant crop varieties, livestock breeds that sustain heat stress are required. Prudent land and water management practices contribute to both adaptation and mitigation. Adaptation strategies can be crop based which include new crop varieties with short duration, heat tolerance, that benefit from elevated CO2 and changed cropping patterns and crop calenders. Resource management through weather insurance also plays an important role in adapting to climate change. Besides technology, strengthening of local institutions and a suitable policy framework are required to adapt Indian agriculture to the current and future climate variability.

IMPACT OF CLIMATE CHANGE ON HUMAN HEALTH :

Climate change will have various health impacts: Those that are relatively direct usually caused by weather extremes, and indirectly through changes in the ranges of disease vectors (e.g., mosquitoes), water-borne pathogens, water quality, air quality, and food availability and quality.

The health consequences of various processes of environmental changes and ecological disruption that occur in response to climate change and the diverse health consequences traumatic, infectious have impacted human health. The actual health impacts will be strongly influenced by local environmental conditions and socio-economic circumstances, and by the range of threats to health.

Those most at risk of being harmed by thermal extremes include socially isolated city dwellers, the elderly and the poor. Populations living at the present margins of malaria and dengue, without effective primary health care, will be the most susceptible if these diseases expand their geographic range in a warmer world. The extent and nature of climate change impacts on human health vary by region, by society’s ability to adapt to or cope with the change. The quality of medical care and public health may lessen climate impacts on human health.

It is essential to understand the significance and scale of impact of climate change on human health and methods to deal with it at individual level and national level. Proactive health adaptation strategies are needed to protect the world's most vulnerable people from the effects of climate change on human health and well-being.

Public health planning and decision making need to shift from only focusing on relatively short term risks to the projected long term impacts of climate change. It will be increasingly important to address the links between climate and health at different time scales. Already today we need to be better at dealing with climate variability and its related health effects. Improving our capacity to prepare and respond, through using for example early warning systems and seasonal forecasts, will allow us to be better positioned to address the challenges that climate change will bring. Long-term climate projections will be increasingly important to ensure that we are prepared for risks changing over time when planning resource allocation, building infrastructure and ensuring that surveillance systems are able to detect changing patterns of disease. Population health often depends on activities in other sectors. To ensure that the health effects of climate change are not overlooked, the health sector needs improved integration into strategic planning in sectors such as water, agriculture and disaster management. This includes safe-guarding the integration of health concerns into for example National Adaptation Programmes of Action. Reducing vulnerabilities and increasing resilience in general will help populations cope with the health effects of climate change. This includes strengthening health systems and ensuring adequate water and sanitation facilities for all.

EFFECTS OF CLIMATE CHANGE ON TEMPERATURE, PRECIPITATION AND WIND SPEED :

Climate change is expected to increase global average temperatures, as well as the number and intensity of heat waves. Climate change is also predicted to result in changes in precipitation patterns, with more pronounced extremes such as flooding or drought expected. Furthermore, *mean* annual precipitation is expected to change, with some areas seeing an increase, whereas other areas seeing a decrease. Precipitation may increase in one season and decrease in another. Flows

in rivers may change in areas where rivers are fed by snowmelt or glaciers Climate variability and climate change are however not the only drivers of water availability but is determined by other drivers such as population growth and industrialisation. Tropical cyclones (typhoons and hurricanes) are predicted to become more intense with larger peak wind speed and more heavy precipitation. Changes in average climate, seasonal patterns and an increase in the number and intensity of extreme events can all influence human health.

EXTREME EVENTS - EFFECTS ON HEALTH AND HOW TO ADAPT :

An increase in the frequency and intensity of extremes of temperature, precipitation and wind speed have clear implications for mortality and morbidity. Flooding and storms increase the risk of deaths and non-fatal injuries. Mental health effects such as depression and anxiety after extreme events have been reported and may result in prolonged impairment. In addition to these effects, flooding has implications for other health effects such as diarrhoeal disease risk and the risk of outbreaks of vector borne diseases. To deal with the health effects of extreme events, the health sector must be engaged in disaster preparedness activities at all levels; international, regional, national, local and community. Better use should be made of existing early warning information on all time scales and new, easily accessible tools must be developed. Early warning systems must be coupled with plans of action – incorporating both disaster management and health expertise. This is an area where national and local government, humanitarian organisations as well as national and regional meteorological institutes should all play a role, down to the community level. Short-term weather forecasts and seasonal forecasts should be used to plan for the coming weeks and season ahead.

DIRECT EFFECTS OF HEAT EXPOSURE :

Climate change is expected to increase average temperatures as well as the number and intensity of heatwaves. Heatwaves are associated with increases in morbidity and mortality in the short term, especially in populations who are not adapted to extremely hot weather. Specific risk groups include not only persons with respiratory and cardiovascular disorders and the elderly, but also physically and mentally handicapped and other groups that are not capable of caring for them-

selves during an extreme event are at risk. The 2003 summer heatwave in Europe showed that even high-income countries are vulnerable to extreme weather events and although many deaths occurred among the elderly and ill, some of these deaths were associated with occupational exposure. The severity of the heatwave and the underlying health status of the population influences what proportion of the mortality that is due to short-term mortality displacement. In south Asia, heatwaves have been associated with high mortality in rural populations as well as among the elderly and labourers who work outdoors. Hot working environments also have non-fatal implications. Heat exposure increases the risk of having accidents.

With regards to longer-term planning, the risk of an increased frequency and intensity of heatwaves and higher average temperatures should be taken into account during the design of homes and work environments. Urban areas tend to have higher temperatures during hot weather, and this urban 'heat island' effect should be taken into account for future city planning. The adverse effects of occupational exposure to heatwaves and high average temperatures may have implications for labour regulations. Interventions such as reducing direct sun exposure for workers can be made.

DIARRHOEAL DISEASES :

High temperatures, water scarcity and water abundance resulting from flooding or heavy precipitation have been shown to be related to diarrhoeal diseases. After a flood-event, rates of diarrhoeal disease, including cholera, may increase, especially in areas where sanitation facilities are poor. Heavy rainfall, even without flooding, may increase rates of diarrhoeal disease as latrines or sewage systems overflow. Increases in soil run-off may contaminate water sources. With heavy precipitation events expected to become more common, rates of diarrhoeal diseases may increase and it is likely that the most vulnerable populations will suffer the greatest burden. Water scarcity on the other hand is also likely to have consequences for public health. A lack of availability of water for personal hygiene and washing of food may lead to an increase in diarrhoeal disease and other diseases associated with poor hygiene.

Cholera outbreaks in coastal areas of Bangladesh have furthermore been linked with sea surface temperature and abundance of plankton, which are thought to be an environmental reservoir for the cholera pathogen.

VECTOR-BORNE DISEASES :

The geographical and temporal distributions as well as the incidence of many vector borne diseases such as malaria and dengue are sensitive to temperature and rainfall. The vector itself, or the pathogen (virus, bacteria) replication rates can be sensitive to temperature. Changes in precipitation patterns can alter the number of breeding sites available or the way people store water – again creating breeding sites. Climate factors may however not be equally important determinants of disease rates in all regions.

HEALTH EFFECTS OF AIR QUALITY :

The formation of many air-pollutants is determined in part by climate factors such as temperature and humidity. In addition the transport and dispersion of air pollutants away from source regions are strongly affected by weather factors. Climate change may therefore influence pollutant concentrations, which in turn may affect health as air pollution is related to cardio-respiratory health. Exposure to high levels of ground-level ozone, for example, which is formed from the exhaust of transport vehicles, increases the risk of exacerbations of respiratory diseases such as chronic obstructive airways disease and asthma, leading to hospital admissions or increased mortality. The number of forest and bush fires may increase as certain regions face longer periods of extreme dry conditions and such fires can contribute to air-pollution.

FOOD SECURITY AND MALNUTRITION :

The relationships between climate change and food security are complex and climate is seldom the only factor at play. High temperatures, lack of rain or low river flows can put harvests at risk. Salinization of agricultural land due to sea levels rise can decrease yields and flood events or heavy rainfall can also destroy harvests. These effects of climate change together with other factors can have consequences for food security. As rates of malnutrition increase, populations may also become more susceptible to other diseases. Climate change is in this way affecting the underlying vulnerability of populations to other effects of climate change. Climate stress may play a part in population movement, including rural to urban migration. Population displacement carries its own health risks, including malnutrition and increased

risks of communicable diseases46. Vector borne diseases can spread as people from an affected area move into new areas. If non-immune populations enter an endemic area they are at higher risk of being infected and can contribute to the spread of disease.

HEALTH EFFECTS OF ADAPTATION ACTIVITIES :

Activities carried out in order to adapt to climate change can in some cases lead to additional health risks. Examples include the construction of dams for water storage, which may provide breeding sites for disease-transmitting mosquitoes. Irrigation of land currently contributes to the spread of malaria and schistosomiasis. The practice of using wastewater for agricultural irrigation may also become increasingly common in times of water scarcity, leading to increased risks of diarrhoeal diseases and intestinal worms for populations living in close proximity to irrigated land54. These risks highlight the need for an integrated risk assessment during the development of new policies at national level or local level, taking into account the possible health effects and how to reduce these risks. However, it is likely that many such practices will take place informally in rural or peri-urban settlements so that national regulations may not be as effective.

Climate change is likely to disproportionately affect the most vulnerable in both high and low income countries and special attention should be paid to these populations both when we think about doing more of the same as well as doing things differently.

SUMMARY :

Over the last hundred years or so, the instrumental temperature record has shown a trend in climate of increased global mean temperature, i.e., global warming. Other observed changes include arctic shrinkage, Arctic methane release, releases of terrestrial carbon from permafrost regions and Arctic methane release in coastal sediments, and sea level rise. Global average temperature is predicted to increase over this century, with a probable increase in frequency of some extreme weather events, and changes in rainfall patterns. Moving from global to regional scales, there is increased uncertainity over how climate will change.

STRATEGIES TO CONTROL THE EFFECT OF CLIMATE CHANGE :

1) Emphasis on energy conservation
2) Promotion of renewable energy sources.
3) Abatement of air pollution.
4) Afforestation and waste land development.
5) Economic reforms, subsidy removal and joint ventures in capitor goods.
6) Fuel substitution policies.

Technology transfer can speed up the modernization process and additional funds can accelerate Govt. initiatives in energy conservation. However policies for poverty alleviation must take priority. It is well known that saving in Green House Gases emissions by the poor should not be the expense of development. Encouragement to conservation and good practices would result in lower emissions leads to stable rainfall patterns which will not affect the poor people and their productivity.

98th Indian Science Congress

January 3-7, 2011, Chennai

II

ABSTRACTS OF PLATINUM JUBILEE LECTURE

PLATINUM JUBILEE LECTURE

Biodiversity prospecting for Prevention, Abatement and Control of Pollution through Bioremediation

G. V. Subrahmanyam

Ministry of Environment and Forests,
Paryavaran Bhavan, C.G.O.Complex
Lodi road, New Delhi-110 003
E. mail : sv.godavarthi@nic.in

Increased population, industrialization and urbanization are responsible for environmental contamination. Environmental decontamination is an enigma. However, advances in science and technology, enabled us to apply the potential of biological diversity for pollution abatement which is termed as Bioremediation. This is emerging as an effective innovative technology for treatment of a wide variety of contaminants. This technology includes, phytoremediation (plants) and rhizoremediation (plant and microbe interaction). Rhizoremediation, which is the most evolved process of bioremediation, involves the removal of specific contaminants from contaminated sites by mutual interaction of plant roots and suitable microbial flora.

Bioremediation is an invaluable tool box for wider application in the realm of environmental protection. Bioremediation approach is currently applied to contain contaminants in soil, groundwater, surface water, or sediments including air. These technologies have become attractive alternatives to conventional cleanup technologies due to relatively low capital costs and the inherently aesthetic nature. The vital functions mediated by biodiversity are: phytosequestration, rhizodegradation, phytohydraulics, phytoextraction, phytodegrada-tion, and phytovolatilization.

The scope of environmental bioremediation extends to: Inorganics viz., Arsenic, Mercury, Chromium, Fluoride, Cyanide, abandoned mines, fly ash disposed sites, engineered phytotreatment technologies, biological permeable barriers; and Organics viz., petroleum hydrocarbons, pesticides explosives.

Mining industries release a variety of waste including abandoned mines and drill cuttings and fluids of fossil fuel exploration. All these constitute as hazardous

waste and pose potential public health or environmental risk. Environmental rehabilitation of abandoned mines in India can be carried out in 4 phases i) Inventory and local surveys, hierarchization process, definition f characteristic ypes and Planning, ii) Master /action plans, iii) Rehabilitation works and monitoring effluent reatment systems and iv) Legislation frame work for environmental rehabilitation of abandoned mines and maintenance and long term monitoring.

Quite a variety of plants, natural, transgenic, and/or associated with rhizosphere micro-organisms are extraordinarily active in these biological interventions and cleaning up pollutants by removing or immobilizing them. While diverse microbes are the most active agents, fungi and their strong oxidative enzymes are key players in degrading /decontamination. recalcitrant polymers and xenobiotic chemicals as well. Constructed wetlands are the result of human skill and technology integrating the geology, hydrology and biology. People have built and operated constructed wetlands to treat wastewater since ancient times.

The proactive role of MoEF and industries for implementing bioremediation and envisaged action plan are also discussed.

98th Indian Science Congress

January 3-7, 2011, Chennai

III

ABSTRACTS OF YOUNG SCIENTIST AWARD PROGRAMME

YOUNG SCIENTIST AWARD LECTURE

Role of Benthic Foraminifera in Marine Pollution Monitoring : Laboratory Culture experiments with Mercury (Hg) and Cadmium (Cd)

Linshy V. N.

National Institute of Oceanography, Dona Paula,
Goa-403 004 India
E-mail : linshy@gmail.com, linshy@nio.org

The responses of benthic foraminifera *Rosalina leei* and *Pararotalia nipponica* to heavy metals mercury and cadmium respectively is observed in laboratory experiments. The results indicate that under given set of conditions, both mercury and cadmium are deleterious to benthic foraminifera. Gradual increase in mercury concentration mainly affected normal growth and caused morphological abnormalities at higher concentrations. During sudden exposure to mercury, more number of specimens had deformed tests and also reproduction was abnormal. In case of cadmium, the morphological deformation was consistent from 4 µg/l to 14 µg/l of cadmium, but the intensity of deformation was severe exhibiting a peculiar change in coiling direction with increase in cadmium concentration.

98th Indian Science Congress

January 3-7, 2011, Chennai (Kattankulathur)

IV

ABSTRACTS OF SYMPOSIUM/INVITED LECTURE

PROCEEDINGS
OF THE
NINETY EIGHTH SESSION OF THE
INDIAN SCIENCE CONGRESS

CHENNAI, 2011

PART II (Abstracts of Symposium/Invited Lecture)

SECTION OF
ENVIRONMENTAL SCIENCES

President : **Dr. G. Bagyanarayana**

INVITED LECTURES

1. Co-processing of Wastes in Cement Kiln"/Thermal Power Plants/ Integrated Iron and Steel Plants

S. P. Gautam
Chairman, Central Pollution Control Board,
Parivesh Bhawan, East Arjun agar,
Delhi-110032
Email : ccb.cpcb@nic.in

Keywords : *Central Pollution Control Board (CPCB), Co-processing, Cement kiln, Hazardous waste, Hazardous waste Rules.*

In conjunction with the UN Commission on sustainable development under the programmes on sustainable consumption and production patterns, the strategy

adopted for hazardous waste management in the country stipulates the hierarchy of Reduce, Reuse, Recycle and Recover ahead of ultimate disposal. In tandem with this approach, the Hazardous wastes (Management, Handling & Trans-boundary Movement) Rules, 2008 provided for a specific section i.e. Rule 11 dedicated to utilization of hazardous wastes. The hazardous incinerable waste has vast potential to be used as a supplementary resource or for energy gradient recovery on co-processing.

By integrating co-processing and treatment of wastes in energy and resource intensive industry, India can forego or significantly reduce investments in costly waste incinerators; save large amounts of non-renewable fossil fuels and raw materials; reduce green house gas emissions; increase its waste treatment capacity and reduce impacts of hazardous chemicals. reduction in new hot spot generation and reduction in landfill requirement.

Millions of tons of municipal, industrial and 6.2 million tons of hazardous wastes including 0.41 MT of incinerable wastes are generated annually in India but only 12 states have 27 hazardous waste treatment, storage and disposal facilities (TSDFs) in operation. Major waste generating states are Maharashtra, Gujarat, Andhra Pradesh, West Bengal, Madhya Pradesh, Rajasthan and Tamil Nadu. The disposal of such waste in common and captive incinerators leads to the loss of vital resource besides potential to cause severe environmental risks if not operated in an environmentally sound manner.

In global scenario for last 25 years USA, Switzerland, Germany, France and Norway use 32% to 52% of such alternate fuel out of total fuel requirement in cement industries.

Induction of co-processing also started in 2005 in India, however restricted in cement industries. Trial included various sludge, Tar, Tyre chips solid waste mix, liquid waste mix of various range grinding muck, spent carbon, oily rags, resin, n-Butanol salt, grinding dust, plastic waste and select municipal solid waste.

The cement industry has been successful in utilizing industrial inorganic waste materials like flyash from coal-fired thermal power stations, granulated slag's from blast furnace production of pig iron (approx. 30 million tonnes fly ash and nearly 8.5 million tonnes of granulated slag are used annually) but have not much

experience of using alternate fuels derived from waste or hazardous waste materials. The main focus uptill now has been to use Petcoke, a solid by-product from oil refineries containing percentage levels of sulphur; approx. 2.3 million tons of Petcoke have been used per year.

The big amount of pollution of distillery spent wash which contains high organic content and dissolved inorganic solids requires high care disposal and monitoring as it caused damage to the environment, can also be co-processed. Land disposal of spent wash by bio-composting to harness fertilizer attribute has been throughout a contentious issue as it contaminate both the ground water and surface water sources.

Despite co-processing having inherent advantages, a careful approach is called for in view of hazardous nature of substances also being handled. The hazardous waste for co-processing need to be handled in an environmentally safe manner avoiding the possibilities of contaminating the nearby environment and eliminate the chances of accidents leading to environmental catastrophe. However The country, has potential to utilize entire hazardous waste generated, if found suitable otherwise, for co-processing can also be co-processing in the Cement industry. Guidelines on-processing in cement industry have been published by CPCB in February 2010. The data is being generated for preparing the guidelines for thermal power and for other furnaces as coke oven and steel etc.

Strict compliance of National Ambient Air quality standards should be observed.the economy of co-processing also favours it as compared to incinerators.

The cost of processing incinerator would depend on its capacity ranging from Rs. 10 crores to 30 cores. Assuming disposal cost of incinerable hazardous waste is about Rs. 16,000/- per MT, it may roughly be estimated that additionally about Rs. 640 cores pr annum would be incurred in incinerating hazardous waste in our country. Besides, incinerator if not operated optimally may contribute to emission including toxic Dioxins and Furans. This coupled with resource conservation and reduced carbon emissions make a strong case for considering co-processing as a sound and better alternative for hazardous waste disposal in general and incinerable waste in particular.

2. Antarctic and the Climate Change

Prem Chand Pandey

Centre for Oceans,
Rivers Atmosphere and land Sciences (CORAL)
Indian Institute of echnology,
Kharagpur-721302
Email : pcpandey@coral.iitkgp.ernet.in.

Antarctica is a critical component of our climate system. The climate and the other properties of Antarctica are linked with rest of the world through the oceanic and atmospheric circulation. The Numerical experiment with global climate models have shown much larger warming of the Polar Regions compared with the rest of the world on account of increasing carbon dioxide and other green house gases as such The Antarctic continent is a sensitive indicator of the global climate change. The Antarctic Peninsular regions have experienced a warming of about 3 degree centigrade during the last fifty years which is the highest in the world. The southern ocean has already shown warming compared with the rest of the world's ocean. The ice shelves are breaking and the populations of the Penguins surviving on the ice shelf and sea ice are decreasing and the penguins from the sub tropical regions are showing an increase. There has been freshening of the Ross sea iceshelf ie salinity has decreased due to melting. These are some of the indicators of the climate change as evidenced in Antarctica.

In addition, Antarctic ice core provides the information of the past climate, the Green House Gases, solar activity and also about the circulation pattern. Satellites have provided information about the sea ice which is expanding due to Antarctic Ozone hole as proposed by John Turner whereas in Arctic it is decreasing. A large chunk of glacier ice has recently broken off the western side of the Greenland ice sheet. Studying the Polar Regions and incorporating the various processes in the global climate models may probably improve the climate predictions.

3. Biological control of weeds using hemibiotrophic fungal pathogens—A novel ecofriendly strategy to save environmental pollution in agro ecosystem

K. R. Aneja

Department of Microbiology, Kurukshetra University,
Kurukshetra-136119 (Haryana)

Herbicides, the chemicals used to check weeds, have played a vital role in improving crop yields and overall production efficiency but over reliance and repetitive use of herbicides belonging to the same, to development of herbicide resistant weed biotypes. Exploitation of microorganisms, especially plant pathogenic fungi, to control weeds is now emerging as an effective and ecofriendly alternative to toxic herbicides used for weed management. The biological control of weeds by fungal plant pathogens has gained acceptance as a practical, safe, and environmentally beneficial method applicable to agro-ecosystem. When the organism used in the formulation is a fungus, the product is termed a 'mycoherbicide'. Many potential mycoherbicidal pathogens have been found to be hemibiotrophs, i.e., the organisms having an initial biotropic phase followed by a necrotrophic phase. *Colletotrichum* spp. have both these characteristics, hence are commonly found on lists of promising mycoherbicides. Internationally, 15 mycoherbicides have been developed to control notorious weeds. The advancement of formulation techniques is of paramount importance to the continued development of mycoherbicides. It is also essential to continue intensive screening programs for the selection of virulent pathogens, especially hemibiotrophs, if mycoherbicides are to become a viable component of integrated weed management in the future. The pace of development in the area of commercialization of mycoherbicides is still slow because of an array of biological, economic and regulatory constraints. The present paper deals with the notable examples of weeds resistant to herbicides, advantages of mycoherbicidal approach, status of various mycoherbicides that have been commercialized and others which are in the process of commercialization, the constraints in the development of mycoherbicides and the ideal characteristics of *Gibbago trianthemae,* a phaeodictyo conidial monotyphic fungus, isolated form horse purslane from Kurukshetra, a potential candidate for developing it into a mycoherbicide, especially in India.

4. Soil and Water Efficiency Enhancing Phytotechnologies (SWEEP) for Remediation-Energy-Health and Sustainability

M. N. V. Prasad

Department of Plant Science, University of Hyderabad,
Prof. C.R. Rao Road, Gachhibowli, Central University,
P.O. Hyderabad-500 046
prasad_mnv@yahoo.com.

Ambient air monitoring of particulate matter (PM_1, $PM_{2.5}$, and PM_{10} and SPM) were monitored at residential areas of National Capital Region (NCR), India. Lung functions like Peak Expiratory Flow Rate (PEFR) and Forced Expiratory Volume (FEV_1) in one hundred and sixty one residents of NCR were assessed to determine the effect of particulate matter pollutants on lung function indices. The different levels of particulate matter in ambient air and its consequences leading to reduced lung functions among residents are discussed in the paper. PEFR and FEV_1 showed decline trend among residents for increase in PM_1, $PM_{2.5}$, PM_{10} and SPM above National Ambient Air Quality Standard (NAAQS).The study indicates the association of lung function indices with particulate matter pollutants.

5. Health & Environment

Malay Chatterjee

Dept. of Pharmaceutical Technology,
Jadavpur University, Kolkata.
mcbiochem@yahoo.com

The detoriation of environmental quality has existed as a serious problem under the ever increasing impact of exponentially growing population and of industrializing societies. Environmental contaminations of air, water, soil, food threatens the very survival of the human race. Critical assessment of the life-style factor, its interaction with the gene and background information important to their responsibility is needed to prevent the genomic instability associated with various DNA-mediated diseases. Assured awareness and critical assessment of the key environmental issues and pollutants entails a holistic treatment.

This article addresses how the hazards in the environment affects our health, assess environmental health careers and empower environmental justice.

6. Microbes in Hyper saline Environments - an Overview

C. Manoharachary
Dept. of Botany, Osmania University,
Hyderabad-500007, A.P.

Keywords : *Halophiles, ecology, biotechnology, Halomonas*

The *Halomonas* is a genus of extremely versatile gram negative halophilic bacteria requiring high NaCl for their growth. It is now known to be widely distributed in nature. Recently 16s rRNA sequencing has been done to elucidate the phylogenetic position of halophytic bacteria. Much data has been added for anaerobic life in hyper saline environments. Though much literature is available on the physiology and biochemistry of halophytic bacteria, our understanding of their ecology is meager. These halophiles also exhibit high activity of photosynthesis, dissimilatory sulfate reduction and other microbial processes. Intensive studies have been done on Dead Sea, a terminal lake at the border between Israel and Jordan. These halophytes live at high salt concentration to maintain cytoplasm. Thus Archaea, Bacteria, Eukarya are able to withstand the stress exerted by salt concentration up to halite saturation exhibit a large metabolic diversity that empowers hypersaline ecosystems to function. Aspects and prospects of halophytes under Indian situation will be discussed.

7. Green House Gas Emission from Agriculture and Climate Change

K. K. Baruah, Leena Borah and Manoshi Goswami
Department of Environmental Science,
Tezpur Central University
Tezpur-784028, Assam

Keywords : *Agriculture, climate change, methane, nitrous oxide, rice, wheat.*

Agriculture and climate change are coherently linked with each other and shares a two- way relationship. While agriculture is a climate dependant process by itself, it also has profound influence on climate by contributing towards greenhouse gas emission. In this paper, attempt has been made to discuss

agricultural sector as the source of emission of two important green house gases, methane (CH_4) and nitrous oxide (N_2O).Wetland rice cultivation is the major source of CH_4 emission while rainfed upland rice and wheat agriculture are the major contributor of N_2O emission. Various soil factors such as soil moisture content, soil organic carbon, soil temperature, pH and redox potential along with plant factors like variety, root biomass, shoot biomass, photosynthetic rate, stomatal frequency, area of the medullary cavity as well as carbon partitioning influence the production and emission of CH_4 and N_2O from agricultural soils. Selection of suitable varieties offers an important option for mitigation of both these gases. The seasonal integrated CH_4 and N_2O emission (Esif) from rice ranges from 8.13 g m^{-2} to 13.00 g m^{-2} and 121.63 mg N_2O-N m^{-2} to 189.46 mg N_2O-N m^{-2}, respectively. Various potential mitigation techniques for reducing N_2O emission are also discussed in this paper which includes C: N ratio management of organic residues, biological nitrification inhibition and varietal selection.

8. Environmental Impacts of Nutrient Recycling and Adaptation Strategies For Integrated Nutrient Management in Terms of Climate Change

Dr. K. Jeevan Rao

Department of Soil Science & Agricultural Chemistry,
College of Agriculture, Acharya N G Ranga,
Agricultural University, Rajendranagar,
Hyderabad-30
Email : kjeevanrao@yahoo.co.in

Food grain production in India has made a quantum jump from a mere 50.8 million tonnes in1950-51 to above 217 million tonnes by 2006-07 was further broken with an estimated harvest of about 227 million tons in 2007-08.. This was made possible by the introduction of dwarf wheats in 1968, which set in the “Green Revolution”. A parallel increase in the consumption of fertilizers from 69.8 thousand tonnes in 1950 to 23.01 million tonnes ($N + P_2O_5 + K_2O$) was witnessed by 2007-08. In spite of serious efforts made in recent years to produce more, sustainability

in agricultural production is remaining still as a goal to be achieved. The share of agriculture in the national GDP and in the employment has reduced from nearly 51% and 72% to 18% and 52% respectively during 1951-2008 owing to expansion of industrial and service sectors. The ratio of agricultural land to population is almost 0.3 hectare/person in India as compared to over 11 hectare/person in the developed countries. With a global share of 2.3% of land, 4.2% of water and 17 % of population, the per capita availability of resources in India is 4-6 times less than the world average.

Recent reports of the Inter-Governmental Panel on Climate Change (IPCC) indicate considerable probability of loss in crop production due to climatic factors in tropical regions. Indian studies also confirmed these findings. Increasing temperature in future is likely to reduce fertilizer use efficiency and lead to higher emissions of greenhouse gases (GHG). Since agriculture is one of the major sources of GHGs, this could become a cause for concern. Global warming is also projected to increase water, shelter, and energy requirement of livestock, and to affect fish breeding, migration, and harvests. Unless we put far greater efforts, climatic factors would bring additional stress on our food security in near future. Greater attention is needed on adaptations to climatic change and mitigation of GHG emissions from agriculture.

Nutrients in an ecosystem recycle through soil organisms, plants, and grazing livestock. Appropriate management can enhance the nutrient cycle, increase productivity, and reduce costs. Rising levels of gases in the Earth's atmosphere have the potential to cause changes in our climate. Some of these emission increases can be traced directly to organic wastes. The disposal and treatment of waste can produce emissions of several greenhouse gases (GHGs), which contribute to global climate change. The most significant GHG gas produced from waste is methane. It is released during the breakdown of organic matter in landfills. Other forms of waste disposal also produce GHGs but these are mainly in the form of carbon dioxide. The annual contribution to global methane budget from Indian rice paddies is less than 4 Tg and not 37 Tg as was propagated by the western agencies. CO_2 equivalent emissions from agriculture have also been quantified. These estimates helped Indian policy makers greatly in their negotiations on global climate change. The possible strategies for mitigating methane and nitrous oxide emissions from agriculture have also been identified, discussed and presented.

9. Combat Global Warming with Green Cover-Green Power-Green Tech

Eub Reddi

Chairman, Board of Studies,
Department of Environmental Sciences,
Andhra University, Visakhapatnam

In the pursuit of developing new comforts and luxuries, the greedy and exploitative modern man is inviting several environmental problems. Global warming is one such severe environmental problem of the postindustrial era.

The last century has witnessed an increase of 0.6 to 0.8°C in the global average temperatures. Annually, around 9 billion tonnes of carbon dioxide is released into the atmosphere because of fossil fuel burning world over. Consequently, carbon dioxide levels are raising and may touch 600ppm by the year 2100. If carbon dioxide is emitted at the present rate it is going to raise the global average temperature by 1.5 to 4.5°C by the year 2100.

As a result, melting of glaciers and polar ice caps, and thermal expansion of oceans are accelerated. Consequently, the global mean sea level would rise by 1 meter by the turn of the century. It leads to submergence of low-lying areas. Other drastic consequences such as increase in cyclones, storms, floods, drought, famine, epidemics, climate change, surge in climate refuges, species extinctions, failures of monsoons, crop failures, socio- economic and political disturbances, water wars etc. may follow. Now several horrifying reports are coming from different corners of the globe in support of global warming. Arctic pole is going to be seen without ice. The devotees of Lord Shiva have met with utter disappointment in 2007 and 2010 because of the melting of 12 feet long ice Sivalingam at Amarnath. Two islands each of Maldives and Sunderbans have totally disappeared in recent times. Polar bears are facing the threat of extinction on account of fast melting of their icy habitats. Several countries including the USA are facing the wrath of the climate change in several forms. Americans are facing worst snow storms, Europeans are facing unexpected heat waves, Rajasthan and Rayalaseema areas are receiving unusual floods and Chirapunji is reeling under the water famine. Even then the world nations especially industrially developed are not cooperating to the Kyoto protocol.

This in turn leads to most horrendous and complicated problems. If we look at the carbon cycle, only green plants have the natural capacity of absorbing carbon

dioxide. The forests and oceans, harboring green plants, are said to be two major sinks of the carbon dioxide on the planet. They clean the air freely by taking carbon dioxide and releasing oxygen. Hence the environmentalists are relying more on green cover (biomass) solutions because of the free service extended by the green plants.

Biomass solutions :

If 600 million hectares of land is converted into thick forests, there would not be any problem of global warming. Six hundred million hectares means the extent of forest that has been lost since World War II. In the pursuit of controlling green house effect, now people are looking for ways and means to accelerate the biomass production.

Coppicing which was an ancient silvicultural technique has been found encouraging for this purpose. With coppicing, 20 tonnes of biomass production per hectare per annum is possible compared to 4-10 through conventional forestry.

The ironing out of oceans : The Pacific experiment of 1993 by US and UK scientists proved experimentally that pumping iron into the sea might help absorb atmospheric carbon dioxide by marine algae. The scientists firmly believe that these tiny green plants with the addition of iron can stave off the heating of the planet. But frequent applications are required and this may invite economic and ecological problems.

Green cover - a cool solution to urban heat islands :

Further, positive cooling effects are possible from green cover as a result of transpiration and albedo changes. The cooling effect is remarkable and rewarding especially in tackling the heat islands of the urban environment. A maximum of 6 ^{o}C cooling can be achieved by 100% green cover whereas 2/3 of the maximum cooling can be achieved by 30% green cover.

Baking soda could help save planet from the impacts of global warming :

Carbon dioxide emitted from smoke stacks and the waste heat formed from the factories can be used to make baking soda (sodium bicarbonate). As it is used for baking, cleaning and deodorizing it can be sold for home or industrial use or the excess can be buried harmlessly in landfills.

Green cover-green power-green tech :

Now, everybody is of the opinion that **green cover-green power-green tech** can be safely used as an integrated green solution to save the planet from the perils of global warming. **Green power** is possible only by switching over from dirty fossil fuels to carbon free fuels such as solar, wind and hydrogen fuels. As immediate switch over is not possible due to lack of viable, cost-effective **green technologies,** a major thrust is given to **green cover** by halting deforestation and hastening greening (aforestation) programmes to remove excess carbon dioxide from the atmosphere. So, let us respect and put into practice the primeval preaching of **VRUKSHO RAKSHATHI RAKSHITHAHA** to avert the dangers of the global warming.

10. Bio Fertilizer for Sustainable Environmental Management

Dr. M. G. Tiwari

P.G. Department of Botany, Deoghar College
Deoghar-Jharkhand

Keywords : *Bio Fertilizer, agriculture, Environment, Sustainable.*

One of the foundations of any agriculture system is that it must be sustainable, that is the output of nutrient in both agricultural product and unwanted losses must be balanced by inputs. In this way productivity can be maintained at a constant level producing food, income and security to the farmers. In western countries agricultural production has been sustained by huge chemical inputs of fertilizers, herbicides, pesticides, but it has been realised there too that this form of agriculture is not in-fact sustainable as the constant increase in input to maintain the natural soil fertility declines and the residual effect of those inputs persist in the environment (Cairns, 1999). So, it is a challenge to develop an agricultural system that meets the present need of population and also it should be eco-friendly and helps in environmental management. One of the most abundant natural resources that is freely available in all cropping environments is atmospheric nitrogen and that nitrogen fixation will play a central role in any sustainable agricultural system.

Bio fertilizers plays an important role in sustainable agriculture and environment management which refers all the nutrient input of biological origin for plant growth. The appropriate term for bio-fertilizers is “Microbial inoculants” as suggested by Subha Rao (1982). The micro-organisms increase the nutrient availability to crop plants due to their biological activity. Bio-fertilizers are the micro-organisms which are use for soil enrichment. The main sources of bio-fertilizers are- Bacteria, Cyanobacteria and Mycorrhizal fungi. Bacteria and cyanobacteria function as bio-fertilizers due to the property of nitrogen fixation (conversion of molecular N2 in nitrogen compound). The micorrhizal fungi withdraw minerals from organic matter for the higher plants with which they are associated.

11. Association between air borne particulate matter pollutants and decrements in Peak Expiratory Flow and Forced Expiratory Volume in$_{1\ sec}$

Kesavachandran Chandrasekharan Nair

Epidemiology Division, Indian Institute of Toxicology Research,
PB No 80, MG Marg,
Lucknow-226001

Keywords : *Particulate matter, PEFR, FEV1*

Ambient air monitoring of particulate matter (PM_1, $PM_{2.5}$, and PM_{10} and SPM) were monitored at residential areas of National Capital Region (NCR), India. Lung functions like Peak Expiratory Flow Rate (PEFR) and Forced Expiratory Volume (FEV_1) in one hundred and sixty one residents of NCR were assessed to determine the effect of particulate matter pollutants on lung function indices. The different levels of particulate matter in ambient air and its consequences leading to reduced lung functions among residents are discussed in the paper. PEFR and FEV_1 showed decline trend among residents for increase in PM_1, $PM_{2.5}$, PM_{10} and SPM above National Ambient Air Quality Standard (NAAQS).The study indicates the association of lung function indices with particulate matter pollutants.

12. Microbial Means for Remediation of Heavy Metals Bearing Aqueous Solutions and Industrial Effluents

Dilip Kr. Markandey

Central Pollution Control Board, Parivesh Bhavan, ZO-W,
Opposite Ward No. 10 VMC Office, Subhanpura,
Vadodara, 390023, (0265) 2392831-33,
E-mail : dilipkrmark@yahoo.com

Keywords : *biosorption, bioremediation, microbial cell immobilization, removal and recovery of heavy metals, aquatic resource decontamination, microbial technology*

The emergence of industrial society has led to the use of a variety of metals of diverse chemical nature in a wide range of human activities. Undoubtedly, the use of these metallic components has provided great comfort to human life and enormous benefits to the society. It is now realized that a price has to be paid in terms of human health and the quality of the environment. A number of industrial operations like electroplating, tannery, chemical, battery manufacturing, electronics etc. contribute significant amount of metallic contaminants to natural aquatic resources in one way and the other. In addition to these sources, other processes like corrosion of plumbing/fittings, dezincification, mining operations, tailing of low grade ore(s) etc. are also contribute significant amount of metallic ions. While strict regulatory measures have been formulated and implemented by various concerned authorities to minimise the release of these contaminants to maximum possible extent, metal contamination has occurred in past and probably will continue to occur in near feature, if strict remedial measures are taken to -date. Out past experience about the episodes of Itai-Itai disease (Cd contamination) and Minimata and Niigata diseases (Hg contamination) have started to emphasize the decontamination of metallic ions from the discharges.

As compare to conventional chemical precipitation methods, there are growing evidences which suggest that microbial methods are efficient and economical. Recent advances in microbial technologies pertaining to suitability of biomass based decontamination material make it possible to assess removal of these metals by microbial means at one common level of considerations. Although bioremediation holds great promise for dealing with intractable environmental problems, it is important to recognize that much of this promise

has yet to be realized. Specifically, much needs to be learned about how microorganisms interact with different environmental conditions. Biosorption/ bioaccumulation based biotechnological aspects/approaches have their great potentials due to low-cost and low-waste techno-economy. Currently, good amount of information is available, especially concerned to the exploitation of algae (including cyanobacteria), lower and higher forms of fungi, bacteria and biomass of other biological origin.

This paper covers the application of microbes and biomass of other biological origin for biosorption of various metallic contaminants of the environmental interest. Information about isolation, characterization, immobilisation of biosorbents, metal recovery from the loaded biosorbents, non - viable concept etc. have also briefly presented. The need for study the efficacy of microbial isolates in comparative manner and its significance in decontamination of metal bearing effluents is also highlighted. As this understanding increase, the efficiency and applicability of bioremediation will grow rapidly. Because of its unique interdisciplinary combination of microbial biotechnology, hydrogeology, environmental technology and geochemistry, this biomass based remediation technology will continue to be at the forefront of this exciting and rapidly evolving restoration of aquatic resources. This paper highlights some of these points and briefly extrapolate the possible future directions and trends.

13. Mass Media Coverage in India on Climate Change

Dr. I. Arul Aram

Dept. of Media Sciences, Anna University,
Chennai-600025
Email : arulram@yahoo.com

Keywords : *Climate change, mass media, discourse analysis, Himalayan glaciers, environmental risk.*

Global climate change may be the greatest environmental risk of our time, and of all time. It has the potential to affect all of the Earth’s inhabitants, like previous climate change has, but perhaps in a shorter time-frame and on a larger scale. It could alter life as we know it in many arcane, unpredictable ways (Wilson, 1995). Reporting on climate change must address the deeper social and economic

dimensions of sustainable development. Reporting needs to be multi-faceted, given the complexity of the issue. Climate change demands both political and personal responses, and this will depend on timely, accurate information. The fact that the reality of today is mediated mostly by the media means the media is the tool to make people informed citizens.

Journalists were more likely to exaggerate rather than reduce measurements. For example, journalists were more likely to exaggerate and not underestimate the rise of sea-levels. The emphasis on bad news, on the potential of horrific events happening, is more newsworthy than information discussing potential subtleties over a longer period. The theory is often used to demonstrate the power of the media over audiences. Agenda-setting studies have suggested that media coverage does influence public attention to climate change, but what to think with regard to the issue is determined by social activism and experience with ground reality.

The methodology of the study is: discourse analysis with the media text including those of *The Hindu, The Times of India, The New Indian Express, Deccan Chronicle,* NDTV and CNN-IBN; and interview with 25 journalists covering climate change and working in the abovementioned media organizations.

The study also involved interviewing some environmental journalists in Chennai. Based on the interviews and review of literature, the following points were arrived at :

- Climate change is abstract, not connected with day-to-day reality;
- Climate change is too broad a topic;
- Climate change is mostly a technical matter;
- Journalists ignore climate change as part of news coverage as they do not understand the technicalities involved.
- Scientists do not give climate change literature in a jargon-free language;
- Journalists hardly receive in-service training on climate change;
- Journalists fail to link ground realities with existing policies and politics.

A discourse analysis of media text proves that journalists have been quite successful in communicating the enormity of the risk planet earth is facing due to climate change. The media makes it clear that problems faced are due to

human causes rather than natural causes. The problems faced by climate change journalists are similar to those in other beats. Lack of sensational content may cause reports to get sidelined. So, controversies such as an error in assessing melting of glaciers in the Himalayas are blown up. The fact the Himalayan glaciers are a little explored area complicates the matter. It is difficult to find sources and one cannot get concrete facts. With extensive competition from other media organizations covering the same news story, the media has taken up to approach the story from different angles to retain the news hungry public. Lack of local scientific data and scientific measurement methods too poses a problem.

14. Environment Friendly & Economically Viable Biodiesel Fuel from Waste Cooking Oil

Dr. Asok Kumar Mukhopadhyay

Iinternational Institute of Management Science, Kolkataae 720,
Salt Lake, Kolkata-700064
ashokm.9@gmail.com

Keywords : *Waste Cooking Oil, Waste oil from Food Processing, supply-chain Management system Biodiesel, polymerized toxic recycled oil, Transesterification, Emission.*

The feasibility of converting recycled **Waste Cooking Oil** as available in plenty from domestic households & restaurants, to clean biodiesel fuel has been studied with the objective of lowering the Greenhouse Gas emission & Cost of Biodiesel production and also protecting Health of masses from metabolic system disorder in consequence with consumption of Toxic, Burnt, Polymerized oil. This paper presents a novel biodiesel production technology with optimum conditions to achieve maximum yield using the waste oils generated from local restaurants. However success of this project depends on how the supply-chain system could be made effective starting from collection of **cooked oil** from millions of Households, Restaurants, Hotels & **waste oil** from Food Processing Industries followed by dumping in common storage place, then forwarding to different production centres & finally distributing to different selling outlets.

15. Bioremediation of Mine Spoils : Microbes and Plant Interactions

Jamaluddin

Deptt. of Biological Sciences, R.D.University,
Jabalpur-482001(M.P.)
Email : jamaluddin_125@hotmail.com

The biological, chemical and physical attributes of calcium and coal mine overburdens are disturbed thereby loss of productivity and biological diversity takes place. The vesicular-arbuscular mycorrhizal fungi and plant growth promoting bacteria are disturbed to a considerable extent after mining. The trials have been made to revegitate the site with *Jatropha curcus*. The cultures of VAM fungi and the bacteria were prepared from the mine sites. The nursery experiments were conducted by inoculating VAM fungi and the bacteria. Single super phosphate was also used a P fertilizers. The growth performance of *J. curcus* was studied in the nursery and in the field. The soil analysis and P content of plant were also analyzed. The phosphatase enzyme was more in inoculated plants. The microbial carbon was also studied in the field soil planted with inoculated *J. curcus* plants. The heavy metals particularly Fe, Cu, Mn, Zn, Pb and co also studied. Iron, copper, Zinc and Lead were mineralized after plantations. The root exudates of *J. curcus* also studied on the establishment of microbes. The protein analysis of inoculated and non-inoculated plants also conducted. The siderophore production was more in plants boosted up with microbial inoculants. The Am fungi and bacteria enhanced the natural chelates and help in the integrated management of mine spoils overburdens.

16. Assessment of Migration Potential of Additives Used in Laminated Pouches in Simulating Conditions and Survey on Usage Trends Among The Consumers of Lucknow & Kanpur City

V. Agarwal, A. Pandey, A. Umar and V. P. Sharma

Indian Institute of Toxicology Research,
(Council of Scientific & Industrial Research),
80, M.G.Marg, Lucknow

Keywords : *Plastic Packaging, Migration, Overall Migration, Biodiversity, Heavy Metal, Human Health*

Plastic packaging is a rapid growing sector, playing an important role in global economy. Laminated Pouches are widely used in packaging of vast array of the products ranging from food materials, cosmetics, dairy products, household items and other consumer goods. Today, the growing market trends & consumer demands have introduced colorful, multi-layered, economic, user friendly and laminated plastic pouches in packaging industry. These laminated sheets are formulated of polymer composites and various additives (colourants, heavy metals, stabilizers, UV absorbers etc). However; these additives could migrate under different environmental conditions. During this exploratory study an attempt was made to correlate the usage pattern and possible health implications by conducting a survey among consumers of two representative cities viz. Lucknow and Kanpur. Study revealed that overall migration at 40 ± 2ºC was ranging between ND*, ND-0.4, ND-2.4, 0.2-1.3, ND - 4.6 whereas at 60 ± 2ºC, it was between ND -0.6, ND- 3.5, ND-4.7, ND-1.6 and ND-6.1 mg in double distilled water, ethanol, acetic acid, sodium chloride and sodium carbonate, respectively. Furthermore, migration of heavy metals viz. Cr, Cu, Mn, Pb, Zn was observed at ppb level under various simulants at 40 ± 2ºC and 60 ± 2ºC. It was concluded that the migration under simulated conditions was found to be within the permissible limit except in normal saline. Survey findings have shown increasing dependability and indiscriminate disposal pattern of pouches by consumers. Thus, there is need of holistic study to understand the long term implications on environmental system for safeguarding human health and biodiversity.

*Not Detectables

17. Effect of Anthropogenic Disturbance on Woody Plant Diversity in Aizawl, Mizoram

B. P. Mishra

Department of Environmental Science, Mizoram University,
Aizawl-796 004, Mizoram
mishrabp111@yahoomail.com.

Keywords : *Anthropogenic disturbance, diversity and distribution, ecological amplitude, plant community attributes, stable community.*

The present study was conducted to assess the impact of anthropogenic disturbance (illicit tree felling, fuel-wood collection, cattle grazing) on woody plant diversity and community attributes in undisturbed, moderately disturbed and highly disturbed forest stands in Aizawl district of Mizoram. The climate of the study area is typically monsoonic with maximum rainfall (*ca*. 80%) during rainy months (June to September). The most common tree species present in the area are *Castanopsis tribuloides*, *Schima wallichi*, *Albizia chinensis*. The common shrubs and grasses are *Osbekia citrine*, *Costus speciosus*, *Clerodendron viscosum*, *Eupatorium odoratum*, *Mikania micrantha*, *Imperata cylindrical*, *Phuyllanthus glaucus*, and *Saccharum longisetosum*. A total of 42 species belonging to 24 families, 26 species belonging to 15 families and 12 species belonging to 9 families were recorded in the undisturbed, moderately disturbed and highly disturbed stands, respectively. The findings of the study depict that anthropogenic activities altered community organization and botanical composition from undisturbed to the highly disturbed stand. The overall dominance increased with increase in disturbance stress. Fagaceae, the dominant family in the undisturbed and moderately disturbed stands no longer maintained its dominance in highly disturbed stand. The shift in position of families in trees of their dominance seems to be linked with the level of disturbance. Population structure depicts the progressive reduction in tree density and basal area from undisturbed to highly disturbed stand. This could be attributed to cutting of mature trees from moderately disturbed stand and subsequently extraction of trees of lower girth classes from highly disturbed stand. Dominant and co-dominant species harvested more IVI with increased degree of disturbance and it was maximum in highly disturbed stand, as disturbance provides greater opportunity for growth of such species. The dominance of bushy nature of trees in disturbed stands appeared to have greater ecological amplitude with respect to degree of disturbance. The species composition was highly linked with degree of disturbance. The tree species absent in disturbed stands appeared to be more vulnerable to disturbance. The species restricted to highly disturbed stand, indicating that it cannot compete with primary species in undisturbed and moderately disturbed stands. Disturbance led to thinning of woody layer and change in forest microclimate which in turn, might have impaired regeneration process of tree species on one hand, and helped colonization and establishment of shade intolerant shrubs and annuals on the other

hand. More uniform distribution of IVI among species under undisturbed stand leads to log-normal dominance-distribution that depicts the stability of plant community. The diversity index was decreased with increase in degree of disturbance, and on the contrary dominance index showed a reverse trend in results. The distribution pattern was highly linked with level of disturbance.

18. Environmental Radiation, Exposure and Effects : A Review

Dr. Krishan Kant

Principal, Aggarwal P.G. College, Ballabgarh, Distt. Faridabad
Haryana-121 004
(Formerly at Deptt. Physics, K.L. Mehta Dayanand College for Women, Faridabad (Haryana)
E-mail : kkant_67@rediffmail.com

Keywords : *Environment, Hormesis, Adaptive Response, Health, Radon, Epidemiological*

Human population is always exposed to ionizing radiation from natural sources. Important sources are cosmic rays which come from outer space and from the surface of the sun, terrestrial radionuclides which occur in the earth's crust in various geological formations in soils, rocks, building materials, plants, water, food, air and in the human body itself. With the increasing use of radiation in health facilities, scientific research, industry and agriculture, the study of impact of low-level ionizing radiation on environment and possible health effects on future generations has been a cause of concern in recent years. Some of the exposures are fairly constant and uniform for all individuals everywhere, whereas the other exposures vary depending on the place, time, height above the ground and meteorological conditions. Exposures can also vary as a result of human activities and practices. In particular, the building materials of houses and the design and ventilation systems strongly influences the indoor levels of the radioactive gas radon and its decay products, which contributes significantly to doses through inhalation. Component of the sources of exposures to Indian population has been assessed on the basis of generated data base. Total contribution to the natural sources to the Indian population works out to 2.3 mSv/y as against the global value of 2.4 mSv/y. Estimated modified source which

includes mining of heavy metals, coal fired power plants, mining of phosphate rocks and its use as fertilizers, production of natural gas, production of gas mantles and luminescent dial and air travel contribution to the background radiation to the Indian population works out to be 1.2 x 10^{-3} mSv/y; while atmospheric weapon tests contributes about 0.045 mSv/y, medical exposure contributes about 0.048 mSv/y and exposure due to nuclear power production contributes about 5.0 x 10^{-5} mSv/y to the background radiation. As regards the effects, it is established fact that high doses of ionizing radiation are harmful to health, there exists, however, a substantial controversy regarding the effects of low doses of ionizing radiation (LLIR). According to the Linear No-Threshold (LNT) hypothesis, any amount, however small, of radiation is potentially harmful, even down to zero levels. The threshold hypothesis, on the other hand, emphasizes that below a certain level of radiation exposure, any deleterious effects are absent. At the same time, there are strong arguments, both experimental and epidemiological, which support the radiation hormesis (beneficial effects of low-level ionizing radiation). These effects cannot be anticipated by extrapolating from harmful effects noted at high doses and all considerations of the validity of the LNT hypothesis based on experiments or epidemiological evidences are dismissed because of the impossibility of deriving statistical significant data at very low doses. The choice of the approximate dose-response model for use in estimating the health effects of small doses of ionizing radiation remains controversial.

19. A Novel Method of Utmost Utilization of Renewable Energies for The Economic & Environmental Development

M. Amirthalingam,

Retired Chief Engineer of Govt. of Tamilnadu

Email : seasandindia@gmail.com

Keywords : *Renewable energy, Pneumatic energy, Converter, Compressor, Air pollution, Global warming*

The Pneumatic Energy (Compressed air) shall be generated through the Novel device, by conversion of Renewable energies in the area – Hydro, Tidal,

Waves, Wind, Solar & Salt gradient, utilizing atmospheric air as working fluid. The Pneumatic energy shall be then put into air turbines to produce mechanical energy which shall be converted into electrical energy by conventional method using generators. Further, to have smoke-free automobiles for mitigation of air pollution & global warming, they shall be operated with pneumatic powered engines, utilizing the pneumatic energy which is eco friendly and also a substitute for fossil fuels.

20. Bioremediation of Waste Water through Anoxygenic Phototrophic Bacteria and its Biotechnological applications

S. M. Reddy, S. Girisham and M. Ramchander

Department of Biotechnology,
St. Martins Engineering College,
Secunderbad and Department of Microbiology Kakatiya University,
Warangal

Anoxygenic phototrophic bacteria are unique group of prokaryotes with diverse metabolism occupying different ecological niches with immense biotechnological potentials. These are metabolically versatile anaerobic photo autotrophic, photoheterotrophicin the light and micro aerobic light condition can grow anaerobically in the dark using fermentation. Many are aerobically heterotrophic in dark. Some are sulphur metabolising and others non sulphurs. Micro aerobic treatment process of waste water is of recent and anoxygenic phototrophic bacteria can be potential candidates. As a transition phases between aerobic and anaerobic environment does not require high energy input and its resultant effluent is hidden with high energy rich molecules which anoxygenic phototrophic bacteria can degrade easily and convert them into cellular matter. Their degradative capacity complex organic substances in waste waters with high BOD and COD are highly appreciable. High tolerance to metal toxicity of anoxygenic phototrophic bacteria and their complex cell walls are reported to be ideal for bio remediation of heavy metals like cadmium, lead, mercury and sodium. Besides, these organisms are ideal as source of SCP and efficient in hydrogen production, a non-conventional energy. The biology and potentials in creating a healthy environment is discussed.

21. Threats of Climate Change on Water, Food, Livelihood and Energy Securities of People

P. M. Natarajan[1], Dr. M. Ponnavaikko[2], Dr. N. Ramachandran[3], Shambu Kallolikar[4] and Dr. A. Ganesh[5]

[1]Director – Centre for Climate Change,
Periyar Maniammai University,
Member - Tamil Nadu State Environment Impact Assessment Authority
[2]Provost, SRM University
[3]Vice-Chancellor, Periyar Maniammai University
[4]Secretary to Governor, Government of Tamil Nadu
[5]Chair, Geography Department,
Bharathidasan University.

Keywords : *Climate change threats - Livelihood security – Industrial Revolution – seawater intrusion – Farm work force - Salinisation of groundwater*

Water, food, livelihood and energy securities are necessary for the people to lead a normal life. Agriculture and industries provide employment globally to a huge working force and in this way many people attain livelihood security. There are more than 60% people depend on agriculture income for their livelihood security globally. In the developing and under developed countries agriculture is the main source of income for more than 80% of people. Using the water resources, food grain is produced by the farm work force (farmers and the agricultural labourers), and this is the only way by which they are attaining livelihood security now. The food produced by the farmers help the entire population to attain food security. Without the livelihood security of the farm work force it may not be possible to achieve food security to the entire population of the globe.

As per the studies carried out by the Inter Governmental Panel on Climate Change (IPCC), almost all the natural calamities are likely to be further intensified due to the threat of climate change. Of all the threats of climate change, its threat on water and food are likely to affect the livelihood security of the farm work force and the food security of the people globally. If the livelihood security of the farm force is affected the economic growth of many nations will be affected.

As a result of the industrial revolution during 1750s, fossil fuels are being used globally in an uncontrolled way. Hence, levels of carbon dioxide in the air (prior to the start of the Industrial Revolution) were about 280 parts per million by volume (ppmv), has increased to more than 380 ppmv and increasing at a rate of 1.9 ppm yr^{-1} since 2000. So, the average temperature of the Earth has risen to 0.76 degree Celsius now.

For the above temperature rise, there are about 1.10 billion people without access to clean drinking water now. At this rate, about 2.8 billion and 4.5 billion people will have no access to clean drinking water during 2025 and 2050 respectively.

Globally, there are about 1.02 billion hungry people now. If the night temperature rises to one degree Celsius due to climate change, it is likely to reduce the grain production to 0.45 ton and 0.75 ton per hectare of land. In that case, there will be a loss of about 125 million to 208 million tons of food grain globally. In India alone about 6 million tons of food grain is likely to be reduced. Hence, the hungry people number is likely to swell to 1.57 billion during 2025 as per the IPCC's latest study.

The installed capacity of hydroelectricity, the environmentally friendly source of energy is 777GWe. This is approximately the 20% of the world's electricity, and accounted for about 88% of electricity from renewable sources. Due to glacier retreat a huge quantity of hydropower generation is likely to be reduced in future. In that case there will be energy scarcity which will affect the economic growth of nations.

So, if the temperature rises to 1.4 to 5.8 degree Celsius as predicted by IPCC, the people to be affected by water, food, livelihood and energy securities will swell many folds.

Due to the present rise of temperature almost all glaciers on land and sea area are retreating globally now. As per the anticipated rise of about 1.4 to 5.8 degree Celsius, the entire glacier water is likely to disappear in another 40 to 50 years period. In this case the glacier water loss globally will be around 24 million cubic kilometre. Himalayan Mountain alone is going to lose about 3,738 cubic kilometer of water. If this quantity is lost due to climate change, the economic

loss of water in Himalaya and in the entire globe is Rs. 68.64 lakh crores and Rs. 44,096 million crores respectively. The water we lose from Himalaya is sufficient for about 12 years domestic water supply to the globe and the quantity of glacier water loss in the entire globe will supply to the present population for about 73,837 years.

Already there is a slow rise in sea level. At the present rate of sea level rise there will be a rise of about 0.56 metre to one metre during 2100. If the entire glacier water both in the land and sea areas retreats, scientists predict, the sea will rise to 70 m. For one km extent of inundation of sea water on land area, globally about 5,31,864 square km area will be submerged and there will be a loss of 79.77 cubic kilometre of groundwater due to salinisation. This will affect the domestic water supply of about 1,619 million people of the coastal area, globally, every year. The value of this water in terms of food grain is about Rs.1,46,484 crores. Once the fresh groundwater aquifer is salinised, it is a permanent loss.

If the entire glacier water in the Himalayan Mountain is used for agriculture about 116.43 billion man days can be generated for the farmers and farm labourers at the rate of 150 labourers per acre of land per year, and the income generation through wage to the farmers and agricultural labourers at the rate of Rs. 150 per man day will be about Rs.17,465 billion. As a result of glacier retreat from Himalaya, several farm work forces in that region are likely to lose their water, food and livelihood securities. Due to the retreat of the entire glaciers in the land and sea area, there will be a loss 7.48 lakh billion man days to the farm work force and the wage loss will be about Rs 112.19 million billion. In this way the farmers and agricultural labourers are likely to lose their livelihood security due to the loss of glacier water. If the farmers and farm labourers lose their livelihood security as a result of glacier retreat on account of climate change, the food security of many people of the globe will be affected, since without the livelihood security of the farm work force it may not be possible at all to achieve food security globally.

So to achieve permanent livelihood security to the farm work force and there by to produce enough food grain for the entire population of the globe, and to achieve water, food, livelihood and energy securities globally, the authors would

like to suggest the following approaches including arresting carbon emission 1. Rainwater harvesting both from the roof and land area 2. Artificial groundwater recharges 3. Treating and recycling the domestic and industrial waste waters 4. Adopting micro irrigation practices 5. Desalination of saline or seawater, at least to meet the domestic demand of the people 6. Increasing the price of water so as to reduce water use 7. Switching over to dry crops cultivation instead of wet crops like paddy, sugarcane, banana in the water scarcity regions and basins 8.Virtual water import and transport to the water scarcity regions and basins to meet the requirement of food and other water embedded products 8. Developing groundwater resources in coastal area aquifers, in such a way, by keeping the fresh groundwater level to a minimum of one foot above mean sea level so that to arrest seawater intrusion.

22. Climate Change and Biodiversity-Mitigation and Adaptation

Yatendra Singh[1], C.A. Reddy[2] and P.L. Gautam[3]

1. Project Manager, India-UNDP Project (Biodiversity), National Biodiversity Authority, Chennai.
2. Secretary, National Biodiversity Authority, Chennai.
3. Chairman, National Biodiversity Authority, Chennai.

Keywords : climate change, biodiversity, mitigation, adaptation, ecosystems

Climate change, a cumulative effect of the anthropogenically driven changes on the earth's surface is affecting almost all the aspects of the terrestrial ecosystems like biodiversity, primary productivity, agriculture, soil dynamics etc at macro as well as micro level. Mitigation measures include cutting down GHG emissions from different sources, Clean Development Mechanism, change in land use, and aforestation, but these cannot avoid climate changes and hence adaptation measures are to be taken to conserve the biodiversity and use it as an adaptive measure. Adaptation measures could be- tolerant crop varieties, improved farming techniques, improving efficiency in irrigation and water harvesting, diversifying livelihood options, alternate energy sources, disaster management and the like.

SPECIAL LECTURE

23. Strategies for Management of Environmental Problems in India

Prof. E. T. Puttaiah

Vice-Chancellor, Gulbarga University,
Gulbarga

Globalization and technological advancements are contributing significantly to large scale environmental problems throughout the globe and also in India. Though environmental issues have explicitly affecting the humanity beyond political boundaries, the developed countries are still showing their apathy in shouldering the responsibility towards the environment. There are many examples of serious environmental problems for which there are not yet appropriate solutions, such as management of scarce natural resources. The increasing economic development and a rapidly growing population that has taken the country from 300 million people in 1947 to more than one billion people today and the trend in migration to urban areas from the countryside is creating environmental crisis beyond the limit of bearing capacity. Industrial pollution, soil erosion, deforestation, rapid industrialization, urbanization, and land degradation are all worsening problems. Biodiversity in India is also under threat due to developmental projects. Housing shortages, electricity and water cuts, traffic congestion, water and air pollution and a lack of basic amenities are the reality for millions. India has been ranked among the top ten worst climate polluters of the world. India is the world's fifth-biggest polluter, with its greenhouse gas emissions growing by more than three per cent annually between 1994-2007. India is also facing effects of global warming such as rising temperatures and sea levels along its coasts. Toxic waste and safe disposal of it is becoming a big issue due to increase in manufacturing industries. Therefore, management strategies are the need of the hour for development of current status of environment and to conserve natural resources for sustainable development.

Limits need to be enforced and better monitoring and safety checks to be made to prevent future environmental disasters such as Bhopal Gas Tragedy. Strategies like changing to cleaner, alternative sources of renewable energy like solar energy is one way to reduce air pollution.

However, these options are very hard to implement for some countries where there is a big supply of coal including India. Air pollution from transport needs to

be reduced and many strategies have been made. Improving and encouraging usage of public transport and introducing congestion charges are just a few of these strategies. The Air Quality Management (AQM) systems existing in India includes air quality monitoring including meteorology, air quality standards, emission inventory, source apportionment, dispersion modeling, health impact study, control strategy, and AQM plan. In addition to the continual escalation of emission controls for various air pollutants, the air pollution efficient control strategy will also be required to tackle the emissions of greenhouse gases (GHGs). The biofuel, the energy elixir possesses the prospective to transform the conventional petroleum-based industries as it can improve the environmental condition at the same time. Energy conservation can result in increased financial capital, environmental quality, national security, personal security, and human comfort. In this milieu, energy conservation technologies, such as green building concepts are crucial. Conservation of biodiversity is another issue which could be managed by development of more reserved forests and national parks for protecting diverse fauna and flora. Reduction of carbon dioxide and other greenhouse gases emission is an urgent need towards reducing global warming. The effects of climate change on various habitats of Indian scenario need to be studied to develop adaptive strategies in preparing to face the possible eventualities. In this context, the Government of India has been taking measures to promote research and develop strategies for management of environmental problems.

PROCEEDINGS
OF THE

NINETY EIGHTH SESSION OF THE

INDIAN SCIENCE CONGRESS

CHENNAI, 2011

PART II (Abstracts)

SECTION OF
ENVIRONMENTAL SCIENCES

President : **Dr. G. Bagyanarayana**

ORAL PRESENTATIONS

1. Effective Screening of Environmental Estrogens (EE_2) using Zebrafish Brain Aromatase Gene (*cyp19a1b*) as a Biomarker

Santosh Winkins*, Yann Le Page, Farzad Pakdel and Olivier Kah

Department of Biotechnology, School of Bioengineering,
SRM University, Kattankulathur, Tamilnadu
UMR CNRS 6026, Université de Rennes 1, Rennes, France
E-mail : santoshmcc@ktr.srmuniv.ac.in

Keywords : *Environmental estrogen, endocrine disruption, fish, aromatase gene*

An environmental estrogen (EE_2) is a compound, either natural or synthetic, which is present in the environment and may alter the hormonal system by mimicking the effects of endogenous estrogenic hormones, potentially leading to rupture of the homeostatic balance. Estrogens correspond to a class of sex steroid hormones best known as being responsible for the development of gender-specific

characteristics and secondary sexual characters in mammals. The estradiol, estriol, and estrone are three major naturally occurring estrogens found in the body. However, mounting evidence shows that many man-made products can mimic the action of estrogens and are called as xenoestrogens or estrogen mimics. In addition, plants can also produce estrogen mimics referred to as phytoestrogens. These natural or synthetic compounds are found almost everywhere in the environment (soil, water, air) and can affect human or wildlife health. Many substances present in the environment can mimic the estrogenic activity: pesticides (DDT methoxychlor, chlordecone, atrazin), plasticizers (bisphenol-A nonylphenol), UV screens (parabens, benzophenone), phytoestrogens (a-zeralenol, genistein) and pharmaceutics (ethinylestradiol, diethylstilbestrol).The effect of EE_2 in mammals, including humans, is extremely deleterious because EE_2 can affect the developing embryos during gestation. Such effects can ultimately affect the reproductive fitness trough alteration of gamete production, sexual differentiation, sex reversal, sexual behaviour or parental care. A number of in vitro assays have been developed to screen and detect EE_2 but each assay has its own disadvantages and less accuracy. In this study, the in vitro assay consists in an ER-negative glial cell line U251-MG transfected with zebrafish ER subtypes and the *cyp19a1b* promoter linked to a luciferase reporter gene. The *cyp19a1b* gene encodes aromatase B, a protein widely expressed in the brain of fish under the control of estrogens. The in vivo assay consists of quantitative-PCR of aromatase B messengers in the brain. Another in vivo assay is based on the use of a transgenic zebrafish that expresses Green Fluorescent Protein (GFP) under the control of the *cyp19a1b* promoter. When exposed to an estrogenic compound, the brain of 5 days old zebrafish embryo becomes fluorescent. The xenoestrogens á-zeralenol, genistein and chlordecone were studied with this effective assay.

2. Spent Mycelia For Removal- and Recovery of Cr (Vi) from Synthetic Solution as Well as Industrial Effluent

Dilip Markandey, V. K. Sachan, N. Semwal and B. R. Naidu

Central Pollution Control Board, Parivesh Bhavan, ZO-W,
Opposite Ward No. 10 VMC Office, Subhanpura,
Vadodara-390023, (0265) 2392831-33,
E-mail : dilipkrmark@yahoo.com

Next to municipalities, industrial operations like electroplating, battery manufacturing, pigment and paint production, tannery etc. contribute significant amount of heavy metals to the aquatic system. These contaminants find their way into the receiving aquatic system through various natural and man made sources and lead to several undesirable effects on natural resources.

There is a great potential in using microorganisms and associated derivatives for resolving the problem of contamination of metals due to discharge of various metal bearing effluents. This approach is certainly economical, which many a times, cannot be achieved through chemical and / or physical reaction with the completeness and efficiency. The microorganisms based decontamination techniques exhibit advantages like easy to realize, profitable, as well as economical. Besides, the microbial methods convert these contaminants into an immobilized insoluble state that can readily be recovered.

Keeping the said point into mind, compressed dehydrated spent mycelia from an antibiotic manufacturing unit was collected and used for preparation of biosorbent to study removal of Cr(VI) from synthetic solution as well as diluted electroplating effluent. The adsorption, desorption and recycling studies indicate the prepared activated carbon effectively used for removal- and recovery of Cr (VI) from synthetic solution as well as diluted effluent. Adsorption data fitted well with the Freundlich adsorption Isotherms. Using NTA and EDTA for desorption, the recovery of the target metal was achieved upto 90% with 4 repeats without deterioration of the sorption/desorption efficiency of the test biosorbent. This paper describes the findings of the said investigations in detail.

3. Ground Water Quality Modeling of Kshipra River Basin of Ujjain District, Madhya Pradesh Using Visual Modflow Software

S. Sharma[1] and R. Annadurai[2]

[1]Remote Sensing & GIS, SRM University
sanchit.sharmadem@gmail.com
[2]Department of Civil Engineering,
Faculty of Engineering and Technology,
SRM University

Keywords : *Visual Modflow, Kshipra River Basin, Ground Water Quality Modeling, Ujjain, Buffer zone.*

The study area Kshipra river basin, Ujjain, Madhya Pradesh is highly polluted due to the khan river is the main tributary of Kshipra River which joins at Triveni ghat is 6 km. South of Ujjain city and carries heavy load of industrial waste. Ujjain is a holy place and facing water crisis due to low amount of rainfall in previous years. The network of observation wells located in the buffer zone of river basin and it covers 80 sq. km. adjacent area extending from Kaliadeh to Quazipura town. The importance of mathematical model is to develop the simulation of ground water. The dug well quality data, surface water quality data analyzed and 25 years rainfall data with its cumulative departure has collected to calibrate the model. Turbidity, nitrate, alkalinity, pH, TSS, total hardness, D.O., B.O.D., total solids parameters has been taken for water quality monitoring. The Visual Modflow software has to calibrate for ground water quality modeling of the study area to predict the ground water quality for next 15 years. This prediction will help to develop a priori action plan including the treatment of surface water pollution to protect the public health.

4. Understanding Climate Change and Adaptation of Species Complexes in Tropical Forest

M. D. Behera[1] and S. K. Behera[2]

[1]Indian Institute of Technology, Kharagpur

[2]National Botanical Research Institute, Lucknow

Reports on climate change predict increase in global temperature. This will have impact in all components including biological such as species reproductive cycles, growing seasons, and species interaction to impact agricultural productivity, besides changing the natural course of many species, and drive many taxa to the verge of extinction. Asia, the most populated continent and home to ~50% of the world's terrestrial plants and animal species is demanding immediate attention to its coastal lands, mountains and wetlands because the species thereof have no alternative habitats under climate change scenario. Climate change studies in India

has received attention of researchers and voluntary organizations, and largely covers diverse issues like, greenhouse gas emissions from India, sea level changes along the Indian coast, its relationship with Indian forests and hydrology of Indian river basins; and sustainable development. However, studies targeting natural vegetation in diverse ecosystems within the country over a considerable period of time are lacking.

A CSIR network project entitled 'Climate change and adaptation of species complexes'under the XIth Five Year Plan is being implemented jointly by 'National Botanical Research Institute, Lucknow' and 'Indian Institute of Technology, Kharagpur' in a test site of tropical deciduous forest. The study aims at developing a forest carbon dynamics model by integrating the field based observations with satellite image derived biophysical outputs in a spatial domain. Permanent plots have been established in the test site at Katerniaghat Wildlife Sanctuary, Uttar Pradesh distributed over various life forms, gregarious and mixed formations to enumerate plant response to present climatic variables at community and ecosystem level. Instrumental observations are being taken to study different plant physiological response. The study would help understanding the adaptation and mitigation scenario in tropics with respect to imminent climate change.

5. Scenarios of Arabian Sea Climate Change under Increased Radioactive Active Gas Concentration and the role of Aerosols in Cclimate Change

Prof. Saroj Deshmukh

Modern College, Ganeshkhind, Pune

E-mail : srjhole45@gmail.com

Origin of research problem : Global Warming and climate change Interdisciplinary Relievance:Enviornmental science, Electronics Physics, Geography related work to be done Reasearch and Development : International Status : KYOTO P rotocol in 1995 . Protocol is signed by almost all countries in the world has made the list of all industrially developed Countries as Annexe 1 and underdeveloped countries as Annexe 2 The protocol states that the countries which are developed should reduce carbon emission to 1990 level by 2000 However all the industrially developed

countries failed to observe the protocol Therefore it was decided to have a financial instrument called as carbon credit for the purpose of reducing carbon emission at global level . 80% of carbon emission is from the developed countries The carbon emission means the word used for greenhouse gases like CO2 ,CO' CFCS, Methane,Water Vapours etc. It is the responcibility Of industries in the developed countries to promote reduction in ca rbon emissions Significance of the study:

Arabian sea is one of the most sensitive regions of the world. Modelling studies have shown that greenhouse gas induced warming over the basin is expected to be much higher than the global average and that the region will experience much drier conditions that at present ,especially during the warm season . Some of these trends have been already observed during recent decades . These changes can have dramatic effects on wide range of sectors in Arabian countries including water management , agriculture, energy production,tourisms, fisheries etc. Despite the fact that this warming /drying signal has been observed for various generations of model projections . There are still substancial uncertainties on the magnitude of this signal on the effects of Arabian air sea feedbacks and on effects of natural (e. g.) dust and anthropogenic aerosols. This last issue is especially critical in view of the fact that Mediterranean receives aerosol fluxes from different sources including desert dust from sahara ,soot from forest fires , agricultural practices and urban and industrial pollution from central and Eastern Europe The large optical depths associate with these aerosols loads can indeed effect the energy budget of the basin. Although global climate models are the primary tools to produce climate change projections Their resolution is still to course to Represent the complexity of morphology and processes of the Arabian sea To address this shortcoming a new generation of high resolution regional coupled climate system . Models have been developed for the basin including atmosphere , ocean, biosphere and chemistry aerosol components They provide powerful tools to jnvestigate the issues of mentioned above. The issue of 20th and 21st century climate change over the Arabian sea under increased greenhouse gas forcing with Particular attention to air sea interaction Changes in Arabian sea circulation atmosphere and ocenic interactions between the Arabian and other regions uncertainty estimates and impact of Natural and anthropogenic aerosols Results from newest regional coupled model simulations will receive special attention in particular with the context of the newly developing international

project CORDEX Coordinated regional climate downscaling experiment that will have the Arabian sea as one of its focus regions (MED-CORDEX) Observations of trends and forcing (e.g.) aerosols both in the atmosphere and oceans will also be reviewed with particular attention to their use for a better understanding of the models and processes for Arabian sea Following things will be studied Changes in Arabian sea circulation of water masses Regional coupled climate system Models for Arabian sea Consensus uncertainties of regional climate projections Impacts of natural / Anthropogenic aerosols on regional climate Interactions between Arabian sea and other regions.

Major work is done on preparing co2 sensors using Lithium chloride CO2 concentration is measured by sending this sensors in atmosphere. At Aaerodrum these experiments are done These sensors can be send in air to get upto 1ppm and 0.001ppm sensitivity Generaly CO2 concentration become less as you go at more and more heighted level. Some humidity sensors and temrature sensors are used to measure humidity and temperature upto 3 yrs.

6. Functions and Complexities of a Reclaimed mine Spoils Ecosystem : A Case Study of Kathara Coalmine Area of Jharkhand

Braj Kishore Sinha and Amita Hembrom

Department of Zoology, S S M College, Ranchi University,
Ranchi-834 008, Jharkhand
E mail : b_kishoresinha@yahoo.co.in
Forest Protection Division, Rain Forest Research Institute,
Jorhat-785001, Assam

Keywords : *Reclaimed mine spoils, homeostasis, resilience, anthropogenic activities, ecesis soil arthropods, ecological model*

Reclaimed mine spoils are byproducts of human development – an ecological footprint, are under twin stresses – anthropogenic and natural. Present paper is an effort to measure these stresses in reclaimed coalmine spoils of Jharkhand and has two sections – first section deals with the experiments and the results, and the second section is based on the observations of the experiment and has an ecological model. An experiment was carried out from year 2006 – 2008 in reclaimed coal

mine spoils of Jharkhand. Experimental sites with different ages of plantations were considered for the study. Soil arthropods along with other physical parameters were collected from 1 meter x 1 meter grid of quadrate seasonally. Shannon, and Simpson Index were calculated for qualitative status assessment. Importance value index and groups and guilds were identified. It was observed that the Shannon diversity index of younger OBD was higher than the 15 and 30 years old OBD. Old age site and forest had higher Diversity Index. Simpson's index was 0.0877, 0.889, 0.869, and 0.887 in four OBD sites, and 0.885, and 0.917 in the forest. Organisms in degraded systems are initially rudrals – create a functional system and establishes as K-select species. It was observed that the system has stresses – homeostatic processes that keep a system in its original state, and other force - resilience pull them out of the *status quo* but in reclaimed mine spoils an additional force anthropogenic activities work synergistically with the forces of resilience that push the system towards non-equilibrium, which is critical for succession and ecesis. Based on findings and functional stresses in the system an ecological model developed for ecesis that is operative in the system.

7. Effect of Seasonal Variation on the Rate of Decomposition of Leaf Litter and Population of Microfungi in *Dipterocarp* Forests in Manipur; North East India

Rajesh Kumar, Ashwani Tapwal* and Debu Moni Baruah

Forest Protection Division, Rain Forest Research Institute,
Jorhat-785001, Assam
*Corresponding author : ashwanitapwal@gmail.
commailto:ashwanitapwal@gmail.com

Keywords : *Dipterocarpus, seasonal variation, leaf litter decomposition, fungal population.*

The earth's climate has been changing throughout the planet's 3.5 billion year history which clearly indicates that the present climate may not remain constant. Climate is the key factor which determines the decomposition or preservation of organic matter and any change in it may affect the rate of leaf litter decomposition. The rate of decomposition of leaf litter is a very important factor as it largely determines the productivity of forest ecosystems. Furthermore, the existing litter layer directly or indirectly influences the diversity of micro-fungi and other soil organisms.

A study was conducted to determine the rate of decomposition of leaf litter of Dipterocarpus tuberculatus in the forests of Manipur; India during April 2008 to March 2009. The impact of seasonal variation on the rate of leaf litter decomposition was evaluated using litter bag technique. The percentage mass loss of leaf litter was found to be maximum during the rainy season and comparatively lower in winter season. Variation in the micro-fungal quantity in different seasons was studied using serial dilution and agar plate methods. The number of fungal colonies per gram of decomposed leaf litter was found to be maximum in the rainy season and minimum in late spring and early rainy season.

8. Virtual Water-Known but Unknown

B. Rajkumar
Depatment of Botany, Osmania University,
Hyderabad-500 007

Keywords : *Virtual water-water foot print-world water trade.*

The begining of 20 th century freshwater is going to be the most scarce resource and its availabilty, exploitation and sustainable use will determine standard of life and livelihood in developed,developing and underdeveloped countries. Of the available fresh water85% is used by agriculture, 10% by industry and 5% for drinking purpose. Crisis of water could lead to conflicts on national and international scales disturbing the peace and progress.

VIRTUAL WATER

'the sum of the water use in various steps of the production chain- a known phenomenon which was coined by Prof. John Anthony Allen, Kings College, London and School of Oriental and African Studies in the year 1993.The virtual water content of a product has three components-Green water, Blue water and Grey water.This enables the Water Foot Print of the nation i.e. gives the nations better consumption based indicator of water use and helps in the water trade practices. Analytically the concept enables to distinguish between Global,Regional and Local levels and thier linkages. It also helps in applied perspective on water problems.

9. Clinical Evaluation of Occupational Lead Exposure on Bus Drivers in various route of South Kolkata, India

Soumendra Darbar* and Tapan Kumar Pal

Bioequivalence Study Centre,
Department of Pharmaceutical Technology
Jadavpur University,
Kolkata-700 032
E-mail : darbarsoumendra@gmail.com.

Keywords : *Lead toxicity, Kolkata, Air pollution, Lead analysis, Health hazards.*

Studies conducted throughout the world has established beyond doubt that elevated blood lead levels may lead to detrimental health effects. It is an environmental toxicant that affects nearly every system in the body. Lead is a highly toxic substance, exposure to which can produce a wide range of adverse health effects. There are many ways in which humans are exposed to lead *i.e.*, through deteriorating paint, lead batteries, household dust, bare soil, air, automobile emission, drinking water, food, ceramics, home remedies, hair dyes and other cosmetics. Lead poisoning, the oldest recognized occupational disease, remains a danger for children and adults. In this study blood lead levels of about 252 adult male bus drivers, age ranges between 20-40 years, working in various route of South Kolkata were investigated. Very little information on the blood lead distribution of the adult male bus drivers is available. This study was undertaken to determine blood lead levels among adults spend most of their time in day and night besides some most congested main roads and crossings of south Kolkata. The results indicated that blood lead levels in the areas close to main roads ranged from 1.6 to 26.42 ìg/dl, with a median level of 12.02 ìg/dl. The blood lead levels of 86.14 % of adult equal or exceeded to 10 ìg/dl, the current international action levels. Automobile emission, dust, congested traffic; prolonged hours of work in the polluted areas, low nutritional status and lack of education were among the factors associated with elevated blood lead levels.

10. Dihydrogen Reduction of Organic Substrates by Using ZSM-5 Anchored Pd(II) Complexes as Catalyst

Priyanka Sagar and Rohit Kumar

Department of Chemistry, SSJ, Campus, Kumaun University,
Almora-263601, Uttrakhand
E-mail : sagarpriyanka_2006@yahoo.co.in

Keyword : *Pd (II) Complexes, ZSM-5, Nitrocompounds, Alkene, Alkyne, Catalytic Hydrogenation.*

The HZSM-5 was used to immobilize the homogeneous Pd (II) complexes of S-triazine derivatives and anthranilic acid. They were found very efficient towards the catalytic hydrogenation of alkenes, alkynes, nitrocompounds, benzaldehyde and benzil at 25^0C and 1.38 x10^3 KNm^{-2} pressure of molecular hydrogen. At this temperature and pressure of molecular hydrogen, ZSM-5 anchored Pd (II) complexes could be used repeatedly. DMF-Toluene (1:2) mixed solvents medium was found suitable for these complexes. No diminished catalytic activity was observed even after 15-20 repeated catalytic runs. This indicated that zero almost negligible leaching out phenomenon of the metal or metal complexes. Immobilized Pd (II) complexes were found more active, stable, thermo potent, eco-friendly and industrially applicable as compare to its homogeneous counterpart.

11. Primary Productivity of Ana Sagar Lake, Ajmer, Rajasthan

Sunil Dubey[1], Vijay Kumar Koli[2], Chhaya Bhatnagar[3] and Mohammed Yaseen[4]

[1]Department of Botany, University College of Science
Mohanlal Sukhadia University, Udaipur-313 001
[2,3]Aquatic Toxicology and Wildlife Research Laboratory
University College of Science, Department of Zoology,
Mohanlal Sukhadia University, Udaipur-313 001
[4]Dept. of Zoology, BNPG College, Mohanlal Sukhadia University,
Udaipur-313 001
Corresponding e-mail : yaseen_bio@rediffmail.com

Keywords : *Productivity, physico-chemical, Ana Sagar, GPP, NPP.*

Primary productivity and physico-chemical parameters were estimated in Ana Sagar Lake, Ajmer from September 2007 to August 2008. The study indicated that Primary productivity of lake was high (GPP 1.93 to 6.24 gC/m3/day and NPP 0.72 to 4.99 gC/m^3/day), which indicate that the lake was in eutrophic category. This productivity was also supported by phosphate (0.14 to 3.2 mg/l), nitrate (14.1 to 26.4 mg/l) and water temperature (16.4 to 28.3ºC).

12. Simple solutions to Tackle Climate Change

V. Venkateswara Sarma

Department of Biotechnology, School of Life Sciences,
Pondicherry University, R.V. Nagar, Kalapet,
Pondicherry-605 014

Keywords : *Multiple cropping, green house gases, carbon dioxide, methane, methylotrophs, carbon sequestration, carbon credits.*

Global warming and climate change are result of emission of Carbon dioxide, methane, and other green house gases which increased from industrial revolution in 18^{th} century. They increase global temperatures due to melting of polar ice caps resulting in rise of sea water thus inundating low lying areas. Though different experts have offered different solutions to mitigate this problem they are mostly expensive. However by adopting simple and cost-effective solutions global warming could be reduced through participatory approaches. These include (i) adopting multiple cropping system as one of the routine strategies where a few trees are planted along the boundary of the main crop in the agricultural fields, (ii) introducing methylotrophs (bacteria that consume methane) in rice fields so that they could reduce methane at the source itself, (iii) growing plants in desert areas by rerouting the sewage water to the desert areas where plants could grow after enough organic load is accumulated over a period of time. If more plants are grown in agricultural lands, waste lands, deserts, then more CO_2 gets fixed into the plants through photosynthesis thus reducing the global warming and climate change. These aspects will be further discussed in the conference.

13. Evaluation of the Status of Heavy Metal Pollution in an Important Ramsar Wetland System of India

U. P. Nasir[a], P. S. Harikumar[b], D. Brahmaiah[a] and B. R. Naidu[a]

[a]Central Pollution Control Board, Zonal Office-Vadodara,
Gujarat-390023
E-mail address : nasirchemistry@yahoo.com
[b]Central Water Analysis Laboratory,
Centre for Water Resources Development and Management,
Kozhikode-673571, Kerala

Keywords : *Heavy metal, sediment quality guidelines, degree of contamination, pollution load index, index of geo-accumulation.*

Indiscriminate industrialization and urbanization led to the increase of Pollution level. Agrochemicals, geochemical structure and industrial wastes create a potential source of heavy metal pollution in the aquatic environment. Wetlands are especially at risk of contamination by different contaminants from anthropogenic sources including heavy metals. A study has been conducted to understand the heavy metal contamination of the Vembanad wetland system, an important Ramsar site on India and its impact to the fresh water region of the Vembanad lake. Surface sediment samples were collected from six stations of the wetland including three from industrial zone and three from fresh water zone. The concentrations of copper, zinc, manganese, cadmium, lead, nickel and mercury were determined in the sediments. Highest heavy metal concentration was determined at industrial zone and lowest was found at southern upstream of the wetland system. Most metal levels in the sediments at the estuarine region exceeded the different sediment quality guidelines. Quality of sediment were evaluated using the numerical value of degree of contamination, pollution load index, sum of toxic units, enrichment factor and geo-accumulation index which showed severe pollution in the industrial zone. The ecotoxicity was determined by using effect range low/effect range median and threshold effect level/probable effect level values of environmental protection agency guideline. The percentage of heavy metal calculated with respect to the industrial zone as the base line and the correlation analysis with organic matter indicated that, mobility of the specific metal has higher impact on its concentration at the fresh water region of the wetland.

14. Application of Semiconductor Oxides Mediated Photocatalysis for Wastewater Treatment

Suja Devipriya, S. Yesodharan and E. P. Yesodharan*

Department of Ecology and Environmental Sciences,
Pondicherry University, Pondicherry-605 014
School of Environmental Studies,
Cochin University of Science and Technology,
Kochi-682022, Kerala
*School of Environmental Studies,
Cochin University of Science and Technology,
Kochi-682022, Kerala

Keywords : *Semiconductor oxides, photocatalysis, TiO_2, Water treatment.*

Semiconductor oxides mediated photocatalysts, as a means of removing chemical and bacterial contaminants from water has been receiving increased attention in recent years mainly due to its capacity to degrade a number of recalcitrant chemicals in gaseous or aqueous systems through relatively inexpensive procedures and the potential of using sunlight as the energy source. The method offers many advantages over traditional wastewater treatment techniques such as activated carbon adsorption, chemical oxidation, biological treatment, etc. Photocatalysis leads to complete mineralization of a variety of hazardous chemical and microbial pollutants into harmless products. The technique is now reaching the preindustrial level, with several pilot plants and prototypes being operational in various countries. This paper reviews major development in this area with special reference to wastewatwer treatment.

15. An Investigation into Water Quality Assessment and some Activity Based Project Work with reference to Ecological significance and its Effectiveness on Climate

Dr. Deepakkumar and J. Pandya

Dhanesh Mehta High School, Crescent Circle,
Bhavnagar-364002, Gujarat.

Why should we not use to apply traditional knowledge to solve our local level environment problem and save our intellectual property like earth, air, and water environment?

Bhavnagar district in Gujarat among 1600 kms coastal area sharply affected with hyper salinity and hyper acidity. There so many attempts have been done during last decade but the traditional approach related with the scientific empowerment improved the structure of acidic soil at coastal area. Farmers have scientific sense and they have implemented in their field. The creative sense should be implemented through the nation wide. So major salinity affected region of India may be solve by this traditional approach.

As far as above combination of formula related to supply in soil of coastal area by local level farmers nowadays scientifically proved to remove the salinity by traditional way of approach still we have not faith with the farmers wisdom which they are experienced with large numbers of attempts at their farms they are not only solving their problems but they are improving the environment of coastal area soil which is highly appreciated for environmental science.

We the teachers will put emphasis on that approach to the children to protect how our farmers take care of mother earth by supplying local level raw material from the coastal area and solved their problems.

To know all this parameters children of our academic field visited 20 villages with the use a questionnaire about our related problems and find out the real views from villagers, member of gram Panchayat, farmers, officers of GUJ.GOV and teacher, to got answers about water quality and after got 1000 views from various villages gained some innovative findings and apply such a useful suggestions to improve water quality assessment.

By doing activity based project work they gained tremendous virtues related to our local environmental issues and gained consciousness about surrounding environmental problems.

The above conceptualisation of agricultural phenomenon related to traditional knowledge and wisdom empowering very high scientifically proved by latest technology of science has made by not a scientist but by the experienced wisdom of farmers the cognitive domain analyse to supply the concentrate affluent of algae has been proved by COUNCIL OF AGRICULTURE RESEARCH INSTITUTE CSMCRI, DEP.OF FOODS AND NUTRITION, CENTRAL FOOD TECHNOLOGY INSTITUTE AND AGRICULTURL UNIVERSITY of Gujarat.

Last but not least we must put emphasize on innovations done by our local level invention, which is highly valuable to develop our agriculture based environment of soil and water.

16. Application of Cow Urine, Butter Milk and Blue Green Algae (Cyano Bacteria) on Crops and Soil To Decrease the Salinity and Improvment of Soil Evironment

Dr. Deepak J. Pandya

Dhanesh Mehta High School, Crescent Circle,
Bhavnagar-364002, Gujarat.
E-mail : pandyadeepakj@rediffmail.com

Why should we not use to apply traditional knowledge to solve our local level environment problem and save our intellectual property like earth, air, and water environment?

Bhavnagar district in Gujarat among 1600 kms coastal area sharply affected with hyper salinity and hyper acidity. There so many attempts have been done during last decade but the traditional approach related with the scientific empowerment improved the structure of acidic soil at coastal area. Farmers have scientific sense and they have implemented in their field. The creative sense should be implemented through the nation wide. So major salinity affected region of India may be solve by this traditional approach.

As far as above combination of formula related to supply in soil of coastal area by local level farmers nowadays scientifically proved to remove the salinity by traditional way of approach still we have not faith with the farmers wisdom which they are experienced with large numbers of attempts at their farms they are not only solving their problems but they are improving the environment of coastal area soil which is highly appreciated for environmental science.

We the teachers will put emphasis on that approach to the children to protect how our farmers take care of mother earth by supplying local level raw material from the coastal area and solved their problems.

The above conceptualisation of agricultural phenomenon related to traditional knowledge and wisdom empowering very high scientifically proved by latest technology of science has made by not a scientist but by the experienced wisdom of farmers the cognitive domain analyse to supply the concentrate affluent of algae has been proved by CSMCRI, DEP.OF FOODS AND NUTRITION, CENTRAL FOOD TECHNOLOGY INSTITUTE AND AGRICULTURL UNIVERSITY.

Last but not least we must put emphasize on innovations done by our local level invention, which is highly valuable to develop our environment.

17. Assessment of Groundwater Contamination by Metals and Nonmetals in Unnao

Namita Mishra and Shadma Naaz

Central Pollution Control Board, Zonal Office,
Lucknow
E-mail : shadma.naaz@gmail.com

Contamination of fluoride and metals reported in the groundwater of Unnao district and evidenced by many cases of fluorosis was assessed. In 30 representative samples collected as to cover whole district, arsenic and fluoride were found in maximum concentrations of 42.2 µg/l and 3.08 mg/l respectively. The fluoride concentration was found higher than above desired limit at 36% of the locations and at only 13% of the locations, it is above 1.5 mg/l i.e., at the unsafe level. Because the concentration of metals found well within the prescribed limits in industrial areas, showing source of contamination from geogenic inputs.

18. Analysis of Water Quality in Chennai City-A Statistical Approach

Dr. T. Senthilnathan[1*], K. V. Parvathavarthini[2] and Shanthi M. George[3]

[1]Professor, Department of Physics,
Vellammal Engineering College, Chennai-66
[2]Asst.Prof., Department of S&H (Physics),
S.A.Engineering College, Chennai-77
[3]Asst. Prof., Department of Physics,
R.M.K. Engineering College, Kavaraipettai

Key-words : *Ground water, physico-chemical parameter, water pollution.*

An investigation was carried out to study the ground water its nutrient status and physico-chemical characteristic of three different locations in Chennai. The present work has been conducted by monitoring two types of ground water (i.e) bore-well and hand pump. Attempts were made to study and analyze the physico-chemical characteristics of the water like temperature, pH, TSS, TDS, BOD, COD, iron ,alkalinity, fluoride , total coliform etc., to give a picture of quality parameter

in both hand pump and bore well of the three locations. The study also included the correlation coefficient analysis between the physico-chemical parameters. The significant values of the observed correlation coefficient is elaborately discussed in this paper and various suggestions to improve the water quality pertaining to the sampling station is also discussed.

19. Effect of Sulphur Dioxide Exposures and Inoculations with *Alternaria Brassicae* on Indian Mustard

Mujeebur Rahman Khan* and M. Mahmud Khan

Department of Plant Protection, Faculty of Agricultural Sciences,
Aligarh Muslim University, Aligarh-202 002, U.P.
*Email : mrkhan777in@yahoo.co.in

Keywords : *Air pollution, Alternaria brassicae, mustard cultivars*

Ten cultivars of Indian mustard, *Brassica juncea* were exposed to 2 (ambient), 25, 50 and 75 ppb SO_2 (5 h day^{-1} on alternate days for 3 months) in open top exposure chambers to evaluate resistance/tolerance against the gas. The exposures at 25 and 50 ppb SO_2 did not incite any measurable injury to mustard cultivars. However, 50 ppb SO_2caused visible injuries to all cultivars screened and led to a significant reduction in plant growth, yield, oil contents and leaf pigments (P=0.05). Effect of SO_2 was studied on leaf blight caused by *A. brassicae* on the mustard cultivars. The fungus was inoculated by spraying one month old plants with 5 ml spore suspension/ plant (10^{5-10} spores/ml). Fungus inoculated plants developed brown to black necrotic circular lesions, and severity of the blight increased on plants exposed to 50 ppb SO_2, but decreased at 75 ppb SO_2. The interaction between the gas and the fungus was found to be dependent of SO_2 concentration. The gas at 25 and 50 ppb SO_2 promoted pathogenesis of *A. brassicae* as a result the cv. Rohini, expressing tolerance to the fungus, became susceptible and exhibited greater blight and plant growth reductions at 50 ppb SO_2; the gas injury was also relatively greater in this treatment. The gas also promoted sporulation of the fungus. Interaction of 75 ppb SO_2 and *A. brassicae* was found to be antagonistic. The study has shown that the effects of SO_2 on Alternaria blight were concentration dependent; the lower concentration (50 ppb SO_2) stimulated the disease whereas 75 ppb SO_2 suppressed the blight.

20. Screening of some Fungi for Removal of Melanoidin Pigment in Molasses Waste Water

Sanjay Patel

Mycological Research Laboratory, Department of Biological Sciences,
Rani Durgavati University, Jabalpur-482001
*Corresponding author E-mail : sanjay.micro@gmail.com

Key words : *Melonoidin; Decolourization; Molasses waste water; Fungi.*

Molasses is one of the most important by products of sugar production process. The molasses based distilleries generate a large volumes of high strength molasses waste water. Distillery molasses waste water is unwanted residual liquid waste effluent during alcohol production.This occurring a pollution which is one of the most critical environmental issue. Molasses waste water is dark brown colour due to recalcitrant melanoidin pigment. Melanoidin pigment is natural condensation product of sugar and amino acids produced by non-enzymatic maillard amino-carbonyl reaction taking place between the amino and carbonyl groups of inorganic substances. It reduces sunlight penetration in rivers and lakes which in turn decrease both photosynthetic activity dissolve oxygen concentration which affect aquatic life. Fungal isolates from effluent were screened for the ability to degrade these pigments. The present research work was to obtain fungi capable of decolorizing treated distillery molasses waste water. The primary screening was carried out in two stages. In the first stage 6 microorganisms had lower capacity of 25% decolourization of molasses waste water. In second stage 4 microorganisms had shown more decolourization of molasses waste water i.e more than 48 percent. An isolate of Trichoderma viride exhibited more decolorization as compared with other fungal isolates.

21. Climate Change and Global Challenges in the 21st Century

S. C. Dubey

Department of Physics, S.G.S. Govt. P.G. College,
Sidhi-486661 (M.P.)
E-mail : subhas1236@rediffmail.com

Keywords : *Climate Change, Global warming, Green House Gases, 11-year Sunspot Cycle, Solar Luminosity.*

During 1978, it has been observed that global changes are increasingly continuously and putting stress on the Earth's climate. Human activities and Industrial Revolution is not only cause of climate change and global warming. Of the many objects in the universe, only two are well known for our climate change and global warming, one is Earth itself and other the Sun. The Sun, which about five billion years old provides an unfailing source of light and energy. Our atmosphere is made up of Nitrogen (78%), Oxygen (21%), with water and other gases making up the remainder. This small remainder is made up of the trace gases Argon, Carbon Dioxide, Neon, Helium, Methane, Hydrogen, Nitrous Oxide and Ozone. The real increase in Co_2 levels in our atmosphere began around the time of the Industrial Revolution (since 1750s). The main Greenhouse Gases ~ Co_2, nitrous oxide and methane have all increased exponentially since the 1750s. Today the use of fossil fuel for power and electricity is increased thousands times in compassion to pre-industrial revolution. Higher concentrations of Greenhouse Gases make the blanket around our globe thicker, trapping more heat and turning the globe into a green house.

Variations in the Sun's total energy output (luminosity) follow a cyclicity of 11 years, are known as 11-year sunspot cycle. There is a close correlation between variations in the 11-year sunspot cycle and Earth's climate. The potential role of solar luminosity in modulating recent climate has been debated for many decades. Before the satellite period solar luminosity had been scaled from proxy data that exists large uncertainty. Recently, variations measured from spacecraft since 1978 are too small to have contributed appreciably to accelerate global warming over the past 32 years. The long-term trends in solar irradiance appear more plausible and produced modeled climates in better agreement. Solar activity varies on shorter-time scales, including the 11-year sunspot cycle and longer-term as Milankovitch cycle. The cyclical nature of the Sun's energy output is not yet fully understood; it differs from the very slow change that is happening within the Sun as it ages and evolves. The geospace is very sensitive to solar and geomagnetic activity, to changes in these activities and its manifestations in the near-Earth space environment and on the Earth. Additional climate forcing by changes in the Sun's output of ultraviolet light, and of magnetized plasmas, cannot be ruled out.

This paper addresses for climate change and global warming studies through space based and ground based observations. The adverse impact of global climate change in our ecosystems and challenges in the 21^{st} century along-with perspective role of solar luminosity change in recent climate change have been discussed.

22. Environmental Crimes and Social Accountability A Legal Perspective

R. Seyon[1] and R. Seyezhai[2]

[1]Advocate & Notary Public,
Mayiladuthurai-609 001.Tamil Nadu
[2]Assistant Professor, Department of EEE,
S.S.N. College of Engineering, Chennai.

Accountability is an organic concept applicable to all sections of hierarchy. But it is little tried. Accountability means responsibility for actions at all levels. The concept of accountability correlates to moral responsibility for an outcome that can be ascribed only to those whose choice of action is the cause of the outcome. In today's democratic world, accountability of society allows responsibility to be jointly negotiated and defined by all who exercise any degree of control over their work. Controls over crimes of environmental pollution can be legally exercised through.

23. Environmental Impact Assessment of A Riverine Ecosystem

Dr. K. Thirumathal

P.G.Department of Zoology,
A.P.A.College for Women, Palani -15.
Email : ID – thirumathalk@yahoo.com

Keywords : *River Amaravathy, Anthropogenic activities, Physical characters, Chemical characters and Biodiversity*

Running waters are paramount to human survival. Rivers are the treasure house of aquatic resources. India is blessed with major rivers. But nowadays the over exploitation leading to the severe impacts to the riverine abiotic and biotic characters. River Amaravathy, at Udumalpet, Tirupur, District, Tamilnadu, India is one of the important rivers of Tamilnadu. Now the river is polluted by different activities of the people living nearby. Hence, the present study has been undertaken at Madathukulam, to identify the pollution status by analyzing the physical, chemical and biological parameters such as phytoplankton and zooplankton.

24. Larvicidal activity of Crude Extracts of *Umbelliferae* Plants against Chikungunya Vector Mosquito *Aedes Aegypti*

Jojo Joseph Vellanikaran[1] and A. P Thomas[2]

[1]Department of Zoology, Kuriakose Elias College,
Mannanam, Kerala-686 561.
E mail : jojojosephv@gmail.com
[2]Director, ACESSD, School of Environmental Sciences,
M.G University, Kottayam, Kerala-686 008.
E mail : ambattu-ktm@sify.com

Keywords : *Larvicidal Activity, Umbelliferae, Phytochemicals, Synergic effect, Chikungunya, Aedes aegypti, Mosquito control, Crude extracts.*

Among the selected twelve Umbelliferae species, the extracts of five could induce significant mortality of *Aedes aegypti* larvae. Crude extracts of three species – *Ferula assa -foetida*, *Eryngium foetidum*, and *Hydrocotyle rotundifolia* exhibited potential larvicidal action. Differential larvicidal activity was seen for various solvent extracts and both *H. rotundifolia* and *E. foetidum* were found lethal to the larvae, the former was more effective. Synergic effect was observed when the crude extracts of *H. rotundifolia* and *E. foetidum* were used together. These two species are potential sources for larvicidal phytochemicals which may be used in mosquito control and eradication of Chikungunya. Isolation of the active principles from the crude extracts of Umbelliferae family may prove useful for the development of safe biocides in future.

25. Bioaccumulation of n-3 PUFA and Methyl Mercury in the Anadromous *Hilsa* (*Tenualosa*) *Lisha* Fish and its Eggs Available in West Bengal, India

Moumita Pal[*] and Mahua Ghosh

Dept. of Chemical Technology,
University of Calcutta 92, A.P.C. Road,
Kolkata-700 009

Keywords : *Hilsa fish, n-3 PUFA, Methyl mercury, Bioaccumulation*

The bioaccumulation of n-3 polyunsaturated fatty acid (PUFA) and organic mercury (methyl mercury) were assessed in various *Hilsa* (*Tenualosa*) *ilisha* fish samples available in West Bengal, India. The total lipid content and fatty acid composition of the lipid in various parts of the fish samples including egg were determined. The average content of organic mercury was also quantified in those tissues which ranged from 0.03-0.05 ìg/g of wet tissue which is quite below than the safe limit given by WHO. The study infers that that phytoplankton diet of Hilsa fish helps them to deposit PUFA rich lipid in their muscle tissues and the high lipid containing part allows them to bioaccumulate a higher amount of organic mercury (methyl mercury).

26. Environmental Radioactive Pollutants and Their Impact on Human Health

R. P. Chauhan

Department of physics,
National Institute of Technology
Kurukshetra-136119
E-mails : chauhanrpc@gmail.com, chauhanrpc@hotmail.com

Keywords : *Radiation; radon; thoron; lung cancer; health*

Radiations are spontaneously emitted by naturally occurring atomic elements like ^{238}U and ^{232}Th ever since their existence on the earth. These radioactive materials emit three types of radiations i.e. alpha, beta and gamma radiations, which differ in their energy and penetrating power. The other radiation sources are nuclear fall out from weapon tests, radioactive releases from nuclear reactor operations and accidents, exposure due to radioactive waste disposal and industrial, medical and use of radio isotopes in the agricultural production. The uranium, thorium rocks and the soil get decayed to a radioactive gas known as radon. Radon, along with its progeny, leak into the atmosphere where people inhale and get their lungs irradiated. Natural radiation is of particular importance because this source is the largest contributor even today to the collective dose of world population. Keeping this in mind the estimation annual effective doses received by the residents

and some industrial workers has been carried out using alpha sensitive solid-state nuclear track detectors (SSNTD). The annual effective radiation dose received by residents varied from 2.7-4.3 mSv while for workers its variation is from 4.1-7.0 mSv.

27. Screening of Dietary Substances : New Blockade Strategy on Quorum Sensing

M. Dhaneesha, D. Arathy Pai and H. Jayalakshmi

Amrita School of Biotechnology,
Amrita Vishwavidyapeetham,
Kollam-690 525

Keywords : *Quorum quenching, fruit extracts, Chromobacterium violaceum*

The increasing occurrence of multiresistant pathogenic bacterial strains has gradually rendered traditional antimicrobial treatment ineffective. Quorum sensing, which is ubiquitous in bacteria, is the cell density dependent expression of species in bacteria mediated by hormone like compounds called autoinducers. Quorum quenching, which is the ability to disrupt quorum sensing, has a great therapeutic potential. The observation that quorum sensing is linked to virulence factor production, suggest that many virulent microbes could potentially be rendered nonpathogenic by inhibition of their quorum sensing systems. Though antimicrobial properties of dietary phytochemicals is well known, their ability as quorum sensing modulators is less studied. The primary objective of this investigation was to determine the quorum sensing inhibition activity of common fruit extracts, viz., *Ananas cosmosus, Citrus sinensis, Vitis Concord Seedless, Punica granatum, Phyllanthus emblica, Anacardium occidentale, Lycopersicon esculentum, Malus domestica, Vitis muscat and Vitis vinifera*. The bacterial strain used was *Chromobacterium violaceum* MTCC 2656. Loss of purple pigment in *Chromobacterium violaceum* is indicative of quorum sensing inhibition by the fruit extract introduced. The experiments were done in triplicate using standard methods. 6 fruit extracts, viz., *Ananas cosmosus, Citrus sinensis, Vitis Concord Seedless, Punica granatum, Lycopersicon esculentum* and *Vitis muscat* expressed quorum quenching activity. *Phyllanthus emblica* showed antimicrobial

activity. Quantitative assessment of pigment inhibition indicated that the quorum quenching activity of the fruits is concentration dependent. *Citrus sinensis* showed lowest quorum quenching activity. The molecules within the extracts that are involved in the inhibition of quorum sensing and the mechanism of quorum quenching are to be studied as a future prospect in order to exploit the wide possibilities of quorum quenching as a possible future treatment scenario for infections caused by bacteria which regulate pathogenocity by means of quorum sensing.

28. Mitigation of Amaranth Dye (Toxic Dye) Through Steam Activated Pigmented Rice Husk Carbon as an Adsorbent From Aqueous Solutions

Beena Janveja[a], Krishan Kant[b], Jyoti Sharma[c],

[a]Dept. Chemistry, K.L. Mehta DN College for Women,
Faridabad (Haryana)-121 001
E-mail : beena_sethi@rediffmail.com
[b]Principal, Aggarwal College, Ballabhgarh,
Faridabad (Haryana)-121 004
E-mail : kkant_67@rediffmail.com
[c]Dept. Chemistry, R.R. College,
Alwar (Rajasthan)-301 001

Keywords : *Steam activated pigmented rice husk carbon, Amaranth dye, adsorption, agitation time, effluent, concentration, adsorbent*

In the present work, the steam activated pigmented carbon prepared from rice husk (B.N. ORYZA SATIVA) was investigated as an adsorbent to remove Amaranth dye from aqueous solutions. The adsorbent was investigated under variable system parameters, such as, initial concentration of the aqueous dye solution, agitation time and adsorbent amount. The results of the present study have indicated that an amount of 0.8g SAPRHC per litre could remove 43% of the dye from an aqueous solution of 10 ppm with agitation time increased from 30 to 300 minutes. The value of q_m are above 0.9 mg g^{-1} also support adsorption potential of SAPRHC. The results obtained indicate that SAPRHC can be used for removing dyes like Amaranth dye from water.

29. Reduction of BOD & COD from Sewage Water by Radiation Technology

Y. AVASN Maruthi[a*], N. Lakshmana Das[a], Kaizar Hossain[a], K. S. S. Sarma[b] K. P. Rawat[b] and S. Sabarwal[b]

[a]GITAM Institute of Science, GITAM University,
Visakhapatnam-530045, Andhra Pradesh
[b]Radiation Technology Development Division,
Bhabha Atomic Research Centre (BARC),
Mumbai-400085
*Corresponding Author : Y. A. Maruthi, Associate Professor,
Dept. of Environmental Studies, GIS, GITAM University,
Visakhapatnam-530045, Andhra Pradesh
E-mail : ymjournal03@yahoo.co.in.

Keywords : *Sewage water, BOD & COD Reduction, and Electron beam irradiation*

The current emphasis on environmental health and water pollution issues, there is an increasing awareness to dispose sewage water safely. Generally sewage water contains several organic and inorganic based chemicals which are toxic and non- biodegradable. Electron Beam treatment of wastewater is very effective to reduce BOD as well as COD. The experimental results elucidated that the percentage of reduction of BOD was 14 more as well as 32 % of reduction in COD with respect to increasing of irradiation doses(0.45 -6 kGy) using E beam Accelerator. EB treated waste water can be used for both irrigation and industrial purposes.

30. Growth of the Brown-tide Alga *Auteococcus Anophagefferens* in Presence of Metalachor : Its Potentiality for Bioremendiation

Sarabanti Basu[a], Megha Takkar[b] and Liping Wei[b]

Department of Biotechnology, Heritage Institute of Technology,
Chowbaga Road, Kolkata-700107
Department of Chemistry and Environmental Science,
New Jersey Institute of Technology, University Heights, Newark,
New Jersey-07102

Keywords : *Aureococcus anophagefferens, metolachlor, growth rate, pigment, lipid*

Metolachlor, one of the herbicides belonging to the chloroacetanilide group, is widely used in crop management of control pre-emergent and early post-emergent broadleaf and grass weeds. It has been detected widely in North American and European surface water, and its wide-spread application in Suffolk Country. NY, coincided with the first brown tide algal bloom in south shores of Long Island (Sufflok Country), NY in 1985-86. Brown tides have been reported and recurred in RI, NY, NJ and other northeastern US embayment since mid 1980's. In the present work, effect of metolachlor an Aureococcus anophagefferens, a pelagophyte responsible for brown tides, has been studied in two sequential batches. The alga was eposed to 400, 800 and 1,600 ug/L metolachlor in artificial sea water medium till they reached their early stationary phase. The cells were again exposed to the respective concentrations and the cells were allowed to grow till the determined for both batches. Cells were harvested for each batch for biochemical studies. A study of pigment profile by HPLC revealed decrease in some pigments of which carotene was worst affected. Amount of non-polar lipids was found to be increased in presence of metolachlor. Residual concentration of metolachlor was reduced in presence of Aureococcus anophagefferens. The study will be helpful in finding out the biochemical basis of the metolachlor resistance of Aureococcus anophagefferens and to check its potentioal for bioremediation of pesticides.

31. Conservation of Rural Wetlands is A Potential Tool to Fully Recharge The Present Deteriorating Under Ground Water In India

Rohtash Chand Gupta

Zoology, Kurukshetra University,
Kurukshetra-136119, Haryana

Considering the scarcity of underground water in cities like Shimala on one had and Shillong and Imphal on the other hand, rain water harvesting technology must be developed to a level where its adoption and implementation is sufficiently practicable. In this Endeavour, one very efficacious policy will be to focus attention on rural India. Customarily, each village possess six to eight ponds which rural

dialect are better known as SAROVARS, JHEELS, TALABS, TALAIAS, POKHARS etc.

In the recent past i.e. about 40 – 50 years ago, the entire rainy water was naturally diverted to these ponds. These ponds were put to multi – farious community use and simultaneously the nearby WELLS were put to use of domestic and agriculture practices. This cycle process was self driven. Now it has been to some extent interfered with due to eutrophication of ponds coupled with urbanization. This negatives process is gradually reaching its nadir. Sooner that letter, all ponds will become the thing of the past. Excessive extraction of underground water for irrigation in rural India will further complicated the situation. In these circumstances, experts from various related field of specialization should join hands to develop a very "SIMPLE EASY TO ADOPT AND IMPLEMENT" a technology whereby rain water in every village is diverted to ponds. In addition, all ponds should be necessarily categorized in official records to avoid encroachment by the REALITY SECTORY. This simple scheme will bear extremely fruitful results in lessen the problem of accelerated underground water depletion and negative effects on irrigation of crops.

In the regard a NATIONAL PROJECT be conceived at the apex level and implemented at village level with the participation spirit between PUBLIC and the EXECUTIVE. Rain water harvesting is the call of the hour in rural India scenario.

32. Organochlorine Insecticide Residues in Human Blood from High and Low Malaria Endemic of Assam

Swapnil Rai, A. K. Chopra, Dinesh Shara and P. M. Gupta

Mangalayatam Univerisity, Beswan,
Aligarh (U.P)-202145
Gurukula Kangri University,
Haridwar (U.K)-249407
E-mail : ssrai31@gmail.com

Keywords : *DDT, HCH, Gas chromatograph, Malaria endemic, Organochlorine*

Organochlorine pesticides have been of tremendous benefit to man and his environment but their inadverte nt use has caused considerable harm to human

health. Exposure of human to these hazardous chemicals occurs directly in the fields and indirectly due to consumption of contaminated diet or by inhalation or by dermal contact. Despite the proliferation of different types of pesticides, organochlorines such as HCH and DDT still account for two third of the total consumption in the country because of their low cost and versatility in action again various pests. Since Assam is an endemic area with perennial transmission where mosquito borne disease are serious health problems, these pesticides are still being used in huge quantities in disease vector control.

Therefore it will be interesting to determine the residual levels of DDT and HCH in human blood samples from district Sonitpur (high malaria and high DDT consumption) and Tinsukia (low malaria and low DDT consumption) of Assam. A total of 233 human blood samples have been collected from these two districts dividing each district into five locations and analyzed using Gas Chromatograph.

All human blood samples were found to be contaminated with different levels of DDT and HCH residues. The results demonstrated that the man levels of total DDT and HCH were 137.57up/l and 172.28up/l for district Sonitpur while the mean levels were 126.29 up/l and 111.39up/l for district Tinsukia.

33. A Study on The Photodegradation of Carboxylic Acids in Presence of Titania Nanocomposites

Ashish Kumar*, Azad Kumar and Rohit Srivastava[1]

*Chemistry Department,
Agra College Agra 1. D.E.I.,
Dayal Baag Agra

Keywords : *Photo-degradation, Water Quality, Carboxylic Acid*

TiO_2 is one of the most commonly used photo-catalyst because of its high oxidation power, stability, and non-toxicity. Cu-TiO_2 nanocomposites was prepared by a adopting the solution impregnation method. After characterization for crystalline phase and particle size by XRD analysis, both the commercially procured TiO_2 and synthesized Cu-TiO_2 nanocomposites were used as photo-catalyst in the photo-degradation of some carboxylic acids (Citric Acid and Acetic Acid,).The degradation

of these acids in the presence of pure TiO_2 and synthesized Cu-TiO_2 was done. The effective photo-degradation was found in case of Citric acid in the presence of Cu-TiO_2 as compared to pure TiO_2.

34. Effect of Calcium and Magnesium induced Hardness on the Toxicity of Lead to Microorganism in aquatic environment as measured by Bio-chemical Oxygen Demand

N. Nazar Khan

Professor & Dean, Academic, Applied Science Department,
VCT Kumaon Engineering College,
Dwarahat-263653 (Almora) Uttarakhand
E-mail : nnazar2000@gmail.com

Keywords : *BOD, Ca-hardness, Lead Toxicity, Microorganism, Mg-hardness, Nitrifying Bacteria Rate Constant, Ultimate BOD*

An experimental study was carried out to observe the effects of water hardness based on calcium and magnesium salt as sulphate at different concentrations ranging from 0 to 400 mg/l as $CaCO_3$ equivalent to Pb toxicity for nitrifying (azobactor) at 20° C and 30° C. The rate constant (K) and ultimate biochemical oxygen demand (L) have been calculated from BOD data taken for 1 to 15 days using Thomas Graphical Method. Glucose was used as the source of carbon for microorganism. The maximum values of BOD and ultimate BOD for nitrifying bacteria were found to be 377.0 and 424.76 mg l^{-1} respectively at 20^0C which was further increased to 385.00 and 438.37 mg l^{-1} respectively at 30^0C in the blank sets without Pb and hardness. While the minimum values of BOD and ultimate BOD were 181.0 and 202.07 mg l^{-1} respectively at 20^0C and increased up to 186.0 and 210.21 mg l^{-1} respectively at 30^0C in the control set lacking hardness but having 5 mg l^{-1} Pb (II) metal as sulphate. It was also observed that the toxicity of Pb to azobactor decreased with increasing calcium as well as magnesium hardness at both the temperatures. The percentage reduction of BOD (over control as without hardness and Pb) was found to decrease from 51.99 18.83 and 54.52 to 19.45 for Ca hardness at 20° C and 30° C respectively. Similarly, for Mg hardness at 20° C and 30° C, the percentage

reduction of BOD was decreased from 51.99 to 14.85 and 51.94 to 15.25 respectively. Rate constant (K) values were found to follow the decreasing order as Mg hardness at 30° C > Mg hardness at 20° C > Ca hardness at 30° C > Ca hardness at 20° C.

35. Monitoring of Herbicide (MH) Toxicity by using Pollen as Indicators Pollen of Mung - A Critical Review

S. A. Salgare

Salgare Research Foundation Pvt. Ltd.,
Prathamesh Society, Shivaji Chowk,
Karjat-401 201 (Maharashtra)
E-mail : drsalgare@rediffmail.com & drsalgare@gmail.com

Keywords : *Genetics and Plant Breeding, Palynology, Crop Physiology, Herbicides, Toxacology, Environmental Sciences.*

Potentiality of the germinability of pollen of *Phaseolus aureus* Roxb. (var. J-781, mung) was noted in all the 4 series *i.e.* F, F-24, F-48, F-72 series investigated. Pollen of F-24 and F-48 series produced higher percentage of the germination with the longer tubes than those of F series. Foliar applications of all the concentrations (5, 10, 25,50, 100, 200-200-1000, 1000-1000-5000 mg/ml) of maleic hydrazide (1, 2-dihydropyridazine, 3-6-dione) failed to suppress the cent percent pollen fertility. However, all the concentrations of MH above 400 mg/ml prevented the germination of pollen of all the 4 series investigated. When there is no germination of pollen the question of the transfer of the male gametes to the female gametophyte does not arises and when there is no transfer of male gametes to the female gametophyte the question of the fertilization and seed settings does not arises. Hence instead of suppressing the pollen fertility which is not possible even with such a high concentrations of MH we should suppress the germinability of pollen with such a low concentrations which gives the birth to the new method of plant breeding - 'Salgare's Method of Plant Breeding'.

It is also confirmed that the pollen development and activity are more sensitive indicators of adverse factors in the botanical environment and the use of an entire vascular plant as an indicator of pollution is a very crud method and rather a wrong choice. There is no evidence of any entire vascular plant exhibiting this much degree of sensitivity.

36. Impact of Hydro Electric Projects on Water Quality of River Bhagirathi (Ganga) in the High Altitude Region

N Semwal, J S Jangwan, Dilip Markandey, VK Sachan and B R Naidu

Central Pollution Control Board, Parivesh Bhavan, ZO- W,
Opposite VMC, Ward No.10, Subhanpura,
Vadodara-(0265) 2392831-33

Millions of Hindus from all parts of India and also from overseas flock to Gangotri, Uttarkashi, Devprayag and other spots along Bhagirathi to observe this majestic river and perform various religious activities. The major human activities which have been observed influencing the water quality of river Bhagirathi are; hydro-electric projects (HEPs), municipal waste (sewage & solid waste), religious activities like mass bathing, open defecation, indigenous fishing methods, landslides and soil erosion triggered by road construction.

Over last two decades a number of HEPs have been proposed, built or under construction on a 225 km stretch along the course of the Bhagirathi between Gangotri (3048 MSL) and Devprayag (475 MSL). The artificial alteration in natural flow of the river water due to reservoirs led to transformation in substratum composition of the river bed and brought about a lot of changes in the water quality characteristics viz., benthic fauna, water temperature, DO, suspended solids, turbidity, pH, metals and nutrient transportation. The alteration in metal and nutrient transportation would adversely affect the agricultural soil fertility of the Great Gangetic Plain and thus the food security of the country. Increase of water temperature and depth and decrease in DO values at HEP reservoirs affects the fauna and thus adversely impact the ecology of the river. The flow variation from Tehri reservoir has shown drastic impact on benthic macro- invertebrates as these animals were completely disappeared from reservoir downstream upto Devprayag.

The saying 'Prevention is better than cure' holds true for mitigation of environmental and social impacts of HEPs. It is worthwhile to abandon projects when the environmental and social costs to be paid are high. This paper briefly describes the physico-chemical and monitoring of benthic fauna of river stretch from Gangotri to Devprayag in the quantitative terms.

37. Relative Biosorpiton of Heavy Metals from Composited Multimetallic Aqueous System

Dilip Markandey, Raj K. Salar, N. Markandey and R. C. Trivedi

Central Pollution Control Board, Parivesh Bhavan, ZO-W,
Opposite Ward No. 10 VMC Office, Subhanpura,
Vadodara-390023, (0265) 2392831-33
E-mail : dilipkrmark@yahoo.com

Heavy metal pollution is an important problem in environmental degradation, stimulating interest in new methods using microorganisms to remove heavy metals. In order to combat this problem, the commonly used procedures for removing metal ions from dilute aqueous streams include chemical precipitation, ion exchange, reverse osmosis and solvent extraction. However, these techniques have certain disadvantages such as incomplete metal removal, high reagent and energy requirements, generation of toxic sludge or other waste products that require disposal. The hazardous wastes generated from metal mining and smelting operations also need to be decontaminated before entering into ecosystem.

Various microbes have shown potential to sequester and concentrate heavy metals from aqueous environments. The biosorption offers an economically feasible technology for efficient removal and recovery of metal(s) from aqueous solutions. The process of biosorption has many attractive features including the selective removal of metal(s) over a broad range of pH and temperature, its rapid kinetics of adsorption and desorption and low capital and operational costs. The biosorbents can easily be produced using inexpensive growth media or obtained as a byproduct from some industry. The composition of the medium may also have a direct effect on both passive adsorption and metabolic uptake. Biosorption includes passive adsorption of heavy metals at binding sites on the envelopes of cells and metabolically mediated uptake.

In the present investigation, an attempt had been made to assess the relative sorption efficiency of various isolates viz. *Rhizopus stolonifer, Penicillium citrinum,*

Aspergillus nidulans, Trichoderma viridae and *Candida tropicalis* under identical experimental conditions for heavy metals like Cd, Cu, Co, Cr (T), Ni and Zn from the multimetallic synthetic solution in the laboratory. The isolate *R. stolonifer* have shown maximum sorption of the test metals. Increase in initial metal concentration from 50 to 150 mg/L, pH 4.5, duration of exposure (5 h) and agitation (150 RPM) were assessed as optimum experimental variables for maximum sorption of target metals. The majority of metals could also be effectively recovered from the isolate like *A. nidulans.* However, the recovery from the loaded biomass of *R. stolonifer* was observed as least in majority of cases. Findings of the present study will be presented in this paper.

38. Water Pollution in Environment of Sugarcane Industries of Madhya Pradesh due to fungal toxicants

A. K. Pandey, Rashmi Dubey and A. K. Awasthi

Mycological Research Laboratories,
Department of Biological Sciences,
Rani Durgavati University,
Jabalpur-482001
E-mail : abhishekawasthi55@ymail.com

The sugar industries are playing an important role in the economic development of the Indian sub continent, but the effluents released produce a high degree of organic pollution in both aquatic and terrestrial ecosystems, which posses a serious health hazard to the rural and semi-urban populations that uses stream and river water for agriculture and domestic purposes, Such harmful water is injurious to plants, animals and human beings. The negative effects of various industrial effluents on seed germination, growth and yield of crop plants have captivated the attention of many workers. The present paper deals with the Environmental pollution caused in sugarcane industries of Madhya Pradesh. A total number of 21 fungal species belonging to 12 Genera of fungi were isolated during our investigation in effluent of various sugarcane industries of M.P. The prevalent fungi were *Aspergillus niger* 100%, *A. flavus* 100%, *Aspergillus candidus* 88.0 % and *A. nidulans* 88.0 % were found to be dominant.The results reported causes lot of losses to aquatic microorganism and agricultural fields of that area.

39. Air Quality Management during Common Wealth Games–2010 : Delhi

Shaveta Kohli*, Alok Kumar, F. Rehman, Srivastava, R. C. and Saha, D.

Air Laboratory Division, Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi-110 032.
E-mail : kohli.shaveta@gmail.com.

Keywords : *Air Quality Management, Common Wealth Games, Delhi*

The 19th Commonwealth Games (CWG) is being organized in Delhi, the capital city of India, during October 3 and 14, 2010. This is an event of paramount importance for India and accordingly steps have been initiated at various levels to make the event a great success. With its modern infrastructure in place, Delhi wishes to provide a healthy and enjoyable experience for all. The management of ambient air quality is one of the major concerns for the regulatory agencies. In Delhi, mixed combinations of manual and on-line analyzers (conventional and open path) have been placed at various locations, which would be utilized for monitoring of air quality and it's forecasting during the entire period of the games. The study is an attempt to describe the air quality status during this prestigious event being organized at Delhi. It is also proposed to make a presentation along with preventive and regulatory measures initiated for this particular event besides establishment of monitoring stations and instantaneous data transmission vis-à-vis implementation of preventive actions at various stages of games.

40. PAH and VOC Profile during an Accidental Fire at Oil Storage Depo in Jaipur

A. K. Sen*, P. Krishnamurthy*, Dolly Kulshreshtha[#] and S. K. Tyagi[$]

*Scientist 'B', # Scientific Assistant, $ Scientist 'D',
Central Pollution Control Board, Parivesh Bhavan,
East Arjun Nagar, Delhi-110032.
Email : scskt.cpcb@nic.in)

Key words : *Polynuclear Aromatic Hydrocarbons, Volatile Organic Compounds, $PM_{10,}$ Oil Depo*

A devastating fire accident has been occurred in an oil storage depo at Sitapur Industrial area, Jaipur on October 29, 2009 and the fire continued till November 11, 2009. The city Jaipur is situated at 26°55' North, 75°49' East & 26.92° North, 75.82°E.The average elevation from sea level is 432 meters. The burning of fuel in the storage tank released dark smoke including organic gases like Polynuclear Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) and inorganic gases like Sulpher-di- oxide, Nitrogen-di-oxide, Carbon monoxide etc. are transported into the surrounding areas. As fuel oils consist of mostly organic compounds such as PAH, VOCs which are highly toxic in nature and affected the humans, animals and vegetation system. Among them benzene and benzo(a)pyrene are known carcinogens. Keeping view of the above, CPCB has conducted an in-depth monitoring of inorganic and organic pollutants of the fire accident areas during Nov 4-5, 2009 to assess the environmental impact of the fire. In this paper, we have mainly emphasized organic pollutants like PAH and VOCs. Ambient monitoring was carried out at 5 locations at a distance of about 1 to 3 km away from the fire in the upwind and downwind directions. PM_{10} Particulate PAH in ambient air was sampled by Respirable Dust Sampler (RDS) equipment using EPM 2000 glass fiber filter paper which was extracted with toluene by ultra sonication followed by pre- concentration to 2 ml by rotary evaporator. The final sample was analyzed in GC-FID using ultra 2 capillary column. Ambient VOCs were adsorbed in Tenax and Chromosorb sorbent tubes in series by low flow pump and directly thermally desorbed and analyzed in GC-MS-ATD. The minimum and maximum concentration of benzene, toluene, ethylene benzene, m,p-xylene, o-xylene, naphthalene were found as 1.3-38.6 $\mu g/m^3$, 25.9 – 75.9 $\mu g/m^3$, ND – 27.5 $\mu g/m^3$, ND- 41.1 $\mu g/m^3$, ND-6.3 $\mu g/m^3$, ND-9.2 $\mu g/m^3$ respectively. The benzo(a)pyrene in particulate ranges from 2.16 ng/m^3 to 11.55 ng/m^3 and total PAH ranges from 21.51 ng/m^3 to 81.39 ng/m^3. Benzene and benzo(a)pyrene concentrations were observed quite high when compared with National Ambient Air Quality Standards (N AAQS) for benzene i.e. 5 $\mu g/m^3$ and benzo(a)pyrene i.e.,1 ng/m^3.

41. Analytical Performance Evaluation of the Laboratories of Pollution Control Boards and Committees participated in Analytical Quality Control Exercises (AQC) for Water Quality parameters carried out by Central Pollution Control Board

A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board, Zone Office (South),
Bangalore-560 010.
[2]Central Pollution Control Board,
Delhi-110 032

Analytical Quality Control (AQC), a part of Quality Assurance (QA) Programme, plays a vital role in any Environmental Monitoring Programme. The analytical data obtained in a monitoring programme is used for decision making purpose, upon which the entire scheme is executed by incorporating money, materials and man power. The Central Pollution Control Board (CPCB) is monitoring 1429 water quality monitoring stations comprising rivers, lakes, wells, and ground water spread over 27 states and 6 Union Territories through various State Pollution Control Boards(SPCBs) and Pollution Control Committees(PCCs). The water samples are being analysed in central or regional llaboratories of SPCB/ PCCs for various physico chemical and bacteriological parameters. In order to generate high quality analytical data as a part of Quality Assurance system, CPCB has started regular and organised Analytical Quality Control (AQC) exercise with the concerned laboratories from 1991 onwards as a continuous programme. Till March 2010, twenty five rounds of exercises were carried out for water quality parameters. At present there are 85 laboratories of SPCBs/PCCs participating under this programme.

Two synthetic water samples prepared in laboratory were distributed to all participating laboratories and analysis reports were obtained from laboratories. Robust Statistical analysis of data for arriving "*Reference value", (Median), standard deviation and Z – Scores values* were worked out. A total of 75 laboratories were considered for assessment and the **AQC performance index**

(API) in terms percentage was found with score of 60 % and above for 30 laboratories. In general performance of these laboratories for titrimetric methods of analysis is comparatively better than colorimetric methods. The performance of laboratories for various analytical parameters in the order decreasing percentage was as follows: Chloride(81) < BOD(75) < NH_3-N(73) < TKN(72) < Total Hardness(72) < Conductivity(71) < Calcium(70) < Magnesium (69) < Sulphate(69) < COD(68) < FDS(68) < Sodium(67) < Boron(66) < Potassium(66) < TSS(65) < TDS(65) < Chromium^{+6}(63) < PO4-P(62) < NO_3 – N (61) < Fluoride(60). The overall mean value was found as 68 %. Further it is observed that there is a continuous improvement in the performance of analysis as compared to earlier periods.

This exercise shall be a routine activity of Central Pollution Control Board for improving the analytical capability of the concerned laboratories. This paper deals with interpretation of the analytical results and suggestive measures for improvement of the analytical performance of the laboratories.

42. Dioxin and Furan Emission from Common Hazardous Waste Incinerators in Gujarat, India

A. R. Thakkar*, P. D. Bharne and B. R. Naidu*****

* Sc. B, ** Sc. C, *** Sc. D, Central Pollution Control Board,
West Zone Office, Vadodara, Gujarat

Key Words : *Dioxins, Furans, Hazardous Waste, CHWTSDF, Incinerator, Standard*

Dioxins and Furans are two families of related chemical compounds known as polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. Dioxins are the group of 75 related chemical compounds known as polychlorinated dibenzo-p-dioxins and furans are the group of 135 related chemical compounds known as polychlorinated dibenzofurans. Out of these, 17 pose a major health risk to human health, including 2, 3, 7, 8- tetrachlorodibenzo-p-dioxin (TCDD) is the most toxic compound of the dioxin group.

Dioxins and Furans are present in trace amounts throughout the environment. Minute amounts may be found in the air, food, water, soil and dust. Dioxins and furans are unwanted by products created in manufacturing of chemicals such as some disinfectants, wood preservatives, dyes and dyes intermediate, herbicides etc. They are also emitted during combustion processes such as the incineration of municipal and industrial waste, wood and gasoline burning.

Gujarat state in India accommodates large numbers chemical industries manufacturing variety of chemicals. The state is having around 3, 00,000 industries and out of which 7751 industries generate hazardous waste. As per the National Inventory of Hazardous Waste Generation and Management in India, 2009, published by CPCB, Gujarat generates incinerable hazardous waste to the tune of 1,08,622 Metric Ton Per Annum. For proper treatment and disposal of hazardous waste i.e. landfill, stabilisation and incineration, Common Hazardous Waste Treatment Storage Disposal Facilities (CHWTSDF) are developed in the state, and become pioneer in development of such facilities. There are eight CHWTSDF with landfill facility. Out of eight CHWTSDF, four facilities are having Common Hazardous Waste Incineration Facility (CHWIF) comprising storage facility of incinerable waste and incinerator. Possibility of generation of dioxin and furan while incineration of hazardous waste and municipal waste is very high as reported in many literatures.

The source emission monitoring carried out for Dioxins, Furans and other pollutants at two CHWIF at Gujarat viz M/s Gujarat Enviro Protection & Infrastructure Limited (GEPIL) Surat and M/s Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar. The paper is prepared which includes information on common hazardous waste incineration facilities, type and characteristics of incinerable hazardous waste, technical details of incinerators including air pollution control system, analysis results of source emission monitoring for Dioxins, Furans and other pollutants.

It is observed from the result that the Total Dioxin and Furan detected during the source emission monitoring were 0.0487 ngTEQ/Nm^3 and 0.00396 ngTEQ/Nm^3 at M/s GEPIL, Surat and M/s BEIL, Ankleshwar respectively. The results are well within the Standard (0.1 ngTEQ/Nm^3).

43. Trend analysis of Gaseous and Particulate Emission Data of Vadodara City and Identification of Transport Pathways using HYSPLIT Trajectory Model

Vinay Kumar Upadhyay*, D. Brahmaiah* and B. R. Naidu*

*Central Pollution Control Board.
Zonal Office-Vadodara,
Gujarat-390023
E-mail : vinay0408@gmail.com,

Keywords : *RSPM, Trend analysis, Mann-Kendall test, ANOVA, Hysplit trajectory model*

An important objective of many environmental monitoring programs is to detect changes or trends in pollution levels over time. Over the period 2005–2009, trend in concentrations of three major atmospheric pollutants were investigated (RSPM, SO_2 and NO_2) using modified non parametric Mann-Kendall test. This trend analysis was supplemented with ANOVA analysis to see significant difference in trend obtained at different sites (industrial, residential and commercial) during years of investigation. The Hybrid Single-Particle Lagrangian Integrated Trajectory model (HYSPLIT) is used to create seasonal air parcel trajectories to understand long distance movement of atmospheric pollutants in Vadodara City. This air mass trajectory results with surface meteorological data was used to interpret high and low concentration episodes in positive trend years.

44. Climate Change in Nanmangalam Reserve Forest and its Environs Near Chennai, Tamilnadu, India

G. Rajah

Vidhya Sagar Women's College (Arts & Science),
Chengalpattu-603111, Tamilnadu

Keywords : *Reserve Forest, Tropical Dry Evergreen Forest, Eucalyptus Plantation, Green House gases, Emission from Automobiles, Deforestation, Mining of Platinum minerals, Encroachment, Loss of Biodiversity*

The study area is a Tropical Dry Evergreen Forest and its surroundings at Nanmangalam near Chennai (India) and it extends over 420 hectares. The altitude

varies from 25m to 70m. It is situated 15 km south of Guindy and is in 13 Degree Northern latitude and 80 Degree Eastern longitude. A survey of this area has brought to light the occurrence of 520 Agiosperm species and many species of animals.

The green house gases especially CO2, SO2, CFC etc., are ever increasing in this atmosphere. The gases emitted from automobiles like Cars, Buses and two wheelers etc., cause air pollution which causes concern to the biodiversity including man. The emission from nearby companies and factories help in the global warming. Mining of blue metals already inside the forest led to decrease of biodiversity and increase in pollution. The blast with the chemicals cause air pollution.

I came to understand that recent findings of platinum and other ores in that area as well as in other areas may lead to mining of that ores leading to air pollution, water pollution and land pollution. It may increase global warming due to excavation of soil which will remove the trees from the forest. Since the forest already suffered from mining of blue metals, we should not encourage another mining of platinum minerals which lead to environmental pollution.

The climate change also induces the area to become desert. It also reduces the mangrove vegetation in the Adayar region in Chennai and other seashore areas of Kanchipuram Dist. Most of the mangrove vegetations disappeared due to man made pollution. Ground water resources are salty due to seepage from sea water. Agriculture is affected in this district due to seasonal changes, erratic rain, unexpected flood and cyclone, rise in temperature and saltish groundwater. The plants biodiversity will be vanished from the area where the mining is undertaken. Now, the question is whether we need fresh oxygen from the plants or green house gases and other pollutants?

The remedy is to involve youngsters, environmentalists, NGO’s and the Government for the reduction in global warming. The Government should reduce the number of plying cars by increasing Car parking fees. The people must be encouraged to travel by public transport. Eco-friendly biodiesel must be used for

running the automobiles. Solar energy should be used for cooking instead of wooden fuels from the forest. Growing of Eucalyptus trees must be stopped in the forest to avoid water scarcity. Afforestation is the time of the hour. We must protect our forest and improve them to the tune of 33% from present level to 21%. We should also produce electricity by means of wind energy. No dead bodies of animals and human beings should be burnt but they must be buried near trees to protect the ecosystem. Let all of us think globally and act locally.

45. Environmental Issues in Recycling of used Vehicles

Anjana Kumari V*, R. C. Saxena and R. S. Mahwar

Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi

There are about 7.22 (2004) million in use vehicles in the country and the country's annual production is about 11.18 (2008) million. There is no mandatory end of life for vehicles (ELV) in India. The existing legislation only requires the removal of 15 years old commercial vehicles in certain cities. The vehicles have parts made of different materials which vary from vehicle to vehicle depending on there make and even from model to model. These materials include right from ferrous and toxic metals to synthetic organic materials such as plastics. The recycling/disposal of the vehicles is therefore required to be done in an environmentally sound manner ensuring maximum recovery/reuse/recycle and generation of minimum residues to be disposed in a safe manner. The paper presents the review of environmental issues involved in recycling of used vehicles.

46. Evaluation of the Status of Heavy Metal Pollution in an Important Ramsar Wetland system of India

U. P. Nasir[a], P. S. Harikumar[b], D. Brahmaiah[a] and B. R. Naidu[a]

[a]Central Pollution Control Board,
Zonal Office-Vadodara,
Gujarat-390023
E-mail : nasirchemistry@yahoo.com
[b]Central Water Analysis Laboratory,
Centre for Water Resources Development and Management,
Kozhikode-673571, Kerala

Key words : *Heavy metal, sediment quality guidelines, degree of contamination, pollution load index, index of geo-accumulation.*

Indiscriminate industrialization and urbanization led to the increase of Pollution level. Agrochemicals, geochemical structure and industrial wastes create a potential source of heavy metal pollution in the aquatic environment. Wetlands are especially at risk of contamination by different contaminants from anthropogenic sources including heavy metals. A study has been conducted to understand the heavy metal contamination of the Vembanad wetland system, an important Ramsar site on India and its impact to the fresh water region of the Vembanad lake. Surface sediment samples were collected from six stations of the wetland including three from industrial zone and three from fresh water zone. The concentrations of copper, zinc, manganese, cadmium, lead, nickel and mercury were determined in the sediments. Highest heavy metal concentration was determined at industrial zone and lowest was found at southern upstream of the wetland system. Most metal levels in the sediments at the estuarine region exceeded the different sediment quality guidelines. Quality of sediment were evaluated using the numerical value of degree of contamination, pollution load index, sum of toxic units, enrichment factor and geo-accumulation index which showed severe pollution in the industrial zone. The ecotoxicity was determined by using effect range low/effect range median and threshold effect level/probable effect level values of environmental protection agency guideline. The percentage of heavy metal calculated with respect to the industrial zone as the base line and the correlation analysis with organic matter indicated that, mobility of the specific metal has higher impact on its concentration at the fresh water region of the wetland.

POSTER PRESENTATIONS

1. 3d City Modelling and Its Application Using Lidar Technology

Sheena A. D. and M. E. Geomatics
Anna University,
Chennai

Keywords : *3D, City model, Visualization, Infrastructure, Disaster Management.*

In this growing phase of urbanization and industrialization there is an emergent need of proper city planning systems. **3D city models** are digital representations of the Earth's surface and related objects belonging to urban areas. **3D city models** are real world representation useful in 3D visualization, planning the city in Infrastructure development, Information system for tourism, Intelligent transportation systems, Environmental aspects, Disaster Management, public rescue operations, real estate market, utility management, Military operations, Training of officers, Simulation of new buildings, Updating and keeping cadastral data, change detection and virtual reality.

LiDAR data (Light Detection and Ranging) is a relatively new technology for obtaining the earth's surface objects. This data when combined with digital orthophotos can be used to create highly detailed Digital Surface Models (DSMs) and eventually Digital 3D City Models. Research in 3D GIS helps to analyse the real world and the related issues using high quality 3D simulations towards sustainable infrastructure.

2. Status of Water Supply, Wastewater Generation and its Treatment in Class-I Cities and Class-II Towns in India

Jitendra Kr Vimal, A. K. Sinha and D. D. Basu
*[1]Jitendra Kr. Vimal, Junior Research Fellow,
Central Pollution Control Board, Delhi
[2]A.K.Sinha, Scientist 'C',
Central Pollution Control Board, Delhi
[3]D.D.Basu, Senior Scientist,
Central Pollution Control Board, Delhi

Keywords : *Water Supply, Municipal Sewage, Water Pollution, Sewage Generation*

Water supply and sanitation are indispensable needs for the improvement of the excellence of life and enhancement of productive efficiency of the people. Almost 80% of the water supplied for domestic use, comes out as wastewater. In most of the cases wastewater is let out untreated and it either sinks into the ground as a potential pollutant of ground water or is discharged into the natural drainage system causing pollution in downstream areas.

Municipal sewage is major source of water pollution in India, particularly in and around large urban centres. In India about 78% of the urban population has access to safe drinking water and about 38% of the urban population has access to sanitation services. The estimated sewage generation from Class-I Cities and Class-II Towns together is 38, 254 MLD, out of which only 11,787 MLD is being treated i.e. there is a capacity gap of 26, 467 MLD. Even the treatment capacity existing is also not effectively utilized due to operation and maintenance problem. Operation and maintenance of existing plants and sewage pumping stations is not satisfactory, as nearly 39% plants are not conforming to the general standards prescribed under the Environmental (Protection) Rules.

Thus, urgent attention is required of all concerned in this regard because if wastewater is not collected and treated properly, it will create directly contribution to the locally available freshwater supplies. Additionally, the cumulative results of untreated wastewater can have broad degenerative effects on both public health and ecosystem.

3. Antibacterial Evaluation of Selected Indigenous Medicinal Plants Against *Streptococcus Pneumoniae*

Radha Vaddavalli* and Dr. G. Bagyanarayana

Department of Botany, Osmania University,
Hyderabad 500 007.
E. mail : vradhika2005@gmail.com.

Keywords : *Antibiotics, Medicinal plants, Streptococcus pneumoniae*

Bacterial pneumonia is one of the four major killing disease world-wide. Pneumococcal disease are killing 140,000 Indian children under five age every year.

Due to antibiotic resistance in *Streptococcus pneumoniae* has been increasing quickly in recent years, and it is obviously urgent to discover new types of antibiotics from natural sources. In order to find new antipneumococcal extracts, an ethanobotanical survey has been conducted in different regions. Based on Auryeda practitioners *Acacia polyacantha, Boerhaavia diffusa, Colius forskholi, Evolvulus alsinoides, Garuga pinnata* are tested against *Streptococcus pneumoniae*. Antibacterial activities of the aqueous extracts of five plants were screened against penicillin-resistant *Streptococcus pneumoniae*. A significant activity has been observed with aqueous extracts of three plants; *Colius forskholi, Evolvulus alsinoides, Garuga pinnata.*

4. Study of the Exhaust Gases from Different Fuel Based Vehicles for Carbonyls and Methane Emissions

R. C. Saxena*, Anjana Kumari V. and Meetu Puri

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

In recent years, the automobiles are the major contributor to the overall pollution in the country. Carbonyl emissions from the vehicle exhaust causes pollution as well as various types of health hazards and material damages etc. Central Pollution Control Board (CPCB) carried out detailed study to evaluate and characterize carbonyls and methane emissions from different category of vehicle exhaust using various fuels. The paper contains the study details from selection of the vehicles, methodology, findings and the recommendations for control of carbonyls and methane emissions.

5. Status of the Vehicular Pollution Control Programme in India

R. S. Mahwar*, J. S. Kamyotra and S. P. Gautam

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

The growing cities, sharp increasing traffic, trajectory growth, rapid economic development and industrialization, and higher levels of energy consumption has

resulted an increase of pollution load in the urban environment. It is also accepted that automobiles have emerged as a critical source of urban air pollution specially in the developing world. Realizing the gravity of the problem, steps are being taken to introduce better technologies, better fuel quality, shift to environment friendly fuels, and mass transit system for the control of environmental pollution in urban areas.

The Central and State Governments in India have been developing strategies for mitigation measures to improve the urban air quality and make the cities cleaner and greener. Over the past decade or so, the Government of India has notified statutes aimed at regulating and monitoring vehicular emissions across the country.

The paper presents a review of the vehicular emission problems in Indian cities, the various developments that have taken place in the past including the studies conducted for assessment of the air quality in cities, the legislation and standards adopted for the control of vehicle emissions, the role of the various concerned agencies, the steps taken for improvement in the quality of the automotive fuel, the overall impact of these measures and the future strategy to be adopted for vehicular emission reduction and related issues.

6. Environmental issues involved in recycling of used vehicles

Anjana Kumari V*, R. C. Saxena and R.S. Mahwar

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

There are about 7.22 (2004) million in use vehicles in the country and the country's annual production is about 11.18 (2008) million. There is no mandatory end of life for vehicles (ELV) in India. The existing legislation only requires the removal of 15 years old commercial vehicles in certain cities. The vehicles have parts made of different materials which vary from vehicle to vehicle depending on there make and even from model to model. These materials include right from ferrous and toxic metals to synthetic organic materials such as plastics. The recycling/disposal of the vehicles is therefore required to be done in an environmentally sound manner ensuring maximum recovery/reuse/recycle and generation of minimum residues to be disposed in a safe manner. The paper presents the review of environmental issues involved in recycling of used vehicles.

7. Isolation of bacteriophages from sewage for removal of human pathogens from water and waste waters

Khadija Banu, Shilpi Yadav, Deepesh Valsan and Pratima Akolkar

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

Keywords : *Bacteriophage, Pathogens, Viruses, Sewage.*

Presence of human pathogens in water and waste waters is a public health concern. Monitoring of Total Coliforms as an indicator of human pathogen may not be adequate to indicate the presence of pathogens and viruses from water and wastewaters. Compared to detection of human enteric viruses in water and waste waters, baceriophage assays were found relatively inexpensive, easy to perform and provided overnight results. Present study deals with the isolation of baceriophages which specifically infected *E. coli*, *Klebsiella, Salmonella, Pseudomonas* and *Vibrio* from sewage. Potential of these phages may be applied for treatment of sewage and ultimate removal of human pathogens from surface waters.

8. Water Quality of A Fresh Water Pond : Chandra Sarovar, Jhalawar

Dr. Prahlad Dube

Biodiversity Research Laboratory,
Department of Zoology, Government College,
Kota, Rajasthan.
Email : dube_prahlad@rediffmail.com

Keywords : *Seasonal variations, physico-chemical parameters, biological characteristics*

Water is considered to be prime necessity of living beings. The importance of fresh water resources and the pollution thereof had been studied and discussed a lot. The climatic factors and catchment area of the water body play an important role in determining the physico-chemical and biological characteristics of water. Jhalawar district is rich in both lentic and lotic water resources. It is a surprising that in spite of so many natural and manmade water resources; very few

benchmark ecological studies are available in scientific literature. Present investigation was aimed at fulfilling this gap and an attempt to generate baseline data about this pond.

Chandra Sarovar is a natural rain-fed pond that was later developed for various kinds of uses. It retains water almost through out the year, except in the drought conditions. Water level keeps on fluctuating and so the physico-chemical parameters and biological characteristics of water.

A total of 20 physico-chemical and biological characteristics of water were studied for a period of two years (2008-2010). Fortnightly collected samples were analysed and results were recorded. Diurnal, Monthly and Seasonal variations were also recorded. Statistical methods were applied to these data and correlation was found out.

9. Characteristic of Effluent of Soda Ash Industry and its Impact on Marine Water in India

Shri Dinabandhu Gouda and Shri Paritosh Kumar

PCI-I Division, Central Pollution Control Board,
East Arjun Nagar, Delhi-32
E-mail : dinabandhu.cpcb@nic.in

Keywords : *Spent brine solution, Suspended solids, Flora and fauna, surface outfall.*

Soda Ash forms an important part of Indian inorganic chemical industry. It is a high volume, low value product and finds application mainly in the production of detergents (40%), glass (25%), chemicals (17%), sodium silicate (11%), pulp & paper and water treatment. The process of brine purification produces effluent as spent brine solution containing clay, silt, sand, calcium and magnesium carbonate, magnesium sulfate and high content of sodium & calcium chloride. The effluent is generally mixed with adequate quantity of seawater to reduce the concentration of suspended solids (SS) and discharged in the sea. The effluent from soda ash industry being heavier than seawater, the best option is to release it through a surface outfall at a location where sufficient dilution is expected. The composition of final effluent indicate that parameters temperature, pH, SS, ammonia and

calcium in the receiving seawater and carbonate contents in sediment around the effluent disposal site has been influenced and can have adverse effects on flora and fauna particularly around the disposal site. The studies were conducted at four locations viz. Mithapur, Porbandar, Sutrapada and Bhavnagar where Tata Chemicals Ltd, Saurashtra Chemicals Ltd, Gujarat Heavy Chemical Ltd and Nirma Ltd, respectively release their effluents.

10. Environmental Issues of Railway Sidings Handling Industrial materials

G. Rambabu*, R. C. Saxena, R. S. Mahwar and J. S. Kamyotra.
Central Pollution Control Board,
Parivesh Bhawan,
East Arjun Nagar, Delhi

The environmental problems arise in railway sidings due to improper storage, collection, transportation and disposal of waste generated, noise pollution, air pollution (dust particles, fugitive emission), untimely operation etc. The materials most involved in the railway sidings are coal, ores, cement etc. The handling to such materials is invariably associated with fugitive emissions from the loading/unloading operations and all associated activities such as movements of trucks, workers etc. It is therefore necessary to develop guidelines for Environmental Management of pollution problems associated during loading and unloading operation at railway sidings. The paper presents a review of the environmental issues of railway sidings handling industrial materials which includes coal, ores, cement etc. The study will cover assessment of the environmental status of some Railway Sidings.

11. Chemical and Bacteriological Water Quality Status in Various Stretches of River Yamuna

Durgapal N. C., Ahuja G. K., Akolkar P. and Kamyotra J. S.
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi-110032

Keywords : *Yamuna River, Dissolved Oxygen, Biochemical Oxygen Demand, Total Coliform and Faecal Coliform*

The entire 1376 Km long Yamuna River from Yamunotri to Allahabad was monitored for chemical and bacteriological parameters during the year 2009 at 21 locations representing various river stretches. Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD) were observed in the range of 6.3- 11.6 mg/l and 1-2 mg/l respectively in the 157 Km. stretch from Yamunotri to Hathnikund barrage (Himalayan stretch). The Total Coliform (TC) and Faecal Coliform (FC) observed in this stretch were in the range of $161x10^2$ – $49x10^5$ Nos./100 ml and 400-$69x10^4$ Nos./100 ml respectively. The 210 km river stretch from Hathnikund barrage to Wazirabad barrage in Delhi (Upper stretch) was found almost dry except D/s Palla during the period April to September due to diversion of water into canals. The values of DO, BOD, TC and FC varied in this stretch between 4.1-11.1 mg/l, 1-7 mg/l, $25x10^3$-$33x10^6$ Nos./100 ml and 600- $83x10^4$ Nos./100 ml respectively. Further downstream in 22 km Delhi stretch between Wazirabad barrage to Okhla barrage the river was devoid of dissolve Oxygen having BOD level of 7-33 mg/l, TC $35x10^5$-$41x10^7$ Nos./100 ml and FC $33x10^4$-$179x10^5$ Nos./100 ml. In 557 km river stretch from Okhla barrage to Chambal River confluence (Mixed stretch) the values of DO, BOD, TC and FC varied between 0.0-17.9 mg/l, 3-32 mg/l, $70x10^3$- $175x10^6$ Nos./100 ml and $3x10^3$- $54x10^5$ Nos./100 ml respectively. In the last 416 Km Yamuna River stretch from Chambal River confluence till its confluence with river Ganga at Allahabad (Diluted stretch) the variations in the values of DO, BOD, TC and FC were 4.5-13.8 mg/l, 1-7 mg/l, $9x10^3$- $67x10^5$ Nos./100 ml and $2x10^3$-$134x10^4$ Nos./100 ml respectively. Study indicated that Delhi stretch of river is severely polluted.

12. Seasonal Variation in Biological Water Quality for Various Designated Best-uses of River Yamuna

Mamta Rani, Pratima Akolkar and H. S. Bhamrah

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi.

Keywords : *Bio-monitoring, Saprobic score, Diversity score, Biological water quality class.*

Bio-monitoring of River Yamuna was carried out from its origin to confluence to River Ganga using Saprobic score and Diversity score of benthic macro-

invertebrates, during October-November,2009 and May-June,2010. The biological water quality indicated Clean water quality Class'A' at Yamunotri and Hanumanchetty during summers and became slightly polluted in water quality Class'B' in winter season. The water quality at these locations may be used as drinking water source after disinfection and for Outdoor bathing. During summer water quality ranged between clean Class 'A' to moderately polluted Class 'C' at Dakpatthar where the river water is mostly used for irrigation and drinking water source of Western and Eastern Yamuna Canals. The biological water quality remained moderately polluted Class 'C'at Delhi (Palla), Mathura, Agra and Allahabad thus indicating its best use as drinking water source after conventional treatment.

13. Study of Ground Water Quality in Industrial Zone of Visakhapatnam

Sk. Rameeza[1*], V. N. V. Srikant[2], D. Mallikarjuna Rao[1] and Ch. Ramakrishna[1]

[1]Department of Environmental Studies,
GITAM University,
Visakhapatnam, A.P
[2]Department of Environmental Studies,
Nagarjuna University,
Guntur, A.P

Keywords : *Industrial area, Water samples and water quality.*

This paper presents quality of water samples from bore wells as well as open wells in and around the industrial zone of Visakhapatnam in order to find out the magnitude of health problems in industrial areas. The natural quality of ground water tends to be degraded by human activities. Ten groundwater samples collected from the study area were measured and mentioned. The study revealed that the water was slightly alkaline (PH: 6.5 – 8.5), moderately hard (TH: 64 – 292), and TDS values ranged from 380 – 1600 mg/l). The study was reported some other important parameters which exceeded the permissible limit and it is unsuitable for drinking purposes.

14. Salinity and Sodicity Problems in Arid and Semi arid Regions of Rajasthan Soils

C. S. Chouhan, K. C. Sharma[1], M. P. Punia[2] and K. K. Sharma[3]

Department of Applied Chemistry, Birla Institute of Technology,
Mesra (Ranchi) Extension Centre,
Jaipur-302017, Rajasthan
[1]Department of Environmental Studies,
Maharshi Dayanand Saraswati University,
Ajmer-305009, Rajasthan
[2]Remote Sensing Division,
Birla Institute of Technology, Mesra (Ranchi)
Extension Centre, Jaipur-302017
[3]Department of Soil Science and Agricultural Chemistry,
S.K.N. College, Jobner-303329, Jaipur, Rajasthan.
E-mail : drcschouhan@gmail.com

Keywords : *Salinity, Sodicity, Arid, Semi-arid, Rajasthan.*

Rajasthan comes in the driest state in the country. Geologically, soils of the state are varied in nature i.e. sandy, saline, alkaline and slightly calcareous. Sand fall is common phenomenon to the state when wind velocity is quite higher during summers. The state receives scanty precipitation. The annual rainfall is below 500mm and temperature reaches upto 46 ^{o}C. Due to extreme of temperature, high evaporative losses ultimately increasing the concentration of soluble salts in surface soils of arid and semi-arid regions of Rajasthan. The soil of the state is low in nutrient contents due to high aridity index. Soils of the state have high pH, electrical conductance, high Na and poor in organic carbon due to sparse vegetation and low biomass available to decomposition to the soil. In these regions, soils have high sodium absorption ratio (SAR) and exchangeable sodium percentage (ESP). Soil salinity adversely affects the agricultural productivity and vast amount of land is converted into barren fields. Generally, saline soils contain soluble salts viz. SO_4^{2-} and Cl^- while sodic soils have exchangeable Na^+ salts. These salts severely retarded the growth of plant as well as soil ecosystem.

15. Impact of Tannery Effluent on Ganga River at Kanpur (U.P.), India

S. D. Tiwari and S. Katiyar

Department of Biochemistry,
Institute of Bioscience and Biotechnology,
C S J M University,
Kanpur-208024

Keywords : *Conductivity, BOD, total solids, river Ganga, DO, summer season, monsoon season.*

The present study was undertaken to asses the quality of water in river Ganga important northern centre areas Kanpur. The water of Ganga suffer from encroachments, dumping and burning of wastes, and unchecked inflow of domestic and industrial effluents. The parameters studied were: colour, odour, temperature, pH, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, and alkalinity. Rapid development, increase in population of the cities and urbanization have resulted in the manifold increase in environmental pollution. The most affected are the water bodies which become highly polluted by industrial effluents. Dumping of solid chemical wastes in Jajmau is the major concern.

A water sample was collected from upstream (P) and downstream (S) of Ganga river along different points (P1 – S3). The river was found to be highly turbid in the monsoon season, but BOD & COD significantly increase in summer while inversely decrease in DO. Study shows that significant negative correlation between BOD & DO ($P<0.05$). The mean range of different parameter observed as conductivity 84-118μs; DO during summer 4.413 ± 0.275 mg/L, monsoon 7.04 ± 0.456 mg/L; BOD during summer 51.71 ± 11.51 mg/L, during monsoon 77.68 ± 7.34 mg/L ($P<0.05$) and TS in summer 1158 ± 155.64 mg/L, monsoon 1245.25 ± 197.23 mg/L. A model study was also conducted and values of different model parameters were estimated.

16. Characterization and Antimicrobial Activity of Silver Nanoparticles Synthesised from *Biophytum Sensitivum*

K. Pillai Raji*[1], Bishwajeet Singh Bhardwaj[2], Deep Punj[2], N. Chandramohanakumar[1] and M. Kailasnath[3]

[1]Rajiv Gandhi Chair in Contemporary Studies,
Cochin University of Science and Technology,
Cochin-682 022

[2]Centre of Excellence in Lasers and Optoelectronic Sciences,
Cochin University of Science and Technology,
Cochin-682 022

[3]International School of Photonics,
Cochin University of Science and Technology,
Cochin-682 022

Email : rajinayana@gmail.com

Keywords : *Bioreduction, silver nanoparticles, Biophytum sensitivum, antimicrobial.*

Biosynthesis of nanoparticles has received increased attention due to a growing need to develop environmentally benign technologies in material synthesis. The possibility of using plants in the deliberate synthesis of nanoparticles is a recent phenomenon. A green, low-cost, reproducible aqueous room temperature synthesis of silver nanoparticles using *Biophytum sensitivum* is investigated. The Ag nanoparticle synthesis is modulated by varying the pH of the reaction medium. The bioreduction of the Ag+ ions was monitored intermittently by measuring the UV-Vis spectra of the solution. The nanoparticles obtained were characterized by Field Emission Scanning Electron Microscopy (FE-SEM), Energy Dispersive Spectroscopy (EDS), X-ray diffraction (XRD), Photoluminescence (PL), Fourier Transform Infrared Spectroscopy (FTIR) and Transmission Electron Microscopy (TEM) techniques. Variation of pH of the reaction medium consisting of silver nitrate and *Biophytum sensitivum* leaf extract gave silver nanoparticles of different shapes and size.

The in vitro antimicrobial activity of the synthesised Ag nanoparticles against common human bacterial pathogens were investigated using Agar disc diffusion technique on Mueller Hinton agar media. Standard antibiotics were used as positive controls. The zone of inhibition of the growth of the bacteria is compared with the

standard antibiotics. Analysis of the Minimum Inhibitory Concentration (MIC) was done. A significant zone of inhibition was obtained against Gram positive and Gram negative organisms. Microbes are unlikely to develop resistance against silver, as they do against conventional and narrow target antibiotics because the metal attacks a broad range of targets in the organisms which means that they would have to develop a host of mutations simultaneously to protect themselves. Biological method of high-yield, fast, and low cost synthesis of silver nanostructures for potential biomedical applications is an eco-friendly alternative with immense potential.

17. Eia For Pollution Control Management at Hospital Morgues and Forensic Tox Lab

Babul Bandyopadhyay*, Suparna Dutta[1], Tapas Kumar Bose[2] and Sankar Sa[3]

*Department of Toxicology Forensic Science Laboratory
Calcutta-700037
[1]Department of Forensic & State Medicine SSKM Hospital
Calcutta-700020
[2]Department of Forensic & State Medicine NRS Medical College
Calcutta-700014
[3]Department of Instrument Central Food laboratory
Calcutta-700016

Keywords : *EIA, Toxicology, Autopsy, Morgue, Odor, Blood, HAZOP, Risk management.*

The strong, unpleasant body and chemical odors are offensive to the employees working at Morgues and Forensic Toxicology Laboratory. Unfortunately, most ventilation systems only re-circulate room air and remove large particulate matter such as dirt, dust, and lint. Noxious body and chemical odors are left free to re-circulate in the air one breathes. Increase in concentration and result in serious indoor air pollution problems e.g. sick building syndrome. The prime objective of the present communication is to assess the environmental impact and heath risk hazard for ensuring as safety measures and pollution free atmosphere for the employees concerned. The Post Mortem and related Toxicology examination

has exposed to a wide variety of infectious agents, including blood borne and aerosolized pathogens - viruses, and Mycobacterium tuberculosis. The continuous exposure of employees in the unusual and polluted atmosphere of toxic and irritably odorous substances enhances the possibility and can lead some adverse health effects and diseases. The risk hazards must be substantially mitigated appropriately. It strictly points out the essential need for Environment Impact Assessment for pollution control management at Hospital Morgues and Forensic Toxicology Laboratory. The discharges of the labs and morgues are to be monitored with equal attention. The risk is always high and especially for those who are highly susceptible and/or highly exposed. The environment exposure for long days in service through different pathways of air, water etc. are awfully bad and frequent contamination of ground water, soil etc. lead to the life at risk. The experimental levels of metals, organic matters, wastes, bacterial and viral infections in the existing system can ensure ultimate harm to health and acute environmental hazards. It can be well checked to a reduced extent in proper designing of EIA control and Management.

18. Analysis & Treatment of Domestic Waste Water

Mr. S. T. Yerule*, Ms. V. A. Bhavsar and Ms. S. M. Patil

Department of Biotechnology, COCSIT College,
Latur, Maharashtra

Keywords : *Domestic water, Activated charcoal, sand bed filter.*

Water is the most vital source of all kinds of life on the earth. Quality of water is adversely affected both qualitatively and quantitatively by all kinds of human activities. So this views the current investigation on analysis & treatment of domestic effluent. The domestic water is analyzed by determining their physico-chemical properties & micro flora which is present in it. The physic-chemical parameters i.e. TS, TDS, BOD, COD, DO & alkalinity analyzed before & after treatment of domestic wastewater. For the treatment primary, secondary & tertiary methods are preferred. In secondary method sand Bed filter 7 activated charcoal filters is used. In the result it is found that after treatment the value of physic-chemical parameter get lowered.

19. Effect of Sodium Fluoride on Growth of Parent and Mutant Strains of Cyanobacteria

Surendra Singh[1] and Archna Tirkey[2]

[1,2]Algal Biotechnology laboratory, Dept. of Biological Sciences,
R.D.V.V., Jabalpur (M.P.)
Email : ID- singhbiosci@yahoo.co.in – archnatirkey2000@gmail.com

In the present investigation the toxicity of NaF in different cyanobacteria was studied. The cyanobacterial strains used were *Anabaena variabilis* (wild type and MHR), *Spirulina platensis* (Parent and Na- resistant strains) and *Nostoc muscorum*. The results showed that in *Anabaena variabilis* (wild type) 35mM, 40mM and 45mM concentration of NaF proved to be lethal (measured in terms of Chlorophyll a content) on 4^{th} day whereas 25mM and 30mM proved to be lethal on 8^{th} day. In case of MHR, the survivability of strain was observed upto 8^{th} day in 30mM, 35mM, 40mM and 45mM concentration of NaF. *Nostoc muscorum* survived upto 4^{th} day in30mM, 35mM, 40mM and 45mM concentration of NaF and 25mM was lethal at 12^{th} day. On the contrary, NaF (upto 45mM concentration) showed no effect on the growth *Spirulina platensis*(wild type and Na-resistant strain).

20. Arsenic Groundwater Contamination in Ballia (U.P.), India

Anupam Porwal, Shridhar Tiwari and S. Katiyar

Department of Biochemistry,
Institute of Bioscience and Biotechnology,
C. S. J. M. University, Kanpur-208024.

Keywords : *arsenic, Ganga river, drinking water, health*

This article is results of our survey on groundwater arsenic contamination in districts Ballia of Uttar Pradesh (UP) in the upstream and downstream of Ganga plain, India. Analyses of 50 well/handpump water samples revealed that arsenic concentrations in 73% exceeded 10 ìg/L, while rest of samples have arsenic level more than 45 ìg/L limits.The age of wells and handpump ranged from more than a year to 22 years, with an average of 5.4 years. Our study shows that older wells

and handpump had a greater chance of contamination. The depth of well and handpump was the major cause of contamination which varied from 5 to 20 m with a mean of 30.5 m. Present study shows the major region of arsenic contamination with reference to Gangatic plain.

21. Microbial Biotechnology for Composting of Municipal Solid Waste Generated from Jabalpur

[1]S. P. Gautam, [2]P. S. Bundela, [3]A. K. Pandey, [2]M. K. Awasthi and [2]S. Sarsaiya

[1]Chairman, Central Pollution Control Board,
New Delhi.
[2]Regional office M.P. Pollution Control Board,
Vijay Nagar Jabalpur (M.P.)
[3]Chairman, Private University Regulatory Commission,
Bhoj University Campus,
Kolar Road Bhopal (M.P.)

Keywords : *composting, consortium, toxicants, phytotoxicity, municipal solid waste.*

The aim of this works was to develop microbial technology for hastening the composting process by optimization of biochemical and biological parameters. The microbial community played a major role in effective degradation of complex molecules, helped in the amelioration of toxicants and quickened the period of composting. The widely followed methods of turned windrow system of composting of organic solid waste have solved the problem of bioerosol, odour and flies affecting the environment. Hence the turned windrow system of composting using microbial consortium was attempt and found to be effective for Jabalpur municipal solid waste. The present study was conducted at ranital trenching site and materials collected from eight different zone of Jabalpur city. During the composting process the microbial community structure belonged to mesophilic bacteria, spore forming bacteria, thermophilic bacteria, cellulolytic fungi Actinomycetes. The population dynamics in relation to physicochemical parameters were studied and temperature 60-70^{o}C, pH 6.5-7.5, moisture 50-60% maintain throughout the composting process in turned windrows. The studies on the environment impact of composting process showed that heavy metals contained were reduced after composting as compared

to other methods. To judge the compost maturity the phytotoxicity test using different seeds was conducted. The study indicated that compost is a good soil conditioner. The management of microbial community structure and the use of microbial consortium proved to be a viable technology in reducing the period of composting and handling the composting of municipal solid waste.

22. Cellulase Production by Dominant Fungi Isolated from Municipal Solid Waste Compost

S. P. Gautam[1], P. S. Bundela[2], A. K. Pandey[3], M. K. Awasthi[2] and S. Sarsaiya[2*]

[1]Central Pollution Control Board,
New Delhi
[2]Regional office, M.P. Pollution Control Board,
Vijay Nagar, Jabalpur (M.P.)
[3]Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University, Jabalpur (M.P.)

Keywords : *Fungi, cellulases, carbon source, cellulose*

Proper biotechnological utilization of municipal solid waste in the environment will eliminate pollution and convert them into useful by products. This situation has urged the technologies and studies various alternative technologies by microbial enzymes. The production of Cellulases (Filter paper activity, endoglucanase and â-glucanase) by dominant fungi like *Aspergillus niger, A. fumigatus, A. nidulans* and *A. flavus* on basal salt medium containing 1% CMC were compared. In the present study, *A. niger* isolated from municipal solid waste compost were produce significant amount of cellulases (1.861 FPase, 1.146 CMCase and 1.382 â-glucosidase in U/ml) while *A. fumigatus* and *A. nidulans* produce 2.248 FPase, 1.084 CMCase, 1.254 â-glucosidase and 1.743 FPase, 0.985 CMCase, 1.136 â-glucosidase respectively. Enzyme produced by *A. flavus was* 0.643 FPase, 0.432 CMCase and 0.662 â-glucosidase. The cellulase enzyme activity of *A. niger* was further tested by using different concentration of carbon sources. The results indicate that 1-1.5% CMC and 1% cellulose & glucose were effective as the carbon sources respectively. The cellulosic waste material can be used as low-cost carbon source for commercial cellulose production.

23. Does any Variation in Distribution Pattern of Mangroves Indicate Global Climate Change?

Punarbasu Chaudhuri

Department of Environmental Science,
University of Calcutta, 51/2,Hazra Road,
Kolkata-70019
Email : punarbasu_c@yahoo.com

Keywords : *Mangrove, Sundarban, Sonneratia caseolaris, Climate change*

A survey was conducted to find out the change in distribution pattern of mangroves along the upper starches of river Hooghly. In this survey it was observed that mangroves were growing naturally on non-saline soil near Kolkata along the banks of the river Hooghly. The chances of natural occurrence of mangroves near Kolkata is very low due to the long distance from Sundarban mangrove forest and fresh water regime of the river Hooghly, though it was reported that mangroves were present in Kolkata during the formation of the city (nearly 320 years ago). Such naturally grown mangrove first noticed by the author near Millennium Park of Kolkata (22°34.224'N, 88°20.565'E), which was a large *Sonneratia caseolaris* [L.] Engler, belonging to the family Sonneraticeae. Another mature tree of the same species was found at Panihati (22°42.192'N, 88°21.944'E), North 24 Parganas, which was situated further 20 km. North of Kolkata. No such tree was found beyond the upstream of this locality. Twenty nine mature trees of the same species with differential growth patterns were also found at different places of the upper stretch of the river Hooghly, starting from the confluence of the river Hooghly and Damodar in the south to Panihati in the north. Though it is reported that *Sonneratia caseolaris* grows in low saline regions but it is interesting that here this plants are growing in fresh water regime. Numerous mangrove associated species (*Derris trifolia*, *Cryptocoryne ciliata*, *Acanthus illicifolius* etc.) were also found sporadically throughout this stretch of the river Hooghly. As a part of this study, salinity, pH of water and salinity, pH and organic carbon content of soil of different locations were determined. In comparison with the previous data the salinity of the water has not been changing significantly in the last two decades. All the places where these plants are observed the salinity is found to be very less in comparison to mangrove habitat. Some experts are asserting that occurrence of these mangroves at and around Kolkata is an indicator of salinity rise

in the river Hooghly which is caused by global warming. However the results obtained so far from this study does not agree with this school of thought; it can only be concluded after the completion of this study. Occurrence of mangrove species in fresh water regime may add certain new directions regarding mangrove adaptations and dispersion ecology associated with the global climate change phenomenon.

24. An Assessment of Biocontrol Potentiality of Mangrove Plants of Indian Sundarban Against Plant Pathogenic Fungi

Punarbasu Chaudhuri

Department of Environmental Science,
University of Calcutta, 51/2,Hazra Road,
Kolkata-19
E-mail : punarbasu_c@yahoo.com

Keywords : *Mangrove plant, Fusarium oxysporum. Biocontrol*

The objective of the present study was to assess the biocontrol potentiality of a few mangrove plants of Indian Sundarban. Leaf, bark, root and reproductive parts of *Bruguiera gymnorrhiza, Rhizophora apiculata, Acanthus ilicifolius, Acrostichum aureum, Aegialitis rotundifolia, Excoecaria agallocha, Aegiceras corniculatum, Phoenix paludosa, Heritiera fomes, Nypa fruticans, Avicennia officinalis, Ceriops decandra* and *Sonneratia caseolaris* were collected and extracted by using eight different solvents namely water, ethanol, acetone, dimethyl sulfoxide, chloroform, petroleum ether, benzene and hexane. A standard plant pathogenic fungi *Fusarium oxysporum* (MTCC No.-284) was procured from Microbial Type Collection Center (MTCC) of Institute of Microbial Technology, Chandigarh for this study. Biocontrol properties was determined by using disc-assay method. Out of the 13 selected mangroves, 12 plant extracts had fungicidal properties against this pathogen. Leaf extracts showed the highest activity followed by bark, root and fruit. Ethanol and acetone were found most effective among the 8 selected solvents. *Ceriops decandra, Heritiera fomes, Nypa fruticans, Bruguiera gymnorrhiza, Aegiceras corniculatum* and *Phoenix paludosa* were found most potential plant species for biocontrol of the test pathogen.

25. Effect of Cellulose and Carboxymethyl Cellulose on Production of Cellulases by *Aspergillus Niger*

S. P. Gautam[1], P. S. Bundela[2], A. K. Pandey[3], M. K. Awasthi[2] and S. Sarsaiya[2*]

[1]Central Pollution Control Board, New Delhi
[2]Regional office,
M.P. Pollution Control Board, Vijay Nagar
Jabalpur (M.P.)
E-mail : surendra_sarsaiya@yahoo.co.in
[3]Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University, Jabalpur (M.P.)

Keywords : *Aspergillus niger*, cellulases, carbon source, cellulose.

Proper biotechnological utilization of municipal solid waste in the environment will eliminate pollution and convert them into useful by products. This situation has urged the technologies and studies various alternative technologies by microbial enzymes. The production of Cellulases (Filter paper activity, endoglucanase and â-glucanase) by *Aspergillus niger* on two different carbon sources were compared. Carboxymethyl cellulose containing media gave the highest mycelia weight of 1.294 mg/flask. Maximum Cellulase enzyme activity (Filter paper activity, endoglucanase and â-glucanase) were obtained from the culture containing carboxymethyl cellulose then cellulose. The waste cellulosic material can be used as low-cost carbon source for commercial cellulose production.

26. Studies on Municipal Solid Waste Management in Jabalpur City-A Case Study

S. P. Gautam[1], P. S. Bundela[2], A. K. Pandey[3] and R. K. Mishra

[1]Central Pollution Control Board, New Delhi
[2]Regional office, M.P. Pollution Control Board,
Vijay Nagar, Jabalpur (M.P.)
[3]Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University, Jabalpur (M.P.)

Keywords : *Municipal solid waste, disposal, Storage*

Solid waste management is a worldwide phenomenon. The present scenario of municipal solid waste management (MSWM) in four study countries of Asia – namely India, China, Sri Lanka and Thailand is highlighted comparing technical, economic, legal and, health issues. It is a big challenge all over the world for human beings. The problem of municipal solid waste management (MSWM) is also prevailing in the urban environment of Jabalpur. Therefore the present study was taken to find out the problems and prospects of Municipal solid waste in Jabalpur city. A detailed investigation was made regarding the methods of practices associated with sources, quantity generated, collection, transportation, storage, treatment and disposal of municipal solid waste in Jabalpur city. The data concerning to municipal solid waste in Jabalpur was obtained through individual field visit, interacting with people and authentic record of municipal corporation and Regional office M.P. Pollution Control Board, Jabalpur. Photographic evidences were also made about generation, storage, collection, transportation, treatment and disposal of MSW. This study reveals that the present system of municipal solid waste management in Jabalpur city was satisfactory.

27. Analysis & Treatment of Industrial Waste Water

S. D. Mahajan*, P. B. Patil, G. V. Naiknaware,
Ms. S. D. Gaikwad and Ms. V. A. Bhavsar
Department of Biotechnology, COCSIT College,
Latur, Maharashtra

Keywords : *Industrial water, Activated charcoal, sand bed filter.*

Water is the most vital source of all kinds of life on the earth. Quality of water is adversely affected both qualitatively and quantitatively by all kinds of human activities. So this view the current investigation on analysis & treatment of industrial effluent. The industrial water is analyzed by determining their physic-chemical properties & micro flora which is present in it. The physico-chemical parameters i.e. TS, TDS, BOD, COD, DO & alkalinity analyzed before & after treatment of industrial wastewater. For the treatment primary, secondary & tertiary methods are

preferred. In secondary method sand Bed filter 7 activated charcoal filter is used. In the result it is found that after treatment the value of physic-chemical parameter get lowered.

28. Impact of Mass Bathing on Water Quality of Shiv Sagar Pond, Khajuraho M.P.

L. N. Gupta, J. S. Parihar*, S. P. Parihar and G. S. Gupta**

Pollution Research Laboratory,
Department of Energy & Environment,
Faculty of Science & Environment,
Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya,
Chitrakoot-485 780, Satna, M.P.
E-mail : lnchitrakoot@gmail.com.
Department of Chemistry* and Botany**
Govt. Maharaja Autonomous P.G. College,
Chhatarpur-471 001, M.P.

Keywords : *Shiv Sagar pond, Mass bathing, Auspicious days, BOD, COD*

The present study, monitoring of water quality of Shiv Sagar pond, Khajuraho was carried out to assess the impact of mass bathing. Shiv Sagar pond is situated at distance of 9 Km from Khajuraho railway station in south direction. The total catchments area of pond was $75x\ 10^2$ square kilometer. Monitoring was performed on various occasions of mass bathing viz. Deepawali, Amavasya, Makar Sankranti, Maha Shivratri, etc. The parameters investigated were temperature, colour, odour, turbidity, transparency, pH, conductivity, total solids, dissolved solids, suspended solids, total hardness, calcium hardness, magnesium hardness, calcium , magnesium, chloride, sulphate, nitrate, DO, BOD, COD, and total coliform. Values of BOD, COD, and total coliform. values exceeded from their permissible limits prescribed by CPCB, BIS and WHO. High values of above parameters were noticed due to the religious offering of various goods i.e flowers, milk, wheat, rice, ghee, oil, flour, etc. in the pond by the large number of pilgrims or devotees. Except BOD, COD, and total coliform, values of all above parameters were found within their permissible limits.

29. The changes in the biochemical and microbiological parameters of tolly nullah in the pre and post metro constructional work

Ayantika Bhattacharjee, Debanjan Mukherjee, Sayantan Goswami*, Soham Bagchi, Richa Mishra, Avika Roy and Sudeshna Shyam Choudhury**

Department of Microbiology,
St. Xavier's College 30, Park Street,
Kolkata-700016, West Bengal.
E-mail : *mail2rip@gmail.com
E-mail : **mantul2000@rediffmail.com

Keywords : *Tolly-Nullah, Metro, Metal, MPN test, IMViC test*

Kolkata, one of the densest cities of India, has only 6% -7% of its land used for vehicular transit. With a view of overcoming the traffic snarls the Government of India and the State Government of West Bengal introduced Metro services in 1984. The existing Dumdum-Tollygunge stretch had been recently extended southwards of Tollygunge till Garia, the extended lines having being built on overhead bridge over the Tolly-Nullah, a canal in the heart of the southern fringe of the city. This project was undertaken to have a comparative study of the water quality of the Tolly-Nullah prior to Metro construction and after it. The sample collected from the waters of the Tolly-Nullah prior to the construction was subjected to colony characterization and IMViC tests resulting in the isolation of- *Enterobacter* spp., *Escherichia* spp., *Klebsiella* spp. and *Aeromonas*_spp. Coliform content was found out by MPN test giving a coliform index of 1600/100 ml. Metal quantification was done by SGS INDIA Pvt. Ltd. Reports showed Cadmium (dissolved) (<0.005mg/l), Chromium (<0.01mg/l), Lead (0.01mg/l), Mercury (<0.001mg/l), Nickel (<0.01mg/l), Zinc (0.07mg/l).

After the construction a new sample was taken and analyzed to give five colonies- *Escherichia* spp., *Enterobacter* spp., *Actinomycetes* spp., *Klebsiella* spp., *Bacillus* spp. The MPN index came out to be 2400/100ml. Metal concentration showed changes with respect to Lead (0.04mg/l), Chromium (0.01mg/l), Zinc (0.1mg/l). The increase in the amount of lead, chromium and zinc refers to the extensive constructional work involving eradication of the local pre-existing slums, digging of the bed-soil, setting up of steel-iron pillars. It involved huge amount of

machineries, steel, iron, zinc alloys. One-third of the pillar remains under water from were there can be metal release into the water. Free chromium metal is not found in water as most water has chromium as a salt. So the increase in chromium can also be traced to the Metro construction. The arrival of some new species of soil-bacteria in the water may be due to extensive digging of soil and addition of huge amount of sludge. In future this site can act as a natural bio-remedial site due to the evolution of newer bacteria which in future may also show metal tolerance.

30. Isolation and Characterization of Plant Growth Promoting Rhizobacteria from Rhizosphere of Some Medicinal Plants

D. Malleswari and G. Bagyanarayana

Department of Botany, Osmania University,
Hyderabad-500 007
E-Mail : malleswari.d@gmail.com

Plant growth promoting rhizobacteria (PGPR) commonly inhabit rhizosphere of plants and enhance plant growth by exerting beneficial effects through production and release of metabolites. In the present study, a total of 102 bacterial isolates were obtained from the rhizosphere of some medicinal plants viz, *Coleus forskohlii, Andrographis paniculata, Withania somnifera, Ocimum sanctum, Aloe vera* and *Tagetes erecta* grown in the gardens at Osmania University and at Central Institute of Medicinal and Aromatic Plants (CIMAP) centre Hyderabad, India. All the isolates were screened for their plant growth promoting activities (PGP) viz, ammonia production, indole acetic acid (IAA) production, phosphate solubilization, HCN production, and antifungal activity. The results showed the bacterial isolates to differ in the levels of PGP activities. The range of percentage of positive isolates for each of PGP activities varied greatly : 96 (94%) isolates showed ammonia production, 27 (29.4%) isolates for IAA production, 51(50%) isolates for HCN production, 27 (26.4%) for phosphate solubilization and 27 (26.4%) isolates for antifungal activity against *Macrophomina phaseolina.* Only 38 isolates were selected as the best and were further tested for the production of chitinase and cellulase enzymes and subjected to seed germination tests. In seed germination tests, all these 38 bacterial isolates showed enhancement of growth promotion in sorghum, green gram and maize.

31. Mitigating Membrane Fouling by Understanding Feed Water Characteristics and Evaluating Coagulation Pretreatment

S. Kumaravel*, A. Anitha and D. Venkatesan****

*Former researcher at University of Duisburg-Essen,
Germany and currently Asst. Prof at the
Department of Chemical Engineering,
Sathyabama University, Chennai.
E-mail : kumars.post@gmail.com
**Asst. Prof, Department of Chemical Engineering,
Sathyabama University, Chennai

Keywords : *Water treatment–membranes– fouling – natural organic matter – pre-treatment - coagulation/flocculation*

In both, industrialized and developing countries, there is growing concern about the ability of traditional drinking water supply systems and existing technologies to cope with present and future demands and threats. Water supply in India faces opportunities as well as challenges promoting the application of advanced treatment technologies such as membrane filtration. Membranes are at the center stage these days when it comes to separation of materials and the use of membrane technology has been growing rapidly during the last few decades. This technology can improve drinking water quality and tackle pollutants of concern such as disinfection by-product precursors or trace organics. Membrane treatment of natural water (surface/sea water) to produce potable/process water and of wastewater for safe disposal is growing at a drastic rate owing to advantages like low energy consumption, no use of harsh chemicals, ease of use and maintenance. Hence it is seen as a sustainable step into the future.

Organic fouling has been identified as the most complicated problem facing MF/UF operations, due to its irreversible nature and difficulties with the cleaning procedure. It also initiates and supports bio-fouling of NF/RO as the organic foulants in the feed water are readily available as nutrients for microbial growth. So a clear understanding of the organic fouling is decisive for improving MF/UF operation performance; not only in the production of potable water from direct treatment of surface water, but also in the pre-treatment line prior to sea water reverse osmosis. Fouling on polymeric membranes is largely dependent on the nature and concentration of organic substances (TOC) in water. Different fractions

of the organic matrix have fairly different fouling tendencies. This paper describes the steps involved in the development and validation of a laboratory-scale unit to obtain water samples with different DOC-fractions with a volume sufficiently high to carry out further experiments on polymeric membranes to test fouling potential and mechanism of organic fractions of different particle/molecular size in natural surface water, and additionally help evaluate use of pre-treatment by coagulation/ flocculation to curtail irreversible organic fouling and provide steady membrane performance. Results indicated that the fractions produced have fairly different fouling potentials on UF/MF submerged capillary polymeric membranes and the influence of coagulation pre-treatment on minimising fouling is also quite different for the different fractions.

32. Estimation of Chromium Tolerance and Uptake by Bacteria Isolated from Rhizosphere of *Lemna* Growing in East Kolkata Wetland

Kaustuv Mukherjee, Sambita Modak, Shilajit Das, Snigdha Bhowmick, Arindam Ray, Sayantan Ghosh and Riddhi Majumder*

Department of Microbiology, St. Xavier's College,
30 Mother Teresa Sarani,
Kolkata-700016. West Bengal.*
E-mail : riddhimajumder@gmail.com

Keywords : *East Kolkata Wetlands, effluent treatment, Chromium uptake, bioremediation, Lemna.*

East Kolkata Wetland is a vast tract of salt-clan having direct connection with the Bay of Bengal. The presence of tanneries near the East Kolkata Wetlands has resulted in the release of chromium, chloride and sulfate rich effluent into these water bodies. Interestingly, a unique consortium of microbes and plants including hydrophytes like *Lemna* is abundant here. To elucidate their high tolerance levels, microbes associated with the rhizosphere of *Lemna* were studied. Three bacteria, isolated and characterized based on Gram's staining, colony formation patterns and enzyme assays, showed increased uptake of chromium indicating a possible role in the removal of chromium from the rhizosphere of plants. Thus, the consortium of microbes found here act as scavengers having increased potency for bioremediation, and along with *Lemna*, can be used for efficient rhizoremediation of effluents in waste-water treatment plants.

33. Short Term Variation in Air Quality Associated with Fire Work Events : A Case Study in Kolkata

R. Saha, S. Ekka, A. K. Naskar, K. N. Nandi, A. Rafique, A. Dubey, D. P. Mukhopadhyay and A. Chattopadhyay.

Central Pollution Control Board,
Kolkata

The effect of fireworks on air quality was assessed from the ambient concentrations of various air pollutants (SO_2, NO_2 & PM_{10}) during Diwali Festival in Kolkata City from 2006 to 2009. The extensive use of fireworks was found to be related to short term variation in air quality. During the festival, the concentration of SO_2 was observed to be increased 4 folds at few sites, whereas the concentration of NO_2, PM_{10} increased 3 folds compared to the data collected on a typical winter day in December. The maximum NO_2 concentration was observed a day after the festival. The diurnal pattern of the above pollutants showed a slight increase in the night. The levels of these pollutants observed during Diwali were found to be moderately high, which can be associated with serious health impact.

34. Assessment of *Acacia Auriculiformis* Hybrids for Raising Energy Plantations in Arid Lands

R. Anandalakshmi*, N. Krishna Kumar and V. K. W. Bachpai

Institute of Forest Genetics and tree Breeding, Coimbatore

Keywords : *Acacia auriculiformis, fuelwood, energy, firewood value index, calorific value*

India is one among the fast developing countries facing scarcity of energy resources and the demand is likely to increase exponentially in the years to come. Despite energy from fossil fuels, green energy sources in the form of biofuel and fuel wood can contribute substantially to combat the increasing energy crisis. Fuel wood from energy plantations not only meet wood energy needs

without affecting agricultural lands but also help green and enrich our waste and unproductive lands. Hence the suitability *Acacia auriculiformis x Acacia mangium* hybrids (*A. auriculiformis* hybrids) for raising large scale energy plantations on poor, arid lands was tested. Individual trees were selected based on growth performance from a two years and four months old trial of *A. auriculiformis* hybrid raised in 1 ha area at Forest Research Station, Vilamundi, Tamil Nadu and evaluated for their fuelwood characteristics. Comparison among the selected hybrid trees showed that tree 2 ranked first with the highest firewood value index (FVI) (207393), lowest ash content (1.85%), highest wood density (0.46 g/cc) and highest calorific value of (28.59 KJ/g). It could also be drawn that selecting hybrids of *A. auriculiformis* from harsh environments which exhibit good performance could be viable strategy for raising energy plantations in arid lands.

35. Biosorption of Selenate using an Agro-industrial Residue

D. Ranjan*, S. H. Hasan

Water Pollution Research Laboratory,
Department of Applied Chemistry,
Institute of Technology, Banaras Hindu University,
Varanasi-221 005 (U.P.),
E-mail : deeksha.ranjan.rs.apc@itbhu.ac.in

Keywords : *Selenium; biosorption; wheat bran; isotherm, thermodynamics; kinetics.*

Present study utilizes wheat bran for biosorption of selenate. Effect of various parameters (pH, temperature, initial metal ion concentration and biomass dose) was extensively investigated on uptake of metal ion. Langmuir, Freundlich and Dubinin-Radushkevich (D-R) isotherm models were applied and all three isotherms fitted well to sorption data. Maximum sorption capacity of wheat bran was found 80.65 ?g/g at 20 °C and pH 2.0. Thermodynamic study revealed sorption to be feasible, spontaneous and exothermic. Pseudo-second order kinetic models fitted well to kinetic data in comparison to pseudo-first-order and both surface adsorption as well as intraparticle diffusion contributed to the rate determining step.

36. Spatial And Temporal Analysis of Rainfall Variations in Tiruchirappalli District, Tamil Nadu

Dr. V. Emayavaramban and C. Ranganathan

Postgraduate Department of Geography,
Periyar EVR College, Autonomous
Tiruchirappalli

Keywords : *Rainfall, monsoon, convection, average, district*

This paper presents the spatial and temporal characteristics of Tiruchirappalli district's rainfall data in the context of climatic variability. Basic data consists of the monthly rainfall totals from 21 stations with a record length of 15 years, during the period 1995–2009. Basic elements of the rainfall climatology have been examined and then normalized rainfall anomaly series have been analysed for long-term trend and fluctuation and changes in runs of dry and wet years, for all of Tiruchirappalli district, rainfall regime regions, and individual stations. Tiruchirappalli district lies in the interior of Tamil Nadu, its climate is hot and dry. The annual mean maximum temperature is 37^{o} C and the mean minimum temperature in 26^{o} C. April and May are the hottest months in the year. The mean annual humidity is 72%. The air is generally dampest in the later half of October and driest in the later half of June. The mean annual rainfall of Tiruchirappalli district is 14993mm. The rainfall is in certain and the major portion of it falls in the months of September, October and November during the north-east monsoon. Rainfall is less during the south-west monsoon. The study area receives convectional rainfall significantly in April and May. Among the 21 stations in the district, Lalgudi gets high amount of rainfall and its average annual fall is 1017.31mm. Tiruchy town and Manapparai are the second and third places to get significant amount of rainfall. Before the year 2004 rainfall recorded in 21 stations, from 2005 it has been recorded in 26 stations.

Tiruchirappalli district is located at the Central part of Tamil Nadu surrounded by Perambalur district in the North, Pudukkotai district in the South, Karur and Dindigul districts in West and Thanjavur district in the East. It lies between 10^{o} 10' and 11^{o}20' of the northern latitude and 78^{o} 10' and 79^{o} 0' of eastern latitude in the centre part of the Tamil Nadu. The general slope of the district is towards east.

37. Mathematical Assessment of Drinking Water Quality and Effect of Monsoon at Moradabad, Uttar Pradesh (India)

Gaurav Kumar Rastogi[1*] and D.K.Sinha[2]

[1]Assistant Professor, Department of Applied Sciences & Humanities,
Sunderdeep Engineering College,
Ghaziabad-201001(U.P.)
Email : gauravsdec@rediff.com.
[2]Associate Professor & Head,
Department of Chemistry, KGK College,
Moradabad-244001 (U.P.)
Email : dkskgk@rediff.com.

Keywords : *Groundwater quality, water quality index, unit weight, quality rating*

Underground drinking water samples at six different sites of hand pump at Moradabad were collected and analysed for pre-monsoon period and after of onset of monsoon for fifteen different water quality parameter following standard method and procedures. With the help of this statistical data, water quality index has been calculated using W.H.O. drinking water standards. Comparison of W.Q.I. values with standard assumptions revealed that the underground drinking water invariably at all the sites for pre-monsoon period and after onset of monsoon as well was found to be severely polluted with W.Q.I. values more than 132. It is also observed that the water quality remained the same or changed slightly after onset of monsoon and there is no improvement in water quality during rains. The results on the basis of calculated values of W.Q.I. are similar to that on the basis of different physic0-chemical parameters. This way assessment of water quality on the basis of W.Q.I. is once again proved and people exposed to water of present study area are prone to health hazards of polluted during water.

38. Bioconversion of a Weed for Sustainable Livelihood

Rakhi Gopalan*. K. P., Rajalakhmi Subramanian and Suguna Yesodharan

School of Environmental Studies,
Cochin University of Science and Technology, Kochi-22
E-mail : *rakhigopalan@gmail.com

Keywords : *watwer hyacinth, oyster mushroom*

The water hyacinth, *Eichhornia crassipes* is an invasive weed whose capacity for growth and propagation cause major management problems in aquatic systems, with considerable socioeconomic impact. Rapid growth rate, and propagation and ability to successfully compete with other aquatic plants give rise to enormous amount of biomass that cover the water surface of a great variety of habitats often interfering with the use and management of water resources. Some of the principal problems are its interference with navigation, water flow, and the recreational use of aquatic systems. It is also responsible for drastic changes in the plant and animal communities of freshwater environments and acts as an agent for the spread of serious diseases in tropical countries. Hence it is pertinent to convert this menace into a resource for sustainable livelihood. Many interventions are being devised for the proper utilization of this bio-resource which includes mushroom cultivation, vermicomposting, paper making, ethanol extraction, etc.

The present research work was carried out to investigate the growth and yield performance of oyster mushroom(*Pleurotus eous*) on water hyacinth when used as a substrate in comparison with other conventional base materials like, paddy straw, coir pith, and saw dust. Mushroom cultivation is a profitable agri-business and oyster mushroom is an edible mushroom having excellent food value. Comparison of the time required for completion of spawn running, fruiting body formation, formation of pinheads and maturation period on different substrates are compared. Results indicated that of the different substrates, time required for all the above growth parameters was minimum in the case of water hyacinth substrate. The macro and micro nutrients in the mushroom were estimated. Moreover, presence of heavy metals in the mushroom were determined was found to be well within the limits prescribed by Prevention of Food Adultration standards. (PFA.)

39. Immunotoxicological Effects of the Pesticide Phosphamidon in the Fish *Cyprinus Carpio*

J. Savarimuthu Michael and *A. J. A. Ranjith Singh

Department of Advanced Zoology and Biotechnology,
Sri. Paramakalyani College, Alwarkurichi-627 412,
Tirunelveli District, Tamil Nadu,
E-mail : singhmispkc@gmail.com

Keywords : *Pesticide- phosphamidon, common carp, Cell mediated immunity, Humoral immunity and Sub-lethal dose*

Pesticides from agricultural activities have every change to pollute aquatic system, ground water table and affect the inhabitants and dependent of aquatic system. In the present investigation sub-lethal effect of an organophosphorus pesticide, phosphamidon (commercially Phamidon) to the fresh water fish, common carp *Cyprinus carpio* were studied. The pesticide phosphamidon at sub-lethal dose is also found to affect the functioning of immune system. The antibody titre values for different types of antigens (S-BSA, HA-BSA,Adj-BSA,SRBC) in the control and phosphamidon exposed fish were traced. In the phosphamidon exposed fish a reduction was observed in the primary and secondary immune response, when different types of antigenic challenges were given. Transplantation of scales was done in phosphamidon exposed fish and it was found that both cell mediated and humoral immunity was inhibited in phosphamidon treated fish.

40. Arsenic in Food Chain : Role of Geological set up from Bihar and Jharkhand (India)

Vikash Kumar Prabhat, Arun Kumar*
and Arvind kumar Dwivedi**
PG Department of Botany,
*Magadh University Bodh Gaya,
Mujhapparpur University,
**Garwa College, Gahwa

Keywords : *Arsenic, Jharkhand, Bihar, irrigation*

Amount of Arsenic in food crops and vegetables are possible difference between two geological set up viz. Bihar and Jharkhand. Arsenic contamination in ground water has become an additional concern visa-a-vis its use for irrigation purposes. Arsenic laden ground water in arsenic becoming irrigating soil enhance arsenic entry into food chain mainly Rice and vegetable. Irrigating a rice field with ground water containing 0.55mg/l of arsenic with a water requirement of 1000mm results a restricted addition of arsenic per hectare per annum in Bihar.

Concentration of Arsenic as high as 80mg/kg of soil was found in an area having arsenic contaminated irrigation and more than mg per kg of arsenic has been found in Arum (Kochu).Vegetables in middle Bihar irrigation of dry crops (Viz.Millet) are with minimum ground water. Relative amount of arsenic in soil and ground water in irrigation field are loss in Jharkhand. So there is less chance of arsenic mobilization in food chain from soil and ground. In Bihar however there has an ample scope to study of arsenic in food chain in middle Bihar and comparison with Jharkhand.

41. Phytotoxicity of Cadmium and Lead in *Hydrilla Verticillata* (l.f) Royle

Alka Singh and Dr. Abha Agarwal

Department of Botany, Bareilly College,
Bareilly-243006, U.P.

Keywords : *Hydrilla verticillata, Phytotoxicity, Heavy metals*

The toxicity of heavy metals Cadmium (Cd) and Lead (Pb) in aquatic plant *Hydrilla verticillata*(l.f) Royle were examined. Plants were acclimatized and exposed to 0.5, 1.0, 2.5, 5.0 ppm of Cd and 2.5, 5.0, 10.0, 20.0 ppm of Pb separately. Plants were harvested for analysis of several physio-chemical parameters after 03 days. Various physio-chemical parameters which were analyzed are Biomass, Chlorophyll, Carotenoid and Proline. Toxicity symptoms of Cd and Pb showed chlorosis and brittleness of leaves at higher meta.

42. Study of Urban Air Quality in Kolkata for Source Identification and Estimation of Ozone, Carbonyls, NOx and VOC Emissions

Meetu Puri*, Anjana Kumara V., R. C. Saxena and R. S. Mahwar

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

The fast urbanization, increasing traffic, economic growth trajectory, industrialization, and higher levels of energy consumption has resulted an increase

in pollution load in the urban environment. It has become essential to keep a continuous watch on emissions and profiles of various air pollutants specially the Hazardous Air Pollutants (HAPs) such as VOCs, Ketones, Aldehydes and Ozone. The Study of HAPs in urban air is even more important in the South-East Asian region including India where high levels of solar irradiation in combination with anthropogenic and biogenic ozone precursors favour photochemical ozone production. The adverse effect of VOCs is well established and includes their high Global Warming Potential (GWP), depletion of ozone layer, loss of bio-diversity etc. Central Pollution Control Board (CPCB) carried out a detailed monitoring study to measure the levels of Ozone, VOCs including carbonyls in ambient air in the metropolitan city of Kolkata.The paper contains the study details from selection of the monitoring locations, methodology, findings and the recommendations for the control of VOCs.

43. Air Pollution Tolerance Index of Plants Growing Near Talkatora Industrial Estate, Lucknow (U.P.)

Arti Trivedi*, Sandeep Shukla and Narendra Kumar

Department of Environmental Science,
Baba Saheb Bhimrao Ambedkar University, (A Central University),
Vidya Vihar, RaeBareli Road,
Lucknow-226 025 (U.P.)

Keywords : *Air pollution tolerance indices (APTI), Relative water content (RWC), Ascorbic acid (AA), Total leaf chlorophyll (TCh).*

The study examined the air pollution tolerance indices (APTI) of twenty five plant species around Talkatora industrial estate**,** Lucknow**,** U. P., India**.** Four physiological and biochemical parameters, which are leaf relative water content (RWC), Ascorbic acid content (AA), total leaf chlorophyll (TCh) and leaf extract pH were used to compute the APTI values. Based on the APTI values the plants were conveniently grouped as Tolerant (APTI value>17), Intermediate (>10<16), Sensitive (<10) and Very Sensitive (<1). The result showed order of ***tolerance*** *Ficus bengalensis > Ficus religiosa >Eucalyptus globlus >Azadirachta indica juss >Hevea brasiliensis >Syzygium cumini > Moringa oleifera* , Plants fall in

intermediate range were *Cassia fistula> Mangifera indica > Anthocephalus indicus > Acacia nilotica>Psidium guayava > Amaranthus spinosus > Bougainvillea spectabilis >Cestrum nocturum > Hibiscus rosa-sinensis > Delphinium denundatum > Ziziphus mauritiana > Calotropis procera.* The rest of plants fall in the ***sensitive*** range include *Dolichos lablab > Murraya koenigii> Callistemon citrinus> Nerium indicum>Tabernaemontana divaricata> Polyalthia longifolia*.

44. Studying the Feasibility of using Coir Pith for the Production of Cellulases

P. Asha and I. S. Bright Singh

School of Environmental Studies,
Cochin University of Science & Technology,
Kalamassery, Kochi, Kerala.
E-mail : haiashahere@gmail.com

Keywords : *Cellulase, Coir pith, saccharification, Aspergillus ochraceous, Chaetomium globosum, Pleurotus sapidus, Bacillus sp, Paenibacillus polymyxa, Submerged fermentation*

Coir pith represents approximately 50 % of the waste from the coir industries in kerala , which could be efficiently utilized to produce ethanol, a promising alternative energy source for the limited crude oil. Due to its high lignin content and crystalline nature , coir pith supported poor fungal and bacterial growth and yields were considerably low. So in the present study partially delignified coir pith was used for the saccharification with five microorganisms namely, *Aspergillus ochraceous, Chaetomium globosum, Pleurotus sapidus, Bacillus sp.* and *Paenibacillus polymyxa.* These were subjected for submerged fermentation with various carbon sources such as delignified coir pith , Whatmann No.1 filter paper and Carboxy methyl Cellulose supplemented with tween 80 as surfactant. *Aspergillus ochraceous* showed the highest total cellulolytic activity on delignified coir pith. Of the surfactants used 1% Tween 80 in the medium increased the production of cellulase several fold than the medium without tween 80. All the cellulase components were optimally active in the assay at pH 5.5 and 50^{o} C and highest activity was observed after 7 days of incubation.

45. Biomass Fuels are the Risk Factor for Chronic Obstructive Pulmonary Disease in Rural Areas

Aakanksha and Ratna katiyar

Department of Botany, University of Lucknow
Lucknow-226 007

There is increasing evidence for a possible association between chronic obstructive pulmonary disease (COPD) and the use of biomass fuels for cooking and heating in rural areas. A study was undertaken to investigate the prevalence of CPOD in rural areas and to measure the association between COPD and indoor biomass fuel air pollution.

The survey was performed in populations aged over 40 years in urban and rural areas of Bakshi ka Talab, Lucknow. Spirometry was performed in all subjects Measurement of indoor and outdoor air pollutants were also performed in a random sample of households. The overall prevalence of COPD in the two areas was 8.4%. The prevalence of COPD in both the whole population and a subpopulation of non – smoking women in rural areas were significantly higher than in urban areas (11% vs 6-4%, and 6.2% vs 1.5% respectively). The use of biomass fuel was higher in rural areas than in urban areas (87.1% vs 0.6%). Pollutant measurements showed that concentrations of carbon monoxide, particulate matter with an aerodynamic diameter = 10 µm, sulpher dioxide and nitrogen dioxide in the kitchen during biomass fuel combustion were significantly higher than those during LPG combustion. So the indoor pollutants from biomass fuels may be an important risk factor for COPD in rural areas.

46. Ecology Of Macrophytes Of Sanjay Gandhi Biological Park Pond, Patna

D. K. Paul and Praveen Kumar

Department of Zoology, Patna University, Patna (Bihar)-800005,
E-mail : dkpaul_31@yahoo.co.in

Keywords : *Pond, Macrophytes, Ecology, Sanjay Gandhi Biological park*

The pond is situated in Sanjay Gandhi Biological Park, Patna, Bihar (India). It is situated in 25° 59´N and 85° 09´E. It is an artificial pond used for boating,

pisciculture and recreation. Its average water depth is 10-12 feet. In the present investigation, several species of macrophytes are recorded in the pond. 24 species of macrophytes are found in this pond, out of which 10 are marginal or sub aquatic, 6 are submerged, 5 are emerged and 3 are free floating. The common species of macrophytes found in this pond are *Pistia stratiotes, Eichhornia crassipes, Poa indica, Cynotis axillaris, Alternanthera philoxeroides* etc. The water temperature fluctuates with the change in atmospheric temperature. The water is greenish in color due to abundance of chlorophyceae. pH of water was noticed above 7. Transparency is low due to abundance of planktons. BOD was noticed low in quantity where as COD was high. No acidity and free carbon dioxide were found in the water. Chloride, nitrate and phosphate and inorganic ions were present but very less in amount. Moderate hardness and alkalinity was found during investigation. It was particularly due to bicarbonate and carbonate ions. Bicarbonate is in high concentration as compare to carbonate. Presence of abundant phytoplankton favors the pond for the growth of herbivorous aquatic organisms.

47. Bactericidal Potential of Aonla Leaves

Vijai Pal, M. L. Chhabra and Indu Jalali

Department of Plant Pathology,
CCS Haryana Agricultural University,
Hisar-125004

Keywords : *Ground water, physico-chemical parameter ,water pollution*

Indian gooseberry popularly known as Aonla (*Phyllanthus emblica* L.) has great importance for its medicinal use not only as an antiscorbutic, but for the treatment of diverse ailments such as anemia, jaundice, cardiac problems, nasal congestion, retention of urine and several problems associated with the digestive system. The leaves are usually used for in digestion and diarrhea as specially in combination with butter milk or fenugreek. Keeping its medicinal value for human beings in view, an attempt was made to find its bactericidal activity if any against plant pathogenic bacteria. For this purpose, aqueous aonla leaf extract was evaluated *in vitro* against *Xanthomonas axonopodis* pv. *citri*, pv. *cyamopsidis*, pv. *malvacearum, X. oryzae* pv. *oryzae* and *Pectobactrerium carotovorum* subsp. *carotovorum* using inhibition zone technique. The results reported herein

indicated that aonla leaves contain some bactericidal metabolites which may be exploited for the control of phytobacterioses caused by these phytopathogen bacteria.

48. Commercial Trawl netting damaging marine ecosystem in coastal West Bengal

Dr. Mahua Das

Bhawanipur Education Society College,
Under University of Calcutta.
E-mail : mdgeo2003@yahoo.co.in.

Keywords : *Commercial trawling ; Marine ecosystem ; Loss of species ; Damage to marine biodiversity ; Disturbed Mangrove ecology*

Commercial fishing plays an important role in the economy of West Bengal as it provides a profitable source of employment and supplies an indispensable animal protein to Bengali diet. Major area of West Bengal coast covers 'Sundarbans', the largest mangrove ecosystem and only mangrove tiger-land in the world declared as the World Heritage Site (1989). It exhibits an excellent breeding and nursing ground of uncountable macro and micro-species of fish, prawn and other marine animals presenting together the largest mangrove foodweb of the world as a part of great marine ecology in West Bengal offshore area. Increasing population with growing demand of fish causes intensification of trawling by large number of commercial fishermen and big MNCs all along the offshore area of West Bengal. Modern bull trawlers use to drag bigger trawl nets through ocean bottom while chasing bottom dweller species of fish. This action is very likely to have destroyed under-sea habitat of many micro-species belonging to the first and second trophic levels of marine food chain. This paper highlights a case study of Shankarpur-Digha fishing zone in coastal West Bengal showing the extent of commercial trawling causing a great loss to a number of marine species like sting ray, cat fish, flat fishes (flounders, soles), silver belly, clupeid fish, halibut, skate, gastropod(*babylonia spirata*), sepia, loligo, squid, mud octopus, nudibranch, sea urchin, sea anemone, squilla(mantis shrimp), protunus crab, gobid fish and marine crab(*doclea ovis*). As all these species belong to primary and secondary trophic levels of the marine food chain, loss of these due to trawling seems to have already created big crisis of food

for a large number of predators in tertiary trophic level. Resultantly, sustenance of sea snail, sea spider, gray sea slug, starfish, sea otter, cuttlefish, ocean pikes, eel, commercial fish & prawn, finfish, barracuda, pinnipeds, sting ray and marine birds are suspected at stake. At the penultimate stage, top consumers or apex species of marine food chain i,e. shark, dolphin and seal will also be affected by food crisis. Above all, the coastal humans themselves who are dependant on seafood will be the worst sufferer. Thus, this paper has proved urgent need for a proper Environmental Management Plan with restrictions on trawling to ensure conservative use of marine resources towards sustainable development of littoral and infra-littoral habitat ecology of West Bengal.

49. Biodegradation Of Antibiotic Wastewater In An Anaerobic Hybrid Reactor – A Kinetic Modelling

[1]P. Mullai and [2]N. Saritha

[1]Department of Technology, Annamalai University,
Annamalai Nagar-608 002, Tamil Nadu
E-mail : sammullaip@yahoo.in
[2]Department of Chemical Engineering,
SRM Engineering College, SRM University,
Katankulathur-603 203, Tamil Nadu

Keywords : *Anaerobic hybrid reactor (AHR); antibiotic wastewater; kinetic modelling; HRT.*

Anaerobic hybrid reactor (AHR) was operated for 156 days at mesophilic temperature (30 – 35°C) for treating antibiotic wastewater at seven hydraulic retention times (HRTs) of 24, 18, 12, 8, 6, 3, 6 h. This paper describes the development of mathematical model for substrate utilization and biomass formation (microbial growth) kinetics. Kinetic parameters were determined through linear regression using the experimental data. As the value of percentage error calculated was 15.27% between the simulated and experimentally observed effluent COD concentration and 1.2% for effluent biomass concentration, this model was found to be a good representation. Besides, the correlation coefficient value (R^2) obtained for the experimental and theoretical effluent COD concentration and effluent biomass concentration also confirmed the suitability of the kinetic model.

50. Reycling Composted Wastes of Sugar Industry to Enrich Soil Fertility

B. Bakiyathu Saliha, T. Balaji, and A.R. Mohamed Haroon

Department of Soil and Environment,
Agricultural College and Research Institute,
Tamil Nadu Agricultural University,
Madurai-625 104, Tamil Nadu

Keywords : *Sugar industry, wastes, recycling, composting, nutrients, crop yield*

Composting is an ecofriendly method of solid waste management which helps to recycle valuable nutrients in the soil and plant systems. The manurial value of different composts prepared from various sugar industry wastes were analysed for their nutrient potentials. The composts prepared from sugarcane trash, pressmud, bioearth prepared from pressmud and distillery spentwash were evaluated for their efficiencies interms of organic carbon, primary, secondary and micronutrients. Among the different composts, biocompost prepared from pressmud and distillery spentwash was found to contain higher organic carbon (15.5 percent), N (2.0%), P (2.5%) and K (3.0%). The pH of the compost was found to be ideal (7-7.5) with a C:N ratio of 15:1. The results of the field experiments conducted to evaluate the efficiencies of the composts indicated that the application of bioearth /biocompost @ 5tha^{-1} and 50% NPK enhanced the available N,P and K status of the soil from 210, 12 and 190 kgha^{-1} to 290, 24 and 410 kgha^{-1} respectively and the maximum cane yield of 115tha^{-1} was recorded in this treatment which was an additional yield of 25kgha^{-1} over 100% NPK alone (90tha^{-1}). The application of composted sugar industry wastes in the form of biocompost not only enhances the soil nutrient status and cane yield but also serves as a means for eco-friendly management of industrial by-products.

51. Ecological Preferences of Lemaneaceae (Rhodophyta) found in the River Systems of Manipur

M. Romeo Singh and *Asha Gupta

Department of Life Sciences,
Ecology Research Laboratory, Manipur University,
Canchipur-795003

Keywords : *Lemanea, Rhodophyta, freshwater, bio-indicator, oligotrophic*

Freshwater red algae (Rhodophyta) occur mainly in running waters. They are generally indicators of good water quality (oligotrophic, ologosaprobic). Many of them are also included on list of threatened algae. Lemanea species locally called as "nungsham" in Manipuri is harvested by the local people because of the fishy smell it produces and sold in the market in dry form and served as a vegetable in dried, fried or roasted form and local delicacy. The plant grows actively during mid winter months (Dec-Feb) and found to be attached to rocks, bricks, stones, shells, clay etc. in the bed of swiftly flowing water of the Imphal, Iril, Thoubal and Manipur rivers. Hydrological investigations were made during the period from April 2008 - March 2009 to evaluate the ecological preferences of species *Lemanea* which shows disjunct distribution found in the river system of Manipur. Of the abiotic parameters included in the analysis, it was found that pH, temperature, transparency, water current; depth, dissolved Oxygen and the presence of stable substrates were the limiting factors influencing the growth of this alga. Discontinuous distribution of it shows the availability of its requirements in the particular habitat. It was found that the alga prefer low nutrients indicating the oligotrophic condition of the rivers during its growing period. This information may be useful in categorizing algae as bio-indicators for monitoring water quality.

52. Sorption of zn, Pb and Cr in Tixtile waste-water using Banana Husk as a Biosorbent

Kalpna Kumari

Department of Chemistry B.P.S. College,
Desari (Vaishali)

Keywords : *Heavymetal, Biosorption, Bananahusk, effluents*

Heavy metals such as chromium, copper, lead cadmium etc in wastewater are hazardous to the environment. The textile effluents contain Cr and Pb which are dominant toxic metals. Biosorption technique has been employed for the treatment of textile processing industrial waste water using banana husk as biosorbant for the metal binding. The concentration of heavy metal zn, Pb and Cr were examined using atomic absorption spectrometry. The concentration of these metals were

detected in the range of 1.04 – 5.38, 0.55 – 2.4 and 0.49 – 8.38 (ppm). Which were higher than the permissible limits recommended by environmental protection agency. The waste water samples were treated using banana husk as biosorbant in a continuous flow system using glass column. There was remarkable decrease in the concentration of zn, Pb and Cr. The other parameters such as pH, turbidity, electrical conductivity (EC), total hardness (TH), total dissolved Solids (TDS), total Suspended solids (TSS), dissolved Oxygen (DO) were also investigated before and after adsorption. The metal binding capacity of banana husk for the removal of heavy metals from the waste water was as zn < cr < Pb.

53. Limnochemical and Limnobiological Status Along with The Energetic Status of Macrozoobenthos and Fishes of Mansarovar Reservoir

Dr. Aruna Chakrawarty

Dept. of Zoology, Govt. Dungar College
Bikaner

Many of the countries are struggling for freedom in order to construct a society where satisfaction of the minimum need of entire population would be the first priority of development. Availability and exploitation of resources needed for the development are connected with the environment. There are several aspects of environment involved in and affecting the developmental process in countries like India.

For the improvement of health of mankind much emphasis should be laid on the quality, particularly caloric contents of food material we consume. Hence, the knowledge of bioenergetics of not only the final consumable food yield (i.e.fish) but even of primary (i.e.phytoplankton), secondary (i.e., zooplankton) and tertiary (i.e., macrozoobenthos) trophic level in an aquatic eco-system is a prerequisite. Since water and biota are inseparable components of any aquatic eco-system, study of water and sediment of the water formation is a basic need.

Mansarova reservoir, an almost circular euphotic water body, is an important pisciculture station used by the Department of Fisheries, Government of Madhya Pradesh for fishing purposes. It is situated in the southern par of the Bhopal city near the Academy of Administration across a tributary of Kaliasot river and a local nullah. Main source of water is rain.

54. Correlation between increasing Pollution Level and Respiratory Distress in the Inhabitants of the City of Joy

Anwesha Saha*[1], Pip Banerjee[1], Priyanka Lahiri[1] and Kaveri Banerjee[1], Avishek Ghosh[1]
Radhika Saraf[2], Mr. Ayan Chandra[2], Dr.Arpita Banerjee[3] and Prof. Sumitra Basu Thakur[3]

[1]Department Of Microbiology,
St.Xavier's College, 30 Park Street,
Kolkata-700016
[2]Department of Statistics,
St.Xavier's College, 30 Park Street,
Kolkata-700016
[3]Department of Respiratory Medicine
Nil Ratan Sircar Medical College and Hospital,
Kolkata-700014, West Bengal

Keywords : *Kolkata, biological air sampler, pulmonary function test (PFT), spirometry, chi-square test, correlation analysis, ANOVA, COPD*

The increasing respiratory problem in Kolkata indicates that it is gradually becoming the pollution capital of the country. This project has been taken up to establish a correlation between the levels of pollution that is encroaching upon our city and the commencement of the chronic respiratory diseases over the common mass of the city. A systematic study was conducted in three different high-rise buildings with varying pollution (i.e. highly polluted, moderately polluted and less polluted area) levels. biological air sampler (LA002), was used to collect air sample from those locations and the microbial load of respective places were determined. Our procedure consists of pulmonary function test (PFT) involving spirometry to detect the respiratory diseases from which the people residing in those buildings at different elevations, were suffering. During PFT, few parameters were taken in concern, i.e. sex, age, height, weight and smoking history of the individuals. Analysis of the collected data was done by using a series of statistical tools. For a Chi-Square test for independence, the p-value for bacterial load is 0.001, while for fungal load it is 0.00021 which indicates a dependence of microbial load upon the height of the buildings. In

a correlation study, the value of Pearsonian correlation coefficient was found to be 0.78 (r^2 = 0.61). This shows that there is moderately high correlation between pollution level and organism load. Analysis of Variance was performed to test whether there is really significant difference between the average organism loads in these three areas. Tests of proportions revealed that the proportion of individuals suffering from COPD and Asthma is significantly more among the smokers. The p-value in case of COPD is 0.0001and for asthma it is 0.00021. From the analysis, it is inferred that the location with high level of pollution imposes a comparatively high level of microbial load in the environment of that area while the area with comparatively lower pollution level corresponds to less organism load as the ground floors of the buildings were taken in consideration. But for the top most floors for three different locations the microbial load was more or less lower as compared to the ground floors. From the study, it is clearly observable, that most of the people residing in the highly polluted area are suffering from major respiratory diseases like COPD(Chronic Obstructive Pulmonary diseases),Asthma and Restrictive lung disorder, while the percentage of people suffering from these diseases are relatively lesser in the less polluted area. Moreover, the injurious smoking habit of individuals is promoting the risk towards COPD and other major respiratory disorders. Even the microbial load of the environment of these three locations have an important role for causing different pulmonary diseases to different extent depending on the pollution levels of the respective places.

55. Species Richnes and Diversity of Algae in Cauvery River and its Tributaries.

J Mahadev, Syed Akheel Ahmed and S. P. Hosmani

DOS in Environmental Science, Mansagangothri,
Mysore-06
DOS in Chemistry Mansagangothri,
Mysore-06
Department of Biotechnology, Mahajana's College,
Mysore.

Keywords : *Algae, Chlorophyceae, Bacillariophyceae, Physico chemical, Cauvery River, Mysore*

The present investigation, Physico-chemical Parameters and fresh water algae and species richness and diversity of the Chlorophyceae and Bacillariophyceae in relation to nutrient status in the Cauvery River in and around Mysore district were carried out between 2008 and 2009. The monitoring of water quality can be done either by direct measurement of physico-chemical parameters of water or by analyzing the inhabiting biota. An algae serves as bio-indicator of water quality and pollution. The diversity of phytoplankton is influenced by the quality of water. 21 species of chlorophyceae, 23 species of Bacillariophyceae. Most influential factors with respect to the abundance of chlorophyceae and Bacillariophyceae are temperature, pH, calcium, free carbondioxide, dissolved oxygen, nitrates, bicarbonates, phosphate and oxidizable organic matter. Decreased diversity of Chlorophyceae and Bacillariophyceae were noted at sites receiving urban waste and agricultural effluents. Positive Correlation was observed between COD, BOD Phosphate and the Phytoplankton divisions. The environmental variables seem to play an important role in determining the species richness and diversity in the Cauvery River.

56. Relationship of Metal Tolerance With Multiple Antibiotic Resistance of Total Heterotrophic Bacteria Isolated From The Soils of Mg University Campus, Kottayam, Kerala

Rinoy Varghese[1], Krishna M. P[1], Harsha H. T[1], Devi K. Balan[1], Jyothy S.[1] and Dr. A. A. Mohamed Hatha[2]

[1]School of Environmental Sciences,
Mahatma Gandhi University,
Kottayam, Kerala.
[2]Department of Marine Biology,
Microbiology and Biochemistry,
Cochin University of Science and Technology,
Cochin, Kerala

In environment, resources such as nutrients are inadequate, a bacterium can produce an antibiotic to eliminate or inhibit neighboring bacteria, thereby limiting

struggle for the limited resources. In order for this strategy to be successful, the bacteria producing the antibiotic should be capable to endure by possessing mechanisms of resistance to the antibiotic they produce. These mechanisms can be transferred to other bacteria, and this has led to a mounting risk to global public health by confounding treatment of infections caused by virtually all major pathogens (Levy, 2002). More recently, however, it has become evident that antibiotic resistance is common not only among pathogenic bacteria of humans and animals but also among environmental bacteria (Chopra and Roberts, 2001). The latter observation is important because bacteria in natural environments likely serve as a pool of resistance genes that ultimately can be transmitted to pathogenic species (Alonso *et al.*, 2001). As an outcome, it is important to build up a more wide understanding of the incidence and diversity of antibiotic resistance in a broad range of environments.

57. Studies on Water Quality of Lakes in Shivaji University Campus, Kolhapur, Maharashtra

Patil Y. Y. and Raut P. D.

Department of Environmental Science,
Shivaji University, Kolhapur

Keywords : *Lakes, water quality*

The drinking water crisis in India has reached explosive proportion due to rapid population growth, urbanization, increasing living standards and diverse human activies. Time is perhaps not too far when pure and clean water may be unavailable for maintaining the normal human life. There is need to study and conserve the water sources. Present study focuses on water quality of lakes of Shivaji University campus, Kolhapur, Maharashtra supplying water to University campus. Lake water quality analysis was carried out, and it was found that facility of pumping and filter station with campus provides good drinking water source. These lakes have also helped to maintain ground water level. The results are discussed.

58. Interaction between Municipal Sewage Water and Ground Water at Warangal town, Andhra Pradesh

Chindam Ravinder*, Pinninti Venkateshwarlu and S.G.D. Khureshi*****

Warangal is one of the major towns in Telangana region. The city is a centre for educational, administrative, industrial and cultural activities. This study was made in Warangal city with a population of over 6 lakhs. The properties of ground water are influenced by the municipal sewage water. Disposal of several toxic pollutants are released into the surrounding environment, some water soluble pollutants percolate into the ground water. This affect the quality of ground water and soils gets deteriorated. The main municipal waste water channel of the city is used for discharging the municipal, house hold, commercial waste waters and it also acts as natural drainage for rain water runoff also. The polluted waters deteriorate the quality of the ground water and may cause serious health hazards. In the present study, an attempt has made to evaluate the quality of the ground water and pollutants present in the municipal sewage water. 7 ground water and 7 municipal sewage water samples were collected and analyzed on 14 parameters. The samples were collected at different locations of municipal sewage water flow channel and ground water sources within 25-50 meters from the selected points near by municipal waste water flow channel.. The results indicate a gradual deterioration of the quality of ground water near the municipal drainage channel is observed. The untreated waste water directly released in to the ground, which pollutes the ground water bodies and the effect may persist for longer time. If necessary precautions are not taken, consequences can be very serious, in terms of damage to the natural resources.

59. Recycling Of Shrimp Biowaste By Safe Eco- Friendly And Economically Viable Process

Kandra Prameela[a]* and Challa Murali Mohan[a]*

[a]Department of Biotechnology, GITAM Institute of Technology,
Rushikonda, GITAM University,
Visakhapatnam-530 045

Keywords : *shrimp bio-waste, chitin, carotenoids, eco-friendly*

Indian shrimp processing industry produces more than 1, 00,000 tonnes of industrial waste. Shrimp is very rich of chitin and natural carotenoids which have many applications including pharmaceutical, cosmetic, biomedical field, fine chemicals and biodegradable packaging films. The traditional chemical method creates a disposal problem due to large amounts of toxic waste that would pollute the environment. This processing is expensive due to enforced environmental controls and disposal measures. To overcome these problems an alternative method has been emerged by using microorganisms which can replace the expensive and non-environment friendly chemical process. This process would minimize pollution problem and maximize profits of the processor.

60. Exploitation of Fungi for Biological Management of Water Hyacinth

Anita Chouksey and Ranu Singh
Mata Gujri Women's College,
Jabalpur (M.P.)

Keywords : *Water hyacinth, weed, Alternaria alternata, Curvularia lunata*

Water hyacinth (*Eichhornia crassipes*) (Mart.) Solms. Laubach is considered one of the world's worst weeds invading lakes, ponds, canals and rivers. During periodical survey of various water bodies of Jabalpur to documents the fungal pathogens of water hyacinth, a total of 30 fungi were recovered from infected and diseased parts of water hyacinth out of which 22 were pathogenic. Among these *Alternaria alternata, Cercospora rodmanii, Curvularia lunata, Rhizoctonia solani, Alternaria eichhorniae* incited severe infection and caused drastic damage to the weed while few others viz. *Fusarium oxysporum, Drechslera indica, Phoma sp., Sclerotium* sp., *Fusarium equiseti, Fusarium solani, Curvularia clavatum, Colletotrichum gleosporioides, Colletotrichum dematium, Helminthosporium sp.,* caused mild diseases to water hyacinth. Several other fungi viz. *Fusarium moniliforme,, Aspergillus clavatus, Aspergillus flavus, Aspergillus nidulans, Aspergillus niger, Penicillium nigricans, Cephalosporium Sp., Penicillium oxalicum,* totally failed to incite any diseases to the weed.

61. Indigenous Remediation Technology for Cleaning up Heavy Metal Ions Present in Soil Around Paper Mills in Saharanpur

Ashok kumar[1*], B. S. Bisht[2] and V. D. Joshi[3]

[1]Department of Biotechnology,
H.N.B.G. University, (A Central University), Srinagar
Garhwal-246174 (Uttarakhand)
[2]Department of Zoology/Entomology,
HNBGU (A Central University), Campus Badshahithaul
Tehri-249199 (UK)
[3]Department of Zoology, Government PG College,
Kotdwara Garhwal (Uttarakhand)

Keywords : *Bioremediation; heavy metals; metal toxicity; physico-chemical analysis; ICP-MS.*

With rapid industrialization all over the world, pollution is on the increase, and India is no exception. One of the modes through which pollutants enter the biosphere is that of industrial effluents. Bioremediation is a low cost method available for reclaiming the soils which have been polluted. The present study was carried out in order to determine the effects caused by paper effluent on soil, as well as upon the macro and micro flora present in its environment, and to develop an indigenous remediation technology for cleaning up heavy metal ions and organic pollutants associated with paper industry effluent. The study was carried out on the effluent and its surrounding soil of Paper Mills Shaharanpur Uttar Pradesh INDIA. Initial recording of data comprised of electrical conductivity, pH and temperature of effluent and soil. The collected samples were processed for further physico-chemical analysis, which included soil field capacity, total soluble salts, organic matter, organic carbon, sulphates, nitrates, phosphorus, potassium and exchangeable cations. The soil and effluent samples were processed for heavy metal analysis using ICP-MS. Similarly, plant material was also digested and analyzed for heavy metals. The present study shows that the metals and other parameters taken in this study, are higher in the almost area in the region of Paper mills.

62. *Lagenidium Giganteum* an Effective Microbial Control Agent for *Aedes* Mosquitoes in the Rubber Plantations

Sareen Sarah John[1] and John K. C[2]

[1]School of Environmental Studies,
Cochin University of Science & Technology,
Kalamassery, Kochi, Kerala.
E-mail : sareensj@yahoo.co.in
[2]School of Applied Life Sciences,
Mahatma Gandhi University, Chuttipara.P.O,
Pathanamthitta, Kerala

Keywords : *Aedes albopictus*, vector control, propogation, *Lagenedium giganteum*

The rubber plantations of Kerala have become the most congenial environment for the propagation of *Aedes albopictus* mosquito, the vector for alpha viruses. All measures adopted for the control of these mosquitoes have yielded unsatisfactory results. This study was focused on the control of *Aedes* mosquitoes in rubber plantations using *Lagenidium giganteum*. These mosquitoes lay their eggs in the latex collecting cups during monsoon and the hatched out larvae grow vigorously and metamorphose in the cups. The adults emerged remain attached on the stems of the tender vegetation in the plantations and later the female mosquitoes look for a blood meal elsewhere.

63. Isolation, Identification and Characterization of Pathogenic Bacteria in Marine Edible Fish of Visakhapatnam Coast

Dr. T. Lalith Govardhan and B. Kanaka Durga

Andhra University,
Visakhapatnam

Keyword : *Isolation, Pathogens, Public Health*

As the fish is highly perishable food item due to bacterial contaminations from the environment, a study was undertaken to isolate the associated pathogenic bacteria of edible marine fish pink perch, Nemipterus japonicus available in local

markets. Raw, frozen and cooked samples of the fish were cultured on various types of enriched and selective medias for 48 hours at 37Oc Bacteria isolated specially pathogens : Escherichia coli, Bacillus cereus, Staphylococcus aureus, Salmonella sp, Vibrio parahaemolyticus, the causative agents of food borne diseases like cholera, dirrhoea, typhoid, paratyphoid fevers have been identified by employin g various standard morphological and biochemical techniques (Cappuccino, 2005 6th edn), number of colonies per ml have been reported in serial dilution samplers by total plate count (TPC) method. The significance of quality and safety if sea fish in processing, storage and cooking to prevent food borne diseases which are mostly prevalent in Visakhapatnam areas would be discussed.

64. Clinical Evaluation of Occupational Lead Exposure on Bus Drivers in various route of South Kolkata, India

Soumendra Darbar* and Tapan Kumar Pal

Bioequivalence Study Centre,
Department of Pharmaceutical Technology,
Jadavpur University, Kolkata-700 032
E-mail : darbarsoumendra@gmail.com

Keywords : *Lead toxicity, Kolkata, Air pollution, Lead analysis, Health hazards*

Studies conducted throughout the world has established beyond doubt that elevated blood lead levels may lead to detrimental health effects. It is an environmental toxicant that affects nearly every system in the body. Lead is a highly toxic substance, exposure to which can produce a wide range of adverse health effects. There are many ways in which humans are exposed to lead *i.e.*, through deteriorating paint, lead batteries, household dust, bare soil, air, automobile emission, drinking water, food, ceramics, home remedies, hair dyes and other cosmetics. Lead poisoning, the oldest recognized occupational disease, remains a danger for children and adults. In this study blood lead levels of about 252 adult male bus drivers, age ranges between 20-40 years, working in various route of South Kolkata were investigated. Very little information on the blood lead distribution of the adult male bus drivers is available. This study was undertaken to determine blood lead levels among adults spend most of their time in day and night besides some most congested main roads and crossings of south Kolkata. The results

indicated that blood lead levels in the areas close to main roads ranged from 1.6 to 26.42 ìg/dl, with a median level of 12.02 ìg/dl. The blood lead levels of 86.14 % of adult equal or exceeded to 10 ìg/dl, the current international action levels. Automobile emission, dust, congested traffic; prolonged hours of work in the polluted areas, low nutritional status and lack of education were among the factors associated with elevated blood lead levels.

65. Nylon 6 Degradation by Lignolytic Fungus *Phanerochaete Crysosporium*

Ms Chonde Sonal G. and Dr. P. D. Raut

Department of Environmental Science,
Shivaji University,
Kolhapur-416004

Keywords : *Nylon 6 degradation, fungus Phanerochaete Crysosporium, lignolytic fungus, Nylon Biodegradation*

A study of Nylon 6 polymer degradation by fungus *Phanerochaete Crysosporium* has been carried out under submerged conditions. The analysis was carried out using viscosity measurements, I R spectroscopy, thermal & mechanical techniques. A colony of fungus was developed that resulted in substantial degradation via crack within 75 days. The groove that weakening & breaking of polyamide bond have been confirmed by weakening in I R band. 50 % molar mass reductions have been observed in viscosity studies. Thermal studies indicated decrease in melting point & crystalinity over the stipulates period.

66. A survey on Mosquito Diversity in Parangipettai Coast, Southeast Coast of Tamil Nadu, India

[a]Balakrishan S., Srinivasan[a] M. and K. Elumalai[b]

Centre of Advanced Study in Marine Biology,
[a]Faculty of Marine Sciences, Annamalai University,
Parangipettai-608 502.
Dept. of Zoology, Govt of Arts College Men's,
Tamil Nadu
E-mail : marugalbalu82@gmail.com

Keywords : *Diversity, Mosquito, Mangrove, Estuarine, Ecosystem*

Diversity of mosquito species was evaluated in different habitats in the Parangipettai coastal ecosystem southeast coast of India. We aimed at verifying changes in these mosquito populations in estuarine consequence. There are different habitats were selected as sampling stations: mangrove, estuarine, salt marsh and backwater ecosystem. Bimonthly collections were made with the Shannon trap and human bait of mosquito activity. Different statistical tools were used in the present study, to know the Shannon - Wiener diversity index (2.37-2.356), Simpson's diversity index (0.9039-0.9016), Margalef richness (2.269-2.001) and Pielou evenness (0.9725-0.9589) mosquitoes. In the present study 11 species 3 genera were recorded in all three habitats. Summer season 107 species, rainy season 148 species and winter season 82 species were recorded. The details were discussed given in the paper.

67. Diversity Of Mosquitoes in Parangipettai Coastal Ecosystem Southeast Coast Of India

[a]Balakrishan S., Srinivasan[a] M. and K. Elumalai[b]

Centre of Advanced Study in Marine Biology,
[a]Faculty of Marine Sciences, Annamalai University,
Parangipettai-608 502.
Dept. of Zoology, Govt of Arts College Men's,
Tamil Nadu
E-mail : marugalbalu82@gmail.com

Keywords : *Diversity, Mosquito, Mangrove, Estuarine, Ecosystem*

Diversity of mosquito species was evaluated in different habitats in the Parangipettai coastal ecosystem southeast coast of India. We aimed at verifying changes in these mosquito populations in estuarine consequence. There are different habitats were selected as sampling stations: mangrove, estuarine, salt marsh and backwater ecosystem. Bimonthly collections were made with the Shannon trap and human bait of mosquito activity. Different statistical tools were used in the present study, to know the Shannon - Wiener diversity index (2.37-2.356), Simpson's diversity index (0.9039-0.9016), Margalef richness (2.269-2.001)

and Pielou evenness (0.9725-0.9589) mosquitoes. In the present study 11 species 3 genera were recorded in all three habitats. Summer season 107 species, rainy season 148 species and winter season 82 species were recorded. The details were discussed given in the paper.

68. Tribal Relocation And Conservation Issues At Mudumalai Tiger Reserve

Sanil R. and Nandini S

Department of Zoology & Wildlife Biology,
Government Arts College,
Udhagamandalam-643 002, The Nilgiris

Keywords : *Mudumalai, tribal rehabiltation, conservation, tiger reserve*

Mudumalai Wildlife Sanctuary is a beautiful and bio-diverse area. It is a home for 390 mammals, 1232 birds, 456 reptiles, 2546 fishes and 45000 species of plants. Not only for the fauna & flora, its also home for many tribes. Most of them are residing in hamlets known as enclaves. *Mondadan chettis, Wyanadan chettis, Kurumbas, Irulas, Kattunayakas, Paniyas* etc., are inhabitants of enclaves in Mudumalai. Mudumalai is declared as Tiger Reserve in 2007. After the declaration, the enclaves in the core zone of Tiger Reserve are requested to be shifted to outer areas. Even though, Government offered many facilities as a part of Rehabilitation, peoples including tribes protested against this. Forest Department is uplifting the tribes by giving the jobs as Mahouts, Forest guards and APW etc. So, they form the major conservation unit in the Sanctuary. In this contest the paper discuss the aspects of rehabilitation and conservation.

69. Solidification And Leachability Of Cr (Vi) In Rice Husk Ash Blended Cement

Neeraj Jain*, A. K. Minocha and Jaswinder Singh

Central Building Research Institute, (a constituent of CSIR)
Roorkee-247 667, India

Keywords : *Chromium; solidification; TCLP; blended cement; XRD; compressive strength*

Investigations were carried out to study the effect of Cr (VI) (1000-3000 mg/l) on solidification and hydration behavior of two cementitious binders viz. OPC and rice husk ash (RHA) blended (10-30 %) cement. The results showed that physico-chemical characteristics of these cements were greatly influenced by Cr (VI). Addition of rice hush ash accelerates final setting as compared to control samples. Retardation in setting time was observed on increase in rice husk ash concentration (10-30 %). Results show that the compressive strength of controls (R0 series) and rice husk ash blended samples (R10, R20 and R30 series) with and without Cr (VI) increases with increase in the curing period and maximum strength was observed with 20 % RHA blended samples. It is also observed that with the increase in Cr (VI) concentrations, the strength of all samples decreases. During Toxicity Characteristics Leaching Procedure (TCLP) test, (pH=~3), it was observed that the leaching from OPC and RHA blended cement is dependent on initial Cr (VI) concentration. The retention capacity of OPC and RHA blended samples was in the range of 92 to 99 % at various curing periods (28-90 days) and maximum retention was observed in case of samples blended with 20 % RHA. The influence of Cr (VI) on hydration of cement was examined by X-ray diffraction which shows the formation of various crystalline phases during solidification in rice hush ash blended cement. The hydration characteristics of OPC and RHA blended cement in presence of Cr(VI) were evaluated by scanning electron microscope (SEM).

70. Arbuscular Mycorrhiza - A Sustainable and a Viable Bio tool to Prevent Soil Pollution & Improve Soil Structure

Dr. K. Ammani

Acharya Nagarjuna University

Arbuscular mycorrhiza (AM), the symbiont of arbuscular mycorrhizal fungi (AMF) and host plant root, has been proved to be able to improve soil structure and enhance plant growth.

In recent years increased pressure for food production has led to the development of intensive agricultural systems that use significant quantities of inorganic fertilizers and pesticides.

Chemicals such as fertilizer and pesticides.are expensive and may cause soil pollution. These Improper agricultural practices can cause harm to ecosystems and healthy crops by destroying soil structure and overloading them with pollutants. Current trend of research is to develop alternative technology to minimise the chemical forms and to encourage the use of biofertilizers. One such promising biofertlizer is the Arbuscular mycorrhiza that plays a crucial role in natural and agricultural systems. It is possible that in certain environments the proper AM management would lead to a substantial reduction of fertilizer, which could translate monetary savings and prevent a pollutant overloa.

Working on mycorrhizas for the past 25 years and established the positive role of AM fungi in several pot culture and field experiments. The present paper deals with the occurrence, distribution & identity of indigenous AM fungi in natural and agricultural systems and the production of glomalin in different soils.

71. Study of Noise Pollution during Deepawali Festival in Kolhapur City of Maharashtra, India

Lad R. J., Patil V. N. and Raut P.D

Department of Environmental science,
Shivaji University Kolhapur,
Maharashtra 416004
E-mail : vishvajeetpatil@ymail.com, drpdraut@yahoo.co.in

Keywords : *Noise pollution, Leq, Deepawali, Firecrackers*

Kolhapur city is district place in the state of Maharashtra with population of 4,93,167. In the recent years it is one of the emerging industrial and commercial city of Western Maharashtra. Problems of pollution along with noise pollution are increasing with time especially during the festival period. In the present study, continuous monitoring of noise levels was carried out during the three festive days of Deepawali in the month of November, 2009 at ten different sites within the Kolhapur city. On the basis of location these sites were divided into industrial, commercial, residential and silent zones respectively. The results showed that there is an enhanced pressure of noise at all sites during the festival of light due to bursting of loud noise firecrackers. All the sites under study showed higher sound level than the prescribed limits of CPCB.

72. Magnetic Iron Oxide Nanoparticles: Oxidative Stress and Cytotoxicity on Rat

N. K. Samal and Paulraj R

School of Environmental Sciences,
Jawaharlal Nehru University,
New Delhi-110067

Keywords : *Nanoparticle, Cytotoxicity, Catalase, Lipid peroxidase, Glutathione*

Magnetic nanoparticles modified with organic molecules have been widely used for various biotechnological and biomedical applications. However there were not much report on the toxic or health effects of such particles. Hence the present investigation has been carried out to address the toxic effect of magnetic iron oxide nanoparticles (MION) on rat. Male wistar rats (8 weeks old) were intra peritoneally injected with different doses of magnetic iron oxide nanoparticle (6.5 nm) for a different period of time. Antioxidative enzyme activity was measured in the liver and brain cells. MION significantly increase oxidative stress in a dose and time-dependent manner in rat liver and brain cells.

73. Dissipation Kinetics of Thirteen House-hold Pyrethroids Pesticide in Whole Lood and for the Determination of Thirteen Pyrethroids Simultaneously and its Metabolites Residue

P. E. Ravi and A. Ramesh

Mass Spectrometry division,
Department of Analytical Chemistry,
International Institute of Biotechnology and Toxicology (IIBAT), Padappai,
Chennai-601 301, Tamil Nadu
Email : 1. pe_ravi2000@yahoo.com

Keywords : *Residues, Dissipation, Whole blood, $DT_{50,}$ $DT_{90.}$ Pyrethroids, Permethrin, Transfluthrin, Cypermethrin, Bifenthrin, Allethrin, Fenpropathrin, Cyfluthrin, Lambda-cyhalothrin, Fenvalerate, Deltamethrin, Prallethrin, Cyphenothrin*

Pyrethroids are house hold insecticides as class of synthetic pyrethroids under pesticides namely as allethrin, bifenthrin, cypermethrin, cyphonothin, cyfluthrin,

lambda-cyhalothrin, deltamethrin, fenvalerate, fenpropathrin, permethrin, prallethrin and transfluthrin. Dissipation kinetics of different pyrethroids in whole blood was studied at three temperatures -10±1^{o}C, 2±1^{o}C and 22±1^{o}C and at two different concentration levels 1µg/ml and 2µg/ml for a period of thirty days. Quantification was done by two different detectors GC-ECD and GCMS-EI selective ion monitoring (SIM) method. A rapid and sensitive method for the simultaneous determination of thirteen pyrethroids pesticide and their stereo isomers in electron ionization gas chromatography-mass spectrometry method was developed in whole blood viz., allethrin, bifenthrin, cypermethrin, cyphonothin, cyfluthrin, lambda-cyhalothrin, deltamethrin, fenvalerate, fenpropathrin, permethrin, prallethrin and transfluthrin. Both the method has the linearity from 1-1000 ng/ml. Recovery studies are conducted at the concentration level 1-1000 ng/ml in whole blood. The recovery of individual compounds in whole blood is 91-103%. Dissipation kinetics of pyrethroids in whole blood was studied at three temperatures -10±1^{o}C, 2±1^{o}C and 22±1^{o}C and at two different concentration levels 1µg/ml and 2µg/ml for a period of thirty days. The DT_{50} and DT_{90} values calculated from the dissipation data collected at 22±1^{o}C are in the range 4.3 to 9.1 days and 14.1 to 30.4 days and showed first order kinetics. Among the pyrethroids studied permethrin showed rapid degradation with the DT_{50} value 4.3days and DT_{90} value 14.1. Cyphenothrin showed remarkably higher DT_{50} and DT_{90} value 14.1 & 30.4 days. The order of the dissipation in whole blood at 22±1^{o}C is Permethrin < Transfluthrin, < Cypermethrin, < Bifenthrin, <Allethrin, < Fenpropathrin, < Cyfluthrin, < Lambda-cyhalothrin, <Fenvalerate, < Deltamethrin, < Prallethrin < Cyphenothrin. Analysis of samples collected from the too lower temperatures (10±1^{o}C & 2±1^{o}C) showed low dissipation indicating high persistence. Sixty numbers of blood samples collected from human volunteers occupationally exposed to the application of different pyrethroids for several years were investigated. None of the samples showed any residues and the results are confirmed by positive spiking.

74. Adsorption of Fluoride on Cotton Nut Shell Waste Based Powdered Activated Carbon

M. Rajan*, G. Alagumuthu and V. Veeraputhiran

PG & Research Department of Chemistry,
Sri Paramakalyani College,
Alwarkurichi-627 412. Tamilnadu
E-mail : rajanm153@gmail.com

Keywords : *Adsorption; Cottonnut shell; Isotherm; Kinetics; Thermodynamics*

In the present study, cotton nut shell, an agricultural waste, was used for fluoride adsorption from aqueous. The experimental isotherm data were analyzed using the linearized forms of Freundlich, Langmuir and Timken equations to determine maximum adsorptive capacities. The equilibrium data fit well to the Freundlich isotherm than the other two. Thermodynamic studies revealed that the spontaneous nature of fluoride adsorption with increase of entropy and an endothermic process. The kinetic data obtained for fluoride adsorption on Zirconium impregnated ground nut shell carbon obeyed the pseudo-second order equation. XRD and SEM patterns of the CTNSC were recorded to get better insight into the mechanism of adsorption process.

75. Studies on Sustainable Agricultural Models in Telangana District of Andhra Pradesh

Mrs. N. J. Kalaivani and Dr. G. Bagyanarayana

Department of Botany, Osmania University,
Hyderabad-500 007.
E-mail : gbagyan@gmail.com

Green Revolution has led to the introduction of high yielding varieties with the increased use of chemical fertilizers and pesticides to get desired yields. Also the Government's budget on major and minor irrigation projects has also led to large scale monocropping of rice and wheat and it led to severe ecological and environmental disturbances because of the perennial flooding of rice and wheat. Also the chemical pest control methods further deteriorate the agro-ecosystems. One million pesticide poisoning cases and 20,000 deaths every year due to high pesticide residues in food chain. This calls for an urgent need for sustainable agricultural practices which includes the Integrated Pest Management (IPM). The current study was intended to carry out in the semi arid environmental conditions with respect to IPM in the regular field crops with the major objectives of formulating the IPM technologies for the major crops to combat environmental and ecological insecurity and their cost effectiveness among the small and medium

farmers. Trails were conducted in the farmer's fields in Rangareddy, Nalgonda and Warangal districts of Andhra Pradesh in the field crops such as cotton, paddy and vegetables. IPM modules for separate crops were employed in different farmer's fields to compare against the conventional pest control method using chemicals. Specific IPM modules have been evaluated to determine their effectiveness against the pest management in different crops. Biopesticides and botanicals were an integral part of the IPM modules. In the present study combined use of *Chrysoperla carnea* and neem oil 0.3% had increased the yield of okra and provided an additional yield of 4126 kg per hectare over the control plots and had registered a CBR of 2.60. The cost of cultivation and the cost of treatment were also less compared to the other combinations *viz., C.carnea* + Bt (Bacillus thuringiensis) application and Bt + neem oil 0.3% applications. It was also found that in tomato effective combination of Bt + HaNPV + neem oil 0.3% had registered the highest yield increase (8199 kg/ha) over the control plots. The treatment schedule had a cost of cultivation + cost of treatment of Rs. 28,643 and had registered a CBR of 2.63. Similarly for the control against *Helicoverpa armigera* in cotton, Nuclear Polyhedrosis Virus (NPV) have been applied at 3 x 10 12 POB /ha in evening hours at 7th and 12th week after sowing resulted in good yields than the normal. The application gave a yield increase of 500 Kgs/ha to the corresponding increased return in income of Rs.12, 000/ha. Based on the results, it is concluded that pest management is an important part in arid/and semi-arid agriculture. Better pest management options are suggested not only based on the cost benefit ration but also for the eco friendliness. Exploration of different methods of pest management methods with a rational thinking so as to give correct appreciation for the ecological conservation and augmentation of biodiversity is the need of the day, derived from the present study.

76. Disaster Medicine, Telemedicine And Integrated Vector Management

G. B. Kale[#] and N. B. Kutemate*

Department of Zoology and *Botany,
G.S.Science, Arts and Commerce College,
Khamgaon District Buldhana-444312 (M.S.)
[#]Email : gokulbkale@gmail.com

Keywords : *UN-SPIDER, Disaster-medicine, Telemedicine, Vector Management.*

UN-SPIDER-United Nations Platform for Space-based Information for Disaster Management and Emergency Response is United Nation's new programme which was established as per UN's resolution 61/110 of 14 December 2006 at their General Assembly meet, with the following mission statement: "Ensure that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle". It is a gateway to space information for disaster management support, by serving as a bridge to connect the disaster management and space communities and by being a facilitator of capacity-building and institutional strengthening, in particular for developing countries. UN-SPIDER is being implemented as an open network of providers of space-based solutions to support disaster management activities. Besides Vienna, the programme also has an office in Bonn, Germany and will also have an office in Beijing, China. Emergency / Disaster Medicine, Telemedicine and Vector-borne Disease Management are the space-based solutions for prevention and control harmful health effects due to disaster optimizing benefits to both health and environment.

77. Comparative Account of Morpho-anatomical, Biochemical and Accumulation of Cr (III) and Cr (VI) in *Zea maize* L. inoculated with Mycorrhiza *Glomus* sp.

Shekhar Mallick

Ecotoxicology and Bioremediation Group,
National Botanical Research Institute,
Rana Pratap Marg, Lucknow-226001.
E-mail : shekharm@nbri.res.in

Keywords : *Chromium III, chromium (VI), vesicular arbuscular mycorrhiza (VAM), Zea mays, stomatal aperture*

The role of vesicular arbuscular mycorrhiza (VAM) in plant nutrition uptake from soil is well documented by several studies, however studies on its role in uptake of toxic metals is very limited. To study the role of VAM in the

uptake of Cr and the related morpho-anatomical and biochemical changes in plants, sand culture experiment was conducted using *Zea mays* L. supplied by four concentrations (mg Kg^{-1}) i.e. 2, 5, 10 and 20 of both Cr(III) and Cr(VI) in 30% Hoagland's nutrient solution. Analysis of the data obtained for stomatal aperture, total chlorophyll, protein content, fresh weight, leaf and root lengths in treated plants revealed that, Cr(VI) was inflicting more toxicity than Cr(III) as the decline in the level of total chlorophyll in plants treated with Cr(VI) was more than Cr(III), along the dose gradient. The accumulation of Cr(VI) increased with a dose dependent manner with levels of Cr higher in roots than in leaves. It was also observed that the levels of Cr(VI) both in leaves and in roots was higher than that of Cr(III) both with treatment with VAM and without VAM, respectively. The level of phosphate uptake in VAM treated plants, were found to increase with increase in Cr concentrations with higher levels in VAM infected plants than grown without VAM, at their respective concentrations.

78. Fluoride Distribution in Drinking Water : A case report from Ottapidaram Block, Tuticorin District, Tamilndau, India

V. Veeraputhiran*, G. Alagumuthu and M. Rajan

PG & Research Department of Chemistry,
Sri Paramakalyani College,
Alwarkurichi-627 412. Tamilnadu
E-mail : liviveera@yahoo.co.in

Keywords : *Fluoride; Ground water, Wilcox, Piper Diagram*

This paper analyzes the most extensive database on fluoride and other chemical constituent distribution in arid tract of Ottapidaram block, Tamilnadu, India where it is the only source of drinking water. The study was conducted in the summer season (May – June, 2009). The water samples, from the total 61 village panchayats were tested, 81.97% had injurious fluoride level above the 1.5 mg/L and having the variation from 0.936 to 4.34 mg/L. Due to the high concentration of fluoride, dental fluorosis was also identified. Overall water quality was found as unsatisfactory for drinking purposes without any prior treatment except at eleven locations out of 61.

79. Emissions of Nitrous Oxide are Affected by Seasonwith Different Crops

Arti Bhatia, S. D. Singh, Vinay Kumar Singh and R. C. Harit

Division of Environmental, Sciences Iari,
New Delhi-10012.

Keywords : *ECD, N2O, NO3, pH, OC*

Flux of N2O from soil was collected in weekly and analyzed using a gas chromatography with electron capture detector (ECD).The rate of emission varies with deferent stases of crop. The maximum emissions of N2O were found between 26-28 and 24-28 day after sowing of arhar and moog crop respectively. Soil sample from 0-15 cm depth were collected to measure the pH, OC and inorganic –N (NH4-N, NO3-N) content. The finding of the experiment can serve as a guideline to understand the relation between NO3-N and emission of N2O from face in arhar and moog.

80. Photocatalytic degradation of Methyl Blue by heterogeneous $PbSnO_3$ photocatalyst under simulated sunlight

A. V. Borhade[1*], V. B. Gaikwad[2] and Y. R. Baste[1]

[1]Post Graduate Department of Chemistry,
HPT Arts and RYK Science College,
Nashik-422005
[2]Post Graduate Department of Chemistry,
K.T.H.M College,
Nashik 422002

Keywords : *Green chemistry, Photocatalyst, photodegredation, Solid stare synthesis*

Light induced photocatalyst $PbSnO_3$ was synthesized by green chemistry approach, with mechanochemical method. The synthesized catalyst was characterized by various analytical investigative techniques like UV-DRS, FTIR Spectroscopy, X-ray Diffraction, SEM and Energy Dispersive X-ray Spectroscopy etc. Avarage

partical size of the catalyst by Scherer's formula is found to be 26.36nm. Photocatalytic activity of $PbSnO_3$ was studied by photodegredation of Methyl blue dye under stimulated sunlight. Complete mineralization of Methyl Blue was successfully achieved by $PbSnO_3$ photocatalyst. In present study, result obtained is evaluated and reported.

81. Air pollution in Kolkata : Yesterday, today and tomorrow

Gaurav Saha[#], Sayantan Goswami, Soumi Sinha Roy, Shibayan Ganguly, Radhika Saraf*, Payel Ganguly, Anwesha Saha and Ayan Chandra[# #]**

Department of Microbiology,
*Department of Statistics,
**Department of Statistics & Microbiology
St. Xavier's College 30, Park Street, Kolkata,
West Bengal-700016.
E-mail : #gourav.saha@gmail.com,
#ayan991@rediffmail.com

Keywords : *Supreme Court, SPM, RPM, SOx, NOx, ANOVA, t-test, Box Plot*

Kolkata, with its vast network of roads lanes and by lanes, is also home to a large number of vehicles (both public and private). Hence the air of Kolkata is filled with the vehicular emissions. In order to check the increasing levels of pollution, the government of West Bengal in accordance with the Supreme Court Order, had banned all public vehicles more than 15 years old from the streets of Kolkata. This order came into existence from 1st August 2009. We have undertaken a study where we are trying to find out whether this ban on vehicles and in turn pollution is successful or not. We have adopted certain statistical tools to analyse the level of pollution that still thrives in the city. We have taken four parameters- SPM, RPM, SO_x, NO_x. We have taken up three seasons in view for three different time periods, one year before the ban, during the year of ban and a year after the ban. We have made a graphical representation of the levels of the four parameters in different seasons and in different years. We have also performed analysis of variance (ANNOVA) to determine whether the average levels of our four parameters differ significantly in the three seasons and in three

years. We have performed a Box Plot to see whether the levels of these parameters significantly differ from their standard values in the residential areas. We also determine the p-value to determine whether the levels of SPM, RPM, SO_X and NO_X have significantly increased or not. After performing this study, we came up to a striking conclusion. We found that the levels of all the four parameters have started to rise again after a slight dip when the ban had been imposed. The levels of SPM and RPM have increased significantly from their standard values but SO_x and NO_x have not shown such a significant rise from their standard values though they are increasing day by day. This means that initially the ban had met with success but with the course of time as more and more vehicles (both public and private) hit the roads, the pollution levels start to rise. Hence an overall monitoring and all round effort is necessary to stop this menace.

82. Nanotechnology : perspectives and present prospects Synthesis of nanofibrils from aquatic weed -Water lilies (*Nymphaea odorata*)

Marimuthu Thiripura Sundari and Atmakuru Ramesh

Department of Analytical Chemistry,
International Institute of Biotechnology and Toxicology (IIBAT),
Padappai-601301, Kancheepuram district, Tamilnadu,
Email : raamesh_a@yahoo.co.in

Keywords : *Nymphaea odorota, Nanofibrils, Weed manangement, Water lilies*

The application of nanotechnology in weed management was successfully demonstrated by using the aquatic weed *Nymphaea odorata*. The weed biomass was chemo - mechanically converted in to nanofibrils. The size of the synthesized nanofibrils measured were below 100 nm. The separation of fibers from the weed is based on alkali treatment at controlled temperature conditions. The fibers were generated and purified by successive chemical treatments and washings. The size and shape of the fibrils was confirmed by Fourier Transform Infrared spectrophotometry (FTIR), Scanning Electron Microscopic (SEM) analysis and by Transmission Electron Microscopic (TEM) image analysis. The data clearly indicates the fiber length is thousands of nanometer and diameter of fiber is in nano range.

83. Be Environmentally Educated Not Literate-Need Of Eco-Education

Arti Gupta

Invertis Institute of Engineering & Technology,
Bareilly (UP)

No any government or NGO project can achieve the goal of sustainable development, until the public has participation in it.

IN the present scenario there is not a single place in the planet earth that remains unpolluted. Over burden of solid, liquid and gaseous waste is adversely affecting the atmosphere, hydrosphere, lithosphere and even biosphere. Man himself is responsible for the degradation of quality of life. The present study reveals the reduce of waste generation, enhancing awareness for the conservation of natural resources, control over population, refuse the use of non-biodegradable substances and use of eco-friendly products. Hopefully this exercise will give fruitful results to conserve our single home i.e., PLANET EARTH.

84. A Study to determine a dynamically changing blend of Diesel Fuel with Biofuel to achieve an efficient compromise between power and exhaust pollution for varying conditions

Dhruba Jyoti Purkait#, Tathagata Guha Mazumder^,
Sayantani Goswami *and Arijita Chakraborty and B. B. Ghosh.**

#Department of Physics, St Xavier's College, Kolkata.
^Department of Computer Science,
Institute of Engineering and Management, Kolkata.
*Department of Microbiology,
University of Calcutta, Kolkata
**Department of Biochemistry,
University of Calcutta, Kolkata

Keywords : *Bio-diesel, emissions, blend ratio, power requirement, optimum blend, emission level*

Low fuel reserves and pollution have made Bio-diesel an attractive modern day fuel. The hurdle in Bio-diesel use, however, is a combination of low calorific value and detrimental effects on standard diesel engines when used in unblended

form. In this investigation an unmodified two-cylinder diesel engine, SVA-2 manufactured by Alamgir.

Industries was used. Four different emissions i.e. NO_X, CO, HC and PM (particulate matter) were chosen and their levels in g/kWH were observed for varying blends of bio-diesel prepared in the laboratory with diesel fuel (Bharat Petroleum). The increase in power requirement and thus, fuel consumption (100% diesel) for an engine per hundred Kilograms increase in load was also recorded. Results showed an increase of 11.2% in NO_X emissions, decrease of 47% in PM and 55% in CO levels and 73% decrease in HC levels. There was a 13% increase in the power requirement over a graduated increase of 600Kg. The fuel consumed per Km rose by 12.7% in the same range. This data and the specifications of the engine were fed to a computer program which generated then, an optimum blend ratio to keep a vehicle moving at a steady speed of 40km/h, taking care of both power and emission, for a given weight increase. The blend ratio changes dynamically with increase or decrease in weight, thereby generating an optimum blend for maximum possible power efficiency and minimum possible emission levels at a steady speed.

85. Atrazine Biodegradation by Soil Isolates

Kale A. S.[1] and Mrs J. N.

[1]Department of Microbiology,
S.V.K.T.. College Deolali Camp, Nasik.
[2]Department of Microbiology,
S.V.K.T.. College Deolali Camp, Nasik

Keywords : *Atrazine, biodegradation, Bioremediation, Chemical oxygen demand, shakeflask, bioreactor*

Atrazine, a herbicide, belongs to S- triazine group, widely used in corn, sugarcane fields. It is frequently detected as a ground water and soil contaminant. An atrazine degrading bacterial cultures were isolated from an agricultural soil, previously impacted by herbicide spill. Fifteen atrazine degrading isolates were isolated, out of which two best degraders were studied for biodegradation studies depending on their high substrate tolerance. The isolated organisms were identified by using 16S rRNA technique Pseudomonas *putida* (ATZ-2) and *Leucobacter komagatae* (ATZ-7).

Atrazine estimation was done by U.V. Specrophotometer at 220 nm. The organisms were capable of using atrazine as a sole source of carbon and nitrogen under aerobic condition. The substrate tolerance of both organisms was found to be 400 ppm. Glucose and ethanol served as good additional carbon sources whereas, ammonium chloride and peptone as good nitrogen sources for carrying out of atrazine degradation. There was no significant influence of different metal ions on biodegradation of atrazine. pH 7 and 27^0c temperature was found favorable for growth of both organisms. As the cell population density increases, the biodegradation activity was found to be increased. Bioreactor and Shake flask studies showed that complete biodegradation of atrazine taken place in 120 hours. Decreasing levels of COD indicated that atrazine is degraded in to non toxic products.

86. Study of Microbial Contamination in *Amaranthus Gangeticus* Life Stages

N. Sundara Rami Reddy, A. Dattatreya and G. V. N. S. Devi Ram

Department of Microbiology, GIS, GITAM University,
Visakhapatnam-45

Keywords : *Bacterial contamination, Amaranthus gangeticus, nutrient agar.*

The study was conducted to determine various microbial species responsible for the contamination of leafy vegetables during their entire life cycle till they are harvested. *Amaranthus gangeticus(*Redroot pigweed). Were cultivated in different areas. Bacterial species observed were *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus and Streptococcus sp*, fungal species *Aspergillus niger, Aspergillus flavus*. The results have shown that out of the samples examined high percentage of contamination occurs in traffic area followed by village garden, then house garden which has been least. *Staphylococcus sp* accounts for a high percentage of occurrences with 52.5%, *Escherichia coli* having 17.9%, then *Pseudomonas aeruginosa* with 20% and 9.5% for *Streptococcus*. Therefore, consumption of these types of vegetables unhygienically paves way for ingestion of considerable numbers of human pathogenic bacteria. This ultimately results in establishment and manifestation of diseases in the final host.

87. Biochemical Screening of Cyanobacterial Isolates Exposed to Common Rice Field Pesticides from Coastal Areas of Visakhapatnam

G. V. N. S. Deviram*, Saidani, Gaurav Pant and R Gyana Prasuna

Department Of Microbiology,
GITAM Institute Of Science, GITAM University,
Visakhapatnam, Andhra Pradesh

Keywords : *Biofertilizer, Cyanobacteria, Pesticide, Protein*

Pesticide contamination in aquatic ecosystem is one of the reasons for global environmental concern. With the increased use of pesticides, Cyanobacteria is also affected which are potent biofertilizer. In order to know the stress response of Cyanobacteria against pesticides, *Anabaena Sp and Aulosira Sp* were studied with graded concentrations of organophosphate pesticide O,S dimethyl – acetyl phosphoramidothiate 'Acephate' with different parameters like photosynthetic pigments, protein content of pesticide treated cells and the free cells. Acephate concentrations higher than 4µg/mL led to a significant decrease in chlorophyll a (Chl-a) biomass yield and protein content. However at high concentrations of pesticide, the pesticide adapted cells exhibited survivability of 10-12 days as compared to their free living counter parts.

88. Nanotechnology in Groundwater Remediation

C. S. Rajan

Chemical Department of Chemical Engineering Sathyabama University,
Chennai-600 119.
Email : csrajan.23@gmail.com

Keywords : *In situ, zero iron nanoparticle (nZVI), carbon nanotube (CNT), toxicology, contamination, remediation.*

Nanotechnology is an area of extensive research in recent years. Nanoparticles have benefited multiple sectors using their nano-scale applications. This review summarizes on the use of nanomaterials such as zero valent iron (nZVI) and carbon nanotubes (CNT) in the environmenta clean up like ground water remediation for

drinking and reuse. However, there are concerns regarding the potential risks associated with the use of nanomaterials to the environment and human health. An understanding of the relationship between the properties of nanoparticles would provide an effective strategy to tackle the deleterious effects.

89. Ayurvedic Bioinformatics : Establishing an *In-Silico*-Ayurvedic Medication for Alzheimer's Disease

[1]Sumit Raj and [2]Pasupuleti Renuka

Department of Bioinformatics, Sathyabama University
Chennai, Tamil Nadu

Keywords : *Alzheimer's disease, Ayurveda, Canscora decussate, Nardostachys jatamansi, Mucunapruriens, Drug designing*

Alzheimer's disease is an incurable, degenerative, and terminal disease. It is associated with mutations in Amyloid Precursor Protein (APP), Presenilin 1 (PS1), Presenilin 2 (PS2), or Apolipoprotein E (APOE). 3D structures of these protein were designed using Homology Modeling. Active compounds of medicinal herbs – Canscora decussate, Nardostachys jatamansi and Mucuna pruriens were selected as these three herbs have properties of memory enhancement. Chemical structures of the active component of these three herbs were drawn using chemsketch, combined and converted to *.pdb. The four proteins were successfully docked with – Canscora decussate, Nardostachys jatamansi and Mucuna pruriens active component combination.

90. Effect of Electric Current on Growth and Heterocyst Differentiation in Cyanobacteria

R. R. Gyana Prasuna[1], Gaurav Pant[2*], Saidani[3] and G. Deviram[4]

[1]Associate Professor, Head of Department,
Department of Microbiology, GITAM University Visakhapatnam,
A.P.-530 045.
[2,3,4]Research scholar, Department of Microbiology,
GITAM University, Visakhapatnam,
A.P.-530 045

Keywords : *Anabaena, Heterocyst, Electric chamber, Applied electric field.*

Filamentous cyanobacteria "*Anabaena*" were subjected to an externally applied electric field of 10 amperes for 2 hours. The effect of electric current was seen on the growth, survival and heterocyst differentiation of the cyanobacterial strain. An electric chamber for the experiment was constructed. Interesting growth pattern with remarkable increase in the percentage of heterocyst were observed when treated cell were compared with control. An increase in the heterocyst percentage to 10.22% was marked in 80 minutes treated sample with development of dimer and trimer forms of heterocyst. These results suggest that possibly treated cells can fix more nitrogen as compared to normal, untreated cyanobacterial cells.

91. Eco-friendly Pyramidal Type Earthenware Storage System for Rural House hold Storage of Vegetables

A. M. Murugan and *A. J. A. Ranjith Singh

Department of Advanced Zoology and Biotechnology,
Sri. Paramakalyani College, Alwarkurichi-627 412,
Tirunelveli District, Tamil Nadu
E. mail : singhspkc@gmail.com

Keywords : *Pyramid, storage, vegetables, nutritive value, organoleptic value*

With view to investigate the influence of pyramidal structure for vegetable storage experiments were conducted for a period of 9 days and it was compared with other storage systems including refrigerator and ambient conditions. Parameters like physiological loss of weight, heterotrophic microbial count, carbohydrate and protein content and organoleptic qualities were analyzed for the stored products like carrot, tomato and ladies finger. The results indicated that the vegetables stored in pyramidal storage system minimized the physiological loss of weight, reduced microbial numbers and prevented spoilage, retained nutritive value much greater than, when compared to refrigerator storage and ambient storage. In the pyramidal system, organoleptic value has also unchanged.

92. Removal of Cd (II) from Waste Water by Synthesised Goethite

Amita Jaiswal and M. C. Chattopadhyaya*

Environmental Chemistry Research Laboratory,
Department of Chemistry, University of Allahabad,
Allahabad-211002
Email : amita_ecsl@rediffmail.com,
mcc46@rediffmail.com

Keywords : *Goethite, Heavy metal, Adsorption, XRD, FTIR, Langmuir isotherm model*

Goethite (á-FeOOH) is the most abundant and most stable of all forms of iron-oxides in soil and its surface chemistry affects the distribution of soluble species in soil. Synthetic goethite have been extensively study and applied for the removal of heavy metal contaminants from industrial solutions, radionuclides from nuclear reactor plants and for municipal water treatment. Adsorption is an effective purification and separation technique used in industry especially in water and wastewater treatments. In the present work we have synthesized a low cost goethite and characterized by XRD and FTIR.Using this goethite, the adsorption of Cd (II) was studied in synthetic waste water in a batch system by varying pH in the range 3 to 5,varying the initial concentration (1-5ppm) and varying the adsorbent dose(1.0 -5.0g). The percentage adsorption of the Cd (II) was found to be 97.56%. The equilibrium isotherm data was analysed using Langmuir isotherm model. The values of b and Qo for Cd(II) is 2.14 and 0.079 respectively and correlation coefficient is 0.9943.

93. Energy Conservation from Organic Wastes

D. Aravindaraja

Artchouna Soupraya Naickar, Govt. Middle. School – Mudaliarpet,
Cuddalore Main Road, Mudaliarpet,
Puducherry-605004.

Keywords : *Environmental Pollution, Organic wastes, Compost Tumbler, Energy Conservation (collection of Bio–Gas)*

This paper describes a method to reduce and manage organic waste using a rotating compost tumbler and also to arrest the harmful gases that are a great reason for climate change and make people aware of the importance of proper waste management. Our main strategy is that we could decompose fruits and vegetable wastes and extract and conserve energy out of the compost formed. For this purpose, we made a Compost Tumbler (a rotating compost bin) which are systems designed to be turned or aerated, with the facility of closing it air tight.

The project is typically conducted over two phases. During the I phase, the decomposition process was carried out and during the II phase, energy was conserved using the decomposed organic matter and the biogas was collected. In conclusion, our hypothesis was partially correct, the final results collected with the data being statistically analysed and recorded.

94. Bacteriological Water Quality of The Nambol River, Manipur

Rebika Soibam Chanu and *Asha Gupta

Department of Life Sciences,
Ecology Research Laboratory, Manipur University,
Canchipur-795003
*E-mail : anjalika_22000@yahoo.co.in

Keywords : *Total Coliform, Faecal Coliform, Indicator organisms, Water quality, Pollution, Nambol river, Manipur*

This survey comprised a part of the pollution analysis of the Nambol riverine ecosystem, Manipur with a goal to assess the bacteriological water quality. Samples were collected from 5 different sites from the Nambol river during Monsoon and Post monsoon period during hydrological year 2010. Total Coliform, Faecal Coliform, and Faecal Streptococci were used as bacterial indicators. Standard methods (APHA, 1989) were used for the analysis of total and Faecal Coliforms and Faecal Streptococcus. Site 5 showed the maximum bacterial contamination in both the monsoon and post monsoon seasons. The water which is otherwise used by the inhabitants in the surrounding areas of the Nambol river for domestic purposes like drinking, bathing, cooking, washing etc did not meet the microbiological water quality criteria for any form of use and the Nambol river is heavily polluted.

95. Phytoremediation : A Novel Strategy for The Removal of Heavy Metal from The Environment using Plant

Mule A. R.[1*], Patil V. V.[1], Jagdale V. V.[2], Patil B. D.[3] and Pawar D. V.[4]

[1]Department of Biotechnology COCSIT, LATUR (MH)
[2]Dr BAMU Sub Center Osmanabad (MH)
[3]New Arts Commerce Science College Ahmednagar (MH)
4 R.Y.K. College Nasik (MH)

Keywords : *Phytoremediation, Heavy metals, Soil contaminant*

Phytoremediation is a site remediation strategy which employs plant to remove non volatile & immisible soil contaminant (Heavy metal). More than 400 plant species have been identified to have potential for soil & water remediation. Among them Brassica & Thlaspi species have been mostly studied. Phytoremediation being more costeffective & fewer side effects than physical & chemical approaches. Three subset of Phytoremediation are applicable to heavy metal remediation (1)Rhizofiltration (2)Phytoextraction (3)Phytostabilization.The use of chelator enhance the heavy metal accumulation activity of plant. This paper is attempted to provide a brief review on recent progress in research & practical application of Phytoremediation.

96. Vermiculture : A Sustainable Solution for Waste and Land Management by Earthworms

Aasha Kumari[1], Soma Chatterjee[1], Dr. Tripti Gangwar[2] and Dr. Bihari Singh[3]

[1]Research Scholar, Department of Environmental Science
[2]Sr. Lecturer, P.G. Department of Chemistry,
A. N. College, Patna
[3]Professor, P.G. Department of Environmental Science,
A.N. College, Patna

Keywords : *Vermiculture, Vermicompost, Sustainable Agriculture, Earthworm Biomass*

Vermiculture is a growing industry not only for managing waste and land, very economically but also for promoting 'sustainable agriculture' by enhancing crop productivity both in quantity and quality at significantly low economic cost than the costly agrochemicals. In any vermiculture practice, earthworms biomass comes as a valuable by-products and they are good source of nutritive 'worm meal'. They are rich in proteins(65%) with70-80%high quality essential amino acids 'lysine' and 'methionine' and are being used as feed material to promote 'fishery',' dairy' and 'poultry' industry. They are also finding new use as a source of collagen' in the manufacture of pharmaceuticals and in the making of 'antibiotics' from the ceolmic fluid as it has ant pathogenic property. The objective of this article is the present an overview of vermiculture technology.

97. Electronic Pollution Control System

T. Raghavendran, Santhosh Jayanthi and P. Indraniel Gupta
Prince4india@gmail.com

The emerging world has been covered with a new blanket along with the atmosphere, in the recent times and that blanket is named "POLLUTION". And measures have been taken in recent times, to the core, to control and enroll certain measures to remove the blanket and it is successfully on way.

Here this is a part of it. This Electronic Pollution control system has been designed for the above purpose. This has a gas detector in the exhaust tube of every vehicle in case of automobile and in the chimney top, in case of different petro-chemical industries, which top the table of leading polluting industries. This sensor will monitor the toxic gases coming through the exhaust and give an electronic output, which will be monitored by small software.

Now when the output from the sensor for a particular season, or a particular period of time goes beyond the safer value, an ANALOG signal will be sent to the nearest transport or police department, with the help of an artificial SIM, equipped in the car. This signal has data regarding the owner's license, bank account number etc details, which helps them to take action on that vehicle.

98. Recycling Waste into Valuable Organic Fertilizer

Miss. S. A. Hake*, M. R. Deokar, H. B. Manjare, S. B. Bhosle and S. S. Khirsagar

Department of Biotechnology,
College of Computer Science and Information Technology,
Latur (MH)

Keywords : *Vermicompost, Earthworms, Biodegradation*

Vermicompost also called worm humus. Vermicompost is literally the best nutrient – rich, organic fertilizer and soil conditioner. Vermitechnology is the use of organic amendment. Vermitechnology comprises Vermiculture (Rearing of earthworms), Vermicomposting (Biodegradation of waste biomass in earthwormic way), Vermiconvertion (Mass maintenance of sustainability of waste lands through earthworms) Eudrilus euginiae is the species of earthworm used in the vermocomposting process. In this present work we prepare three beds with different contents. The worms added in the beds by using Random method. Then we found that the mixer of Soil, Agriwaste, Cow dung, Desiculture suitable for production of higher quality vermicompost with micro flora of vermicompost Azotobactor, Agro bacterium, Rhizobium, microbes.

99. Application of Water Quality Index to Assess Water Quality- A Case of Neyyar River Basin South West of India

Sheeja R. V.*, Sabu Joseph, Sheela A. M. and Jaya D. S.

Keywords : *Water quality Index, Weighted Arithmetic Index method*

Water quality monitoring studies in Neyyar River Basin were carried out with water quality index (WQI) Weighted Arithmetic Index model by using water characteristic data for Neyyar river, South west of India during the period, May 2006 to January 2007. The WQI is used to classify water quality as excellent, good poor and very poor. The index ranges from 0 to 100, where 100 represent very poor water quality. Water samples were collected in the premonsoon, monsoon and post monsoon seasons from selected stations of the river stretch. Eight parameters were

analysed, namely pH, Total Dissolved Solids, Total Alkalinity, Total Hardness, Chlorides, Sulphates, Dissolved Oxygen and Biological Oxygen Demand. The results of spatial and temporal distribution of WQI of Neyyar River Basin revealed that the water quality fall under good to poor category. Direct and indirect influx of solid and liquid wastes from urban area, withdrawal of water for irrigation, agriculture practice prevailing in the basin etc. mainly led to deterioration of water quality in some sampling stations of Neyyar River Basin.

100. Effect of Sand Mining on the Structure of Meiofaunal Community with Special reference to Marine Nematode Assemblages : an Experimental Approach

Ravail Singh and Baban IngolE

Biological Oceanography Division,
National Institute of Oceanography,
Dona Paula, Goa-403004
*Email : rubail2010@gmail.com

Keywords : *Sand Mining; Impact; benthic assemblages; simulated experiment; Paradeep; Bay of Bengal; India*

The exploratory mining phase was started about quite years ago on the assumption that the resources of terrestrial mines able to meet demand within a few decades. Supplies of certain metals might also become limited on political grounds, since production of certain metals is concentrated in relatively few countries. Increasing demand for metals and its depletion on land has turned global attention towards the Sea. Present study is investigating the effect of sand mining on benthic communities. This will be the first attempt to study meiofauna with special reference to nematodes up to species level from Paradip harbour east India. Disturbance (natural and /or manmade) is one of the major factors affecting the species diversity. Field studies investigating the effects of different classes of disturbances on benthic meio- and macrofauna have been conducted and results of before, immediately after and 24 hours of monitoring experiment are presented. We report the results of simulated sand mining experiments with dominant macro- and meiofaunal species in order to examine the effects of disturbance on species composition, diversity and community structure. The hypotheses that physical

disturbance brings significant change in benthic community structure, especially the species density and diversity. The experiment was conducted in the offshore between Mahanadi estuary in the north and Paradip port mouth in the south (20^0 15 08 -20^0 16 46 N lat.; 86^0 41 41 - 86^0 42 46 E long.) and it falls almost in the centre of the coastal periphery of the Mahanadi delta. The hypotheses tested is physical disturbance brings significant change in benthic community structure, especially the species density and diversity. Nematodes community attributes (species abundance, species number, species diversity) showed influence of disturbance. *Daptonema* sp was the most abundant among 16 nematode genera recorded at D-0hrs. The distribution of nematode was influenced by the supply of food material from water column and thus, any fluctuation in food input may impact the nematode distribution within the sediment column. We can say that the mining or any type of physical disturbance could change the feeding structure of community in a particular ecosystem. The results presented here contribute to a better understanding of benthic processes and improved the precision with which the response of the biota to environmental change can be determined. The experimental approach proved to be a powerful tool for the evaluation of environmental impacts. It is clear from this short-term experimental study that sand mining has large impact on the marine benthic communities. Thus, there is a need for conservation and the effective management.

101. Effect of Alternaria Leaf Blight on Seed Germination and Seedling Vigour of Sunflower in Rohilkhand Region

Vikas V. Patel, Reetu Gangwar and U. S. Mishra

Phytopathology Lab. Department of Botany,
Bareilly College, Bareilly, M.J.P. Rohilkhand University,
Bareilly-243006
E-mai : vpversatile@gmail.com

Keywords : *Alternaria leaf blight, sunflower, seed germination, seedling vigour, management*

Alternaria leaf blight of sunflower is a very common and destructive disease in Rohilkhand region. Despite the rapid spread of the crop in India, the productivity is going down in recent years due to the susceptibility of this crop to the fungal

diseases. The symptoms of *Alternaria* leaf blight appeared in the month of March in the form of characteristic small circular, brown coloured patches on the surface of leaves and these brownish patches grow in size and coalesced to cover the entire surface of leaves producing blight symptoms. Marked blight symptoms are seen in the head (capitulum) of heavily infected plants in which seeds are also infected with *Alternaria helianthi*. Naturally infected seeds with *A. helianthi* and artificially inoculated one showed 38.6% and 23.0% reduction in germination respectively. Shoot and root length of seedlings was also significantly reduced in both cases. There was a marked increase in number of seedlings showing blight incidence with increase in spore load of *A. helianthi* on seeds. Biocontrol of *Alternaria* blight by selected natural herbal plant extracts *in-vitro* has been observed and recommended for use to the farmers.

102. Ginger (*Zingiber officinale)* Rhizome Extract : A Source of Silver Nanoparticles and their Application

R. P. Singh*, S. Magesh[(a)] and C. Rakkiyappan

Amity Institute of Nanotechnology,
Amity University Uttar Pradesh,
Noida : 201301, (UP)

Ginger root extract has been used for chemical reduction of Ag^+ ion producing Ag nanoparticles. It is observed that chemical reduction is slow as compared to pudina or other leaf extracts reported by other authors. The observations of non-uniform particle size in the early stages of reaction, and subsequent appearance of uniform size distribution at the later stages have been accounted for the slow reduction process of ginger root extract. 3D Atomic Force Microscope (AFM) images of Ag nanoparticles reveal hill like structures around them. Attempt has been made to explain the mechanism of formation of such particles. It is believed that polyol (oxalic/ascorbic acid) and water-soluble heterocyclic components of the root extract play a key role in chemical reduction and stabilization of Ag nanoparticles respectively. Transmission Electron Microscope (TEM) images have been used as a complementary technique to see the shape and absolute size of Ag nanoparticles. In addition, the toxic effect of Ag nanoparticles to E.coli strain has been demonstrated.

103. Biosorption of Zn(Ii) from its Synthetic Solution by Aspergillus Niger

Asha Gupta[a]*, Pawan Rose[a] and Jaipal[b]

[a]Department of Environmental Science and Engineering,
Guru Jambheshwar University of Science and Technology,
Hisar-125001 (Haryana)
[b]DAV College of Engg. & Tech., Kanina,
Mohindergarh, Haryana,
*E-mail : drashagupta@indiatimes.com

Keywords : *Biosorption, Langmuir Isotherm, Freundlich Isotherm, Correlation Coefficient*

Free biomass of *Aspergillus niger* for the removal of Zn(II) from an aqueous solution was tested in this study. Batch studies were performed to optimize parameters like pH, biosorbent dose, contact time and initial metal ion concentration. Biosorption process was found to be highly pH dependent. The optimum pH for biosorption of Zn (II) was found to be 5.5. Biosorption was found to increase with increase in biosorbent dose and decrease with increase in metal ion concentration. The Langmuir and Freundlich isotherms were applied for describing sorption equilibrium. Freundlich isotherm was found to describe well the process with correlation coefficient (R^2) greater than 0.97.

104. Product Advertisements and Its Effects on Environment

#Mansi Shukla, Shilpi Bose, *Somit Roy Chowdhury and ^Vikas Gupta

#Lecturer, Department of Commerce,
Avadh Girls' Degree College, Lucknow
*Lecturer, Department of Botany,
Lucknow Christian College, Lucknow
^Research Scholar, University of Lucknow,
Lucknow

Keywords : *Eco friendly, environment.*

"Let every individual and institution now think and act as a responsible trustee of Earth, seeking choices in ecology, economics and ethics that will

provide a sustainable future, eliminate pollution, poverty and violence, awaken the wonder of life and foster peaceful progress in the human adventure."

The labelling of ecofriendly products has been introduced in a number of developed countries to assist in the protection of the environment. Recently, developing countries like India, have introduced the scheme.

As consumer demand for environmentally conscious products increases, so do claims touting the positive environmental impact of products, also known as "green" claims. Companies wishing to capitalize on the demand for eco-products must understand the law regarding such claims, as well as the ramifications, both legal and otherwise, of making illegal or false claims. With calls to conserve our resources, protect our environment and "Save Our Earth" reaching an all-time high, there is no question that green claims will continue to populate the marketplace with ever-increasing regularity.

105. Sedimentary record of heavy metal pollution of Lake Burragorang using ^{210}Pb dating

Archana Saily Painuly[1], Surendra Shrestha[2] and Paul Hackney[3]

[1]Babu Banarasi Das National Institute of Technology & Management, Lucknow, India

[2]University of Western Sydney, Sydney, Australia

3SA Water, Adelaide, Australia

Keywords : *Dating techniques, metal, nutrients sedimentation rate, paleoenvironment*

Sediment core samples from Lake Burragorang, Sydney, Australia were subjected to ^{210}Pb radiometric dating to determine the rate of sedimentation. CIC model has been applied in this study for age determination. The ages calculated were correlated with organic matter, carbonate content, nutrients and metals concentration, and past rainfall record and bushfire data in order to characterise the historical record of their deposition.

106. Assessment of chromium tolerance potential in three locally available aquatic macrophytes

Surjendu Kumar Dey

Department of Environmental Science,
Fakir Mohan University, Vyasa Vihar,
Balasore-756020
E-mail : surjendufmu@rediffmail.com

Keywords : *Ceratophyllum, Hydrilla, lipid peroxidation, peroxidase, Superoxide dismutase, total chlorophyll, Utricularia*

Three locally available aquatic macrophytes viz., *Hydrilla verticillata* (L.f.) Royle, *Ceratophyllum demersum* L. and *Utricularia aurea* Lour. were exposed separately to 100 ppm solution of $K_2Cr_2O_7$ for seven days and some physiological parameters were assessed in order to determine their Cr tolerance potential. The physiological parameters assessed were total chlorophyll and soluble protein contents; activities of antioxidative enzymes like superoxide dismutase (SOD) and peroxidase; and the level of lipid peroxidation. Since the concentration of Cr used was quite high, toxic effects in terms of alterations in physiological parameters were observed in all three species. However, differences in term of changes in physiological parameters were observed in three species tested. In *Hydrilla verticillata*, the decrease in total chlorophyll content, soluble protein content, activities of SOD and peroxidase and increase in lipid peroxidation levels were 26%, 14%, 15%, 18% and 41% respectively in comparison to the control plant. In comparison to other two plants, least decrease in the parameters was found in *Hydrilla verticillata*. The alterations in physiological parameters were found maximum in case of *Utricularia aurea* and the twigs were found disintegrated and in *Ceratophyllum demersum*, intermediate toxicity symptoms were noticed. Thus, the results of this study indirectly give evidence that among three species, *Hydrilla verticillata* has maximum potential to tolerate Cr and therefore, it may be recommended for Cr phytoremediation in polluted water bodies.

107. Effect of Ph and Biosurfactant on Bioremediation of Petroleum Contaminated Soil

Dr. B. Santhaveerana Goud

Professor, Department of Civil Engineering,
Bangalore University, Jnana Bharathi,
Bangalore-560056

Keywords : *Bioremediation, Biosurfactant, Soil, Hydrocarbons*

The biodegradability of petroleum hydrocarbons in oily sludge was studied in solid phase treatment by preparing simulated contaminated soil. Simulated contaminated soil was prepared by mixing fresh soil with oily sludge and innocuous soil collected from VRL Logistics Ltd, near R.V.College, Mysore Road, Bangalore. The simulated contaminated soil was filled in FIVE bioreactors and tested in the laboratory for various parameters at regular intervals of once in a week, for a period of 3 months to determine the biodegradation rate of TPH under laboratory conditions by maintaining optimum CNP ratio of 100:10:1.

Biodegradation of TPH was studied with four bioreactors for various soil pH conditions i.e. (i) 6.5, (ii) 7.0, (iii)7.5 and (iv)8.0. Fifth bioreactor was maintained at pH 7.5 with addition of Biosurfactant. From the results it was observed that the pH and biosurfactant have influence on bioremediation. The higher rate of biodegradation was observed when the pH was 7.5. The addition of biosurfactant further enhanced the biodegradation rate. At pH of 7.5, total TPH reduction was 71.62% with degradation rate of 0.0140/day. When biosurfactant was used, total TPH reduction was 82.17% with degradation rate of 0.0191/day.

108. Pesticidal Residue in Water and Soil of Godavari Delta

Mahaboob Pacha Mohammed[1] and N. Srinivas

Department of Environmental Studies,
GITAM Institute of Science, GITAM University,
Visakhapatnam.
[1]Department of Chemistry, Petrochemicals and P. G. Courses,
P.R. Government College (Autonomous),
Kakinada

Keywords : *Pesticide Residue, Godavari Delta*

Water samples were analysed for pesticide residue in Godavari Delta of East Godavari District of Andhra Pradesh. The important physico-chemical parameters were determined and a significant spatial variation was observed. The residue levels of persistent chlorinated pesticides such as HCH isomers, Chlorpyrifos and Endosulfan compounds were quantified in water samples. HCH showed higher levels during premonsoon (July to September) and monsoon (October to December) months, reflecting the HCH usage during that season for paddy crops. But in the case of Endosulfan no clear trend in residue level was observed. The Chlorpyrifos was detected as the dominant pesticide in all the sampling sites.

109. Comparative Investigation of Growth, Antioxidants and uptake of two Cultivars (Sona and SRHM 445) of *Zea mays* L. towards Cr (VI) in Sand Culture

Shekhar Mallick

Ecotoxicology and Bioremediation Group,
National Botanical Research Institute,
Rana Pratap Marg,
Lucknow-226001

Keywords : *Tolerant, sensitive, Zea mays, antioxidants, lipid peroxidation, chromium uptake*

The study reports a comparative evaluation of growth and biochemical response in two cultivars of Zea mays L. namely cv. sona and cv. SRHM 445 against Cr(VI) (2.5, 5 and 10 µg g-1 dw) under sand culture for 7 and 14d. The two varieties exhibited differential response in its growth and antioxidant parameters. Besides high uptake of Cr in cv. sona, percentage reduction in shoot, root length and fresh weight of cv. sona was less than cv. SRHM445. After 14d, the decrease in the shoot length, root length and fresh weight of

the cv. SRHM 445 was observed as 26.67, 26.37 and 51.66%, respectively and 6.32, 7.69 and 46.83% respectively in cv. sona as compared to their respective C. Similarly antioxidant parameters were less affected in cv. sona, is indicative of the fact that it is a relatively tolerant cultivar than cv. SRHM 445. As compared to respective C, there was significant increase in APX and GPX activities of cv. sona, and maximum increase of 114.53 and 30.65% was recorded after 14d in 10 µg g-1 dw, respectively as against 152.48 and 38.30% in cv. SRHM 445. Thus, cv. sona may be suitable to grow on contaminated sites. However, the level of Cr in the edible part needs to be checked before its consumption.

110. Removal of Cr (Vi) from its Aqueous using A Fungus -*Aspergillus Niger*

Jaipal* and Asha Gupta**

*DAV College of Engg. & Tech., Kanina,
Mohindergarh, Haryana
**Deptt. of Environmental Sci. and Engg.,
Guru Jambheshwar University of Sci. and Tech.,
Hissar, Haryana

Keywords : *Biosoption, fungus, Aspergillus niger, Chromium (VI), isotherms, Freundlich*

The aim of this study was to investigate the Chromium (VI) biosorption potential of Fungus Aspergillus niger at varying pH, biosorbent dose, contact time and temperature through batch mode experiments. The biosoption followed first order rate expression and Langergren equation. Biosorption data was fitted to Freundlich and Langmuir isotherms. The highest (94.4%) metal biosorption is achieved at pH -2, biosorbent dose -0.6 gram per 50 ml, contact tome 60 minutes, agitation speed 150 rpm and 30 ppm metal ion concentration. It is proposed that aspergillus niger can be potential biosrobent for chromium (VI) removal from waste water.

111. Ground Water Quality of Paldi Village of North Gujarat Region : A Case Study

Dr. J. R. Prajapati, Dr. B. V. Raol, F. J. Thakor* and Shri P. H. G. Muni

Arts & Science College, Kalol (N.G.) 382 721.
*J & J College of Science, Nadiad, Dist. Kheda.
E-mail : jrpbiology@yahoo.com,
bvraol@yahoo.co.in,
fulsangjithakor@yahoo.co.in

Keywords : *Ground water quality, Physico-chemical characteristics, bore-well samples*

The ground water quality of Paldi Village (Tal. Visnagar, Dist. Mehsana, North Gujarat) was assessed by examining various physico-chemical & bacteriological characteristics. The bore-well samples were collected from four different seasons. On the basis of TDS values all samples were rated as unacceptable for their taste and on the basis of total hardness these were rated as hard. The sulphate, total iron and fluoride, MPM\N of coliforms values exceeded the permissible limit. The defluoridation and disinfection of borewell water of this area are recommended to ensure the health of population residing in rural area of North Gujarat region.

112. Heavy Metal Assessment in Leachates of Municipal Solid Waste Dumping Site – Jaipur

Anirudh Sahni* and Abhishek Gautam**

Department of Environmental Science,
Birla Institute of Technology, Mesra (Ranchi),
Jaipur Campus
E-mail : anirudhsahni@yahoo.com,
dranirudhsahni@gmail.com

Keywords : *leachates, heavy metals, natural water resources, health hazards*

The MSW mismanagement is a serious problem of the world. Proper disposal methods are important in management of municipal solid waste. Open dumping may have adverse affects on environment and human health. Leachates are the byproducts of decomposition of municipal solid waste. It consists of various toxic and poisonous substances and heavy metals. These heavy metals may percolate through soil in surface and sub surface water and may cause negative impact. In the present study analysis of heavy metals in the leachates of MSW site of Jaipur shows their presence in toxic levels. Iron was found in highest quantity (224.0 ppm) and cadmium in least amount (0.14 ppm). The order of merit of heavy metals was found to be Fe > Zn > Pb > Cr > Cu > Ni > Cd. Complete isolation of municipal solid waste dumping site from population and natural water resources is recommended to minimize the adverse effects.

113. A Comparative Analysis of Trace Elements in Domestic Waste Water and Industrial Waste Water by ICP-MS

Pathan A. D.*, Gaikwad S. D., Patil S. M. and Bhavsar V. A.

Dept. of Biotechnology, COCSIT College,
Latur (Maharashtra)

Keywords : *Trace elements, Heavy metal, ICP-MS, Waste water*

Water is the most vital source of all kinds of life on the earth water quality is adversely affected both qualitatively & quantitatively by all kinds of human activities. Determination of trace element is considered as a useful and important test in survey of environmental pollution. So this issue is taken for the study. Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is used to determine trace elements and metals. A number of elements are normally present in relatively low concentration, usually less than a few mg/l, in conventional irrigation water and are called trace elements. They are not normally included in routine analysis of regular irrigation water. Particularly if contamination with industrial wastewater discharge is suspected. These include Al, Be, Co, F, Li, Mn, Mo, Se (Selenium), Sn (Tin), Ti (titanium), W (Tungsten), V (Vanadium). ICP-MS (Laser Ablation Inductivity Coupled Plasma Mass Spectroscopy) were used for the detection of

trace metals in a solid matrix consisting of KBr and two oxides. In the present investigation it is found that concentration of Be, Na,V,in domestic waste water is higher than industrial waste water. In the present study the aim was only detection of trace elements and metals. On the basis of this data the further study will be on, to reduce the load of trace element and metal by using advanced techniques e.g. Biosorption.

114. Biodegardation of Atrazine by Soil Isolates

Avinash S. Kale[1] and Mrs. J. N. Bandal[2]

[1]Department of Microbiology,
S.V.K.T. College Deolali camp Nasik,
[2]Department of Microbiology,
S.V.K.T. College Deolali camp Nasik

Atrazine, a herbicide, belongs to S-triazine group, widely used in corn, sugarcane fields. It is frequently detected as a ground water and soil contaminant. An atrazine degrading bacterial cultures were isolated from an agricultural soil, previously impacted by herbicide spill. Fifteen atrazine degrading isolates were isolated, out of which two best degraders were studied for biodegradation studies depending on their high substrate tolerance. The isolated organisms were identified by using 16S rRNA technique Pseudomonas *putida*(ATZ-2) and *Leucobacter komagatae* (ATZ-7).

Atrazine estimation was done by U.V. Specrophotometer at 220 nm. The organisms were capable of using atrazine as a sole source of carbon and nitrogen under aerobic condition. The substrate tolerance of both organisms was found to be 400 ppm. Glucose and ethanol served as good additional carbon sources whereas, ammonium chloride and peptone as good nitrogen sources for carrying out of atrazine degradation. There was no significant influence of different metal ions on biodegradation of atrazine. pH 7 and 27^0c temperature was found favorable for growth of both organisms. As the cell population density increases, the biodegradation activity was found to be increased. Bioreactor and Shake flask studies showed that complete biodegradation of atrazine taken place in 120 hours. Decreasing levels of COD indicated that atrazine is degraded in to non toxic product(s).

115. Sand Mining Impact Assessment of Ecology of Kallada River in Kerala, India

S.Sheeba and Nimisha P.*

Sree Narayana College, Punalur,
Kollam-691 305, Kerala.
***Sree Narayana College,**
Kollam-691 001. Kerala.

Keywords : *sand mining impact, Kallda river, ecology*

The quality of environment and ecosystem in rivers of the world are declining at an alarming rate. The rapid growth of population, industrialization, urbanization disturbing the natural quality of environment and that of the ecosystem has degraded. The entire old culture has changed due to destroying the environment rather than conserving. The life of the organisms is being threatened. Monitoring the ecosystem degradation level has not yet started in a serious way. Exploding population and shrinking of resources are the causes of environmental degradation. The natural resources are ruthlessly exploited in the name of development for economic benefit without giving adequate consideration to gradually deteriorating the environment. Human activities have greatly altered the ecosystem, and geographical factors very strongly influence the environment and environment is a product of various geographical factors.

116. Environmental Effects on Voltage Comparator Circuit - A Simulation Study Performed using MULTISIM

R. B. Barve and A. V. Mancharkar

Department of Electronic Science, New Arts,
Commerce and Science College,
Ahmednagar-414001
E-mail : mancharkarav@rediffmail.com;
barve_rb1970@rediffmail.com

Keywords : *Multisim, Simulation, Temperature Analysis*

Electronic products reliability is very important to both user and manufacturer. Designing products to survive harsh environments is expensive in time and money. An optimum design is one of that meets its requirements at minimum cost. Different factors such as humidity, radiations, EMI, vibrations, shock, water leakage, fungal growth, chemical attack, damage due to abuse & many others would also play as distracter. In the industrial processes temperature is a main factor. Many of these factors put constraints on the mechanical & electronic design**.**

This paper presents simulations of typically chosen representative circuit of analogue electronics using MULTISIM 10.1. The circuit performance is tested by simulating under specified temperature range. The results are plotted as a function of temperature to show performance degradation of circuit operation. This study would then help the pool for bridging the gap between the customers need & the manufacturer which would cut down the product waste cost, time & efforts manufacturing new product.

117. Physico-Chemical Analysis of Effluents of Dairy and Textile Industries

Lav Varma and Dr. Jyoti Sharma

Department of Chemistry, Raj Rishi Govt. College,
Alwar-301001, Rajasthan

Keywords : *Physico-chemical analysis; Dairy effluents; Textile effluents; Chemical oxygen demand*

Samples, from each industry, were collected and analyzed for various physico-chemical parameters such as pH, total dissolved solids (TDS), biochemical oxygen demand (BOD) and chemical oxygen demand (COD),suspended solids(SS), oil and grease, calcium, magnesium, iron, manganese, copper, chromium, sodium, potassium, total hardness. Results indicated that textile effluent is more acidic and possesses lower values of BOD and COD than dairy effluent. TDS and SS levels are higher in textile than dairy.Irrigation with high TDS water will result in decrease in optimal crop productionSodium levels were found quite high. Soil becomes poorly drained and tends to crust when treated with high level sodium water.Dairy effluent excels in Sodium, Calcium, Potassium and Manganesevalues, while textile effluent has

greater magnesium, total hardness and iron than dairy effluent. Copper and chromium were untraceable. Some methods like Electro-dialysis, ion exchange method, biochemical purification etc. can be employed for the treatment of such wastewater.

118. Polyphenol Content and *in vivo* Antioxidative Effect of *Ipomoea Aquatica* Extracts against Carbofuran Toxicity

***Sanjukta Datta and Santinath Ghosh**

Department of Chemical Technology,
University College of Science and Technology,
University of Calcutta, 92, A.P.C. Road.
Kolkata-700 009
E-mail : samyukta9231@gmail.com

Keywords : *Carbofuran, Flavonoids, Oxidative stress, Lipid peroxidation*

Carbofuran (2, 3-dihydro-2, 2-dimethyl-7-benzofuranol methyl carbamate) is a widely used carbamate which has been reported to be a potent inhibitor of neuronal functions in the body. Its ill effects by way of producing oxidative stress in the body tissues are well established. Studies have revealed the antioxidative properties of green vegetables and fruits to a large extent and have attributed this characteristic to the presence of the large quantities of polyphenolic compounds present in them of which, flavonoids form a major portion. The aim of this study was to evaluate the deleterious effects of this pesticide on blood plasma and erythrocyte membranes due to oxidative damage in Wistar albino male rats, given an oral dose of 0.1mg/ kg body weight and the extent to which the leafy vegetable extracts of *Ipomoea aquatica* (20 mg of polyphenolic compound expressed as gallic acid equivalents / kg body weight) protects the body against the oxidative insult caused to the blood. The evaluation was based on the lipid peroxidation levels in the plasma and also the erythrocyte membrane peroxidation levels. The results show that there was an increase in lipid peroxidation levels in the pesticide treated group than the group treated with the plant extract along with the pesticide. This provides a better surface to understand that how these natural products can protect the body cells against the deleterious effects of the oxidative stress caused by the pesticide. The present study thus gives an insight into the ill-effects of this carbamate and the protective role of plant polyphenols in minimizing those effects.

119. *Trigonella Foenum-Graecum* Mucilage : An Adsorbent for Removal of Sulphate Ions

Dr. Alka Tangri
Dept. of Chemistry, Brahmanand P.G. College,
Kanpur
E-mail : alka. tangri@rediffmail.com

Sulfate occurs naturally in groundwater. Sulfate ions present in water in high concentrations may cause temporary and acute effects on humans and animals, including diarrhea. Recently, numerous approaches have been studied for the development of cheaper and more effective adsorbents containing natural polymers. Among these, the use of adsorbents containing polysaccharides has been investigated as a replacement for current conventional methods of removing pollutants from solution.

The mucilage extracted from the seeds of Trigonella *foenum-graecum*, a food grade natural polysaccharide, is used as an adsorbent for removal of sulphate ions in aqueous medium. The maximum removal obtained was 87.80% after 60 minutes. The optimum mucilage dose was 50mg/L. The maximum removal was obtained at acidic pH. A series of contact time experiments were conducted to assess the system variables such as concentrations of mucilage and ions and pH. This ecofriendly food grade polysaccharide was proved to be a very good adsorbent for the removal of sulphate ions.

120. Uptake of Chromium and their Effects on Biochemical Constituents in *Salvinia Molesta* (Mitch.) Exposed to Tannery Waste Water

S. N. Pandey*, Kavita Singh, Padma and Sindhuja Shukla
Department of Botany, University of Lucknow,
Lucknow,
*E mail : snpandey511@gmail.com

Keywords : *Salvinia molesta* (Mitch), *tannery waste water, chromium, catalase activity.*

Due to the wide spread discharge of tannery waste, Cr is considered as hazardous aquatic pollutants in the environment. The exposure effects of Cr (VI),

evaluated in tannery waste water in *Salvinia molesta* with respect to biochemical alterations and visible symptoms of toxicity were studied. Tannery waste water were collected from Jajmau area in Kanpur district (U.P. state, India) and analyzed for some important pollution parameters. The waste water was slightly acidic in pH (6.7) with high BOD, COD and chromium content (1.32 ppm). Tannery waste water was low in dissolved oxygen content. *Salvinia molesta* were exposed with various concentrations of waste water (25, 50, 75 and 100%), tap water was served as control (0). The high uptake of chromium in *Salvinia molesta* was determined (612 µg g^{-1} dry weight) at 144 h exposure of undiluted tannery waste water (100%). Chromium accumulation was increased with increase in waste water concentrations. *Salvinia molesta* showed visible symptoms of toxicity such as necrosis in the leaves followed by chlorosis, spread from upper marginal portion. Visible effect of toxicity was more severe at undiluted tannery waste water than its ditlutions. The decrease in carotenoids content (- 54.3%) and activity of catalase (-60.9%) in *S. molesta* were observed at undiluted tannery waste water (100%), whereas these were stimulatory at low concentration (25%) of tannery waste water. Accumulation of chromium in *Salvinia molesta* was found concentration dependent. Therefore study concluded that, elevated level of Cr in tannery waste water showed high accumulation in *S. molesta* and exhibit visible symptoms of toxicity. Thus, tannery waste water needs more treatment prior to its discharge.

121. Microbial Removal of Hexavalent Chromium from Railway Locomotive Effluents in Liluah, West Bengal

Parijat Sil, Sneha Dutta, Rishita Baishya, Deblina Basu, Shriya Saha and A. K. Mitra*

Department of Microbiology,
St. Xavier's College
Kolkata-700 016
Email : *drakmitra01@hotmail.com

Keywords : *Liluah, Howrah, West Bengal, Hexa-valent Chromium, Bacillus firmus*

In India, the locomotive industries have a rich heritage of more than 150 years. But because of their old status, they have not always kept the effluent level low. The one at Liluah, Howrah, West Bengal, turns out effluents rich in heavy metals

like chromium, cadmium, lead and mercury. They have different levels of toxic influence on the aquatic microbes. Untreated water contains a typical micro-flora of bacteria tolerant to those heavy metals and was considered for this investigation. Five different colonies were chosen from this consortium and were named 1,2,3,4 and 5. Chromium content was highest in this effluent ((0.01 mg/I)). SO metal tolerance assay for Chromium was carried out and colony 1 showed 99% efficiency in the uptake of hexavalent chromium at 10ppm concentration of the metal in the growth media.it is worth mentioning here that colony 5 was growing appreciably at 50ppm concentration of the hexavalent metal. The bacteria to be Bacillus firmus, strain CM21 (GenBank Accession Number : **EU660344.1**), Which is a gram positive, long rod, aerobic, motile, and was found to be catalase positive, indole negative, voges Proskauer Positive. The consortium of these organisms can therefore act as effective means of removing hexavalent chromium from railway locomotive effluent.

122. Study of Kinetic Alfven Wave by Kinetic Approach in Inhomegeneous Plasma

P. Agarwal, Nidhi Shukla, P. Varma and M. S. Tiwari

Department of Physics.
Dr. HS Gour Uiversity,
Sagar-470003, Madhya Pradesh.
E-mail : nidhiphy.shukla@gmail.com

The Kinetic Alfven waves are investigated using Maxwell – Boltzmann-Vlasov equation. The model is developed by basic kinetic theory in inhomogeneous plasma. The physical model is based on the collisionless Vlasov-Maxwell equations in which unperturbed distribution function is evolved. Throughout the present analysis it is assumed that the plasma is immersed in inhomogeneous magnetic field. The effect of inhomoeneous magnetic field is included in the analysis for both the regions k1p1 <1 where k1 is the perpendicular wave number and p1 is the ion gyroradius. In this model, kinetic dispersion relation for inhomogeneous plasma is determined. This model of KAW is applicable to evaluate the dispersion relation, growth rate, growth length and damping rate of kinetic Alfven wave. The applicability of this model is assumed for auroral acceleration region and plasma sheet boundary layer.

123. Study of EMIC Waves with Linear Dispersion Relation in Current Free Plasma by Particle Aspect Approach

Soniya Patel, Nidhi Shukla, P. Varma and M. S. Tiwari

Department of Physics,
Dr. Hs Gour University,
Sagar-470003, Madhya Pradesh.
E-mail : nidhiphy.shukla@gmail.com

Electromagnetic ion cyclotron instability, incorporated the details of charge particles trajectory has been discussed. In this paper the energy of EMIC waves, growth rate and marginal instability by linear dispersion relation is determined. The growth rate has been obtained by and energy conservation method for a general loss-cone distribution function. It is assumed that the whole plasma is considered to consist of resonant and non-resonant particles. The resonant particle participates in energy exchange with the wave whereas the on-resonant particle participates in the oscillatory motion of the wave. The effect of non-resonant particle on the resultant growth rate has been discussed and beam effect on EMIC wave in current free plasma has also been derived. The heating of ions perpendicular and parallel to the magnetic field has been derived. The heating of ions perpendicular and parallel to the magnetic field has been discussed along with EMIC emission on auroral field line.

124. The Effect upon *Tilapia mossambica* on Exposure to short term and long term Concentration of Acehate

Dixy. B. A., Cannali Christy Deena. J. and Prakash. D. J.

Postgraduate & Research Department of Zoology,
Voorhees College,
Vellore-632001. Tamil Nadu.

Keywords : *Toxicity – Acephate – LC 50*

Water pollution is a global problem. Products and wastes from synthetic chemical industries are extremely complex in their composition and have an adverse effect on the water quality. *Tilapia mossambica* fishes from Vellore

Moat water (a polluted water body) were collected and exposed to lethal concentration of Acephate (orthene). LC50 value was calculated to be 1600mg/litre in 96hrs. The behavioural, physiological and histopathological parameters were studied during the lethal (96hrs) exposure. The observations show a moderate damage. The study concludes that the toxicity of this insecticide is comparatively less to the other insecticides and the damage to the non-target population is tolerable.

125. Studies on the Socio-economic Effects of Arsenic Pollution and Existingstatus of Mitigation measures in the Katlamari – I G.P. of Raninagar – II Block of Murshidabad District, West Bengal, India.

Saptaparna Chowdhuri, Abhijit Das and Subarna Bhattacharya

Department of Environmental Studies,
Rabindra Bharati University,
56, B.T. Road, Kolkata-50
Kandi Raj College, Kandi,
Murshidabad (West Bengal)

The presence of arsenic in the groundwater has become a high profile problem in many districts of West Bengal. Murshidabad district is one of the 9 severely arsenic affected districts of West Bengal. In which excepting Nabagram and Bharatpur-II blocks, 24 blocks are arsenic affected. Kotlamari-I Gram Panchayat under the Raninagar-II block of Murshidabad district was chosen to analyze the socio-economic effect of arsenic pollution among the villagers and the existing status of arsenic mitigation measures implemented there. Primary data was collected through door to door field survey from the 10 villages (20 households from each village) of Katlamari – I Gram Panchayat. It is observed that 30.38% of people affected by arsenic skin lesions out of which 18% died. Many arsenic mitigations measures like 4 arsenic treatment units, 5 deep tube-wells, 1 swajal dhara project, 1 pipes water supply scheme have been implemented there. But at present except the piped water supply scheme, all other measures are defunct. Proper awareness must be imparted to the villagers and project based on surface water resource; rainwater harvesting should be adopted there to fight out the arsenic pollution.

126. Nano-crystalline Mgo as Adsorbent to Reduce COD from Pharmaceutical Industry Effluent

Mohd. Mehmood Hussain, Rajest, V. V., Surabhi Shrivastave., Naidu, R., Nagapa, B., Tejas T. S. and G. Panduranga Murthy

Centre for Shridevi Research Foundation –
CSRF & Dept. of Biotechnology,
Shridevi Institute of Engineering & Techonology,
Sira Road, Tumkur-572106

Keywords : *Meso-porous, Solution combustion synthesis, Physico-chemical*

Mesoporous Nano-crystalline MgO was prepared by the process i.e, Solution combustion synthesis (SCS) and using Magnesium nitrate as oxidizer & Glycine as a fuel. TEM & SEM studies were conducted to evaluate pore diameter (4-11nm) of MgO powder for the further analysism. The collected 'Pharmaceutical effluent' (from TPRL – Tumkur) was subjected for 'batch stirring processed for the treatment. Some of the important Physico-chemical parameters like sulphate, chloride, pH and COD were conducted before and after treatment of effluent. The results reveal; 150mg of MgO at constant pH-8 & stirring time- 40 minutes in 200 ml of pharmaceutical effluent sample could reduce 91.41% Chemical Oxygen Demand(COD). This can be a significant & noval approach for the removal of COD in the pharmaceutical effluent.

127. Avenue Trees - A Boon To Mankind

Huma Fazal*, S. S. Khan and Zahoor Ahmed Lone

Dept of Botany, Saifia,
P.G.College of Science and Education,
Bhopal M.P. 462001

Among the loveliest living things, trees once covered nearly all the land on earth. But it is a far different story today, and perhaps it was the apparent endlessness of the world's forests and trees that led to their present predicament. Humanity has always looked upon trees as an economic resource to be exploited, rather that the very foundation on which all the life on earth depends. Like the huge

and beautiful trees of te forests, the avenue trees, which are planted on the roadsides, also play a very important role in our life. They control the pollution level as well as add to the beauty and aesthetics of the cities. Apart from these they play several other roles also.

Some of the common avenue trees are Azadirachta indica ADR.Juss (neem), Bauhinia variegate L.Sp.Pl., Bombax malabaricum L.Sp.Pl., Caesakoubua saooab L.,Cassia renigera, Enterolobium sanam Prain, Holoptelia integrifolia Roxb, Jacaranda mimosaefolia D.Don, Peltoforum ferrugineum Benth, etc. The present paper deals with these and many more trees with the same utility.

128. The Flying Coffines (Devastating Grabbing Gravity)

M. H. Ranebennur

Astronomer Cum Co-Ordinator,
The Astro Divine Science Research Centre,
GADAG-582101, Karnataka State
E-mail : mhranebennur@hotmail.com

The death cavity, great grave gap developed under the earth due to oil spill technology since 150 years created catastrophic effects. Earth's magnetic power, gravitational power added with devastating grabbing gravity power. Internal global warming, de-hyderated earth, de-oxygenation zone in oceans kills whales, dolphins, devastating cloud brust, tornadoes, cyclones, hurricanes, earth slides, Avalanche of mountains, torrential rains, heavy down pours of rains, floods, mud floods, killer earth quakes, valconic eruptions, they are all biter fruits and free gifts of oil spill technology which is the mother of all ills & evils affects shrouded around the earth.

Earth's grabbing gravity reaches the sky to recover back it's own blood & Breath (Fossile Fules) burning in flights engines. Picks fire & plung into sea or on mountains killing all air travelers of the Flying coffins.

This devastating grabbing gravity of earth inner core reaches the Meteorieds, Astroids, converts into stony rains, it will grab the poisionus gases of passing comets kills millions of people, when this lathe energy reaches moon split into pieces. Already moon has started shrinking by more than 100 meters in it's size and developed many cracks on its surface.

We think that we know more about earth inner core. Actually we know little about the life giving capabilities and super hyper caliber of earth inner core. Now we cannot escape from it's catastrophic effect internal global warming, resulting into PLANET CHANGE on 21st December 2012. Erasing 80% of living beings from the surface of the earth, but this is not the Dooms Day. Dooms Day is very very far away. This is purely the man made catastropy.

129. Plants in Relation to Fisheries Practices – A Survey on Biodiversity Utilizatio in North Bihar, India

V. Jha, A. B. Verma and Anuradha Mishra***

Department of Botany, L.N. Mithila University,
Darbhanga-846004.
E-mail : vidyanathjha@gmail.com
Department of Botany, M.R.M College,
Darbhanga-846004.
Department of Botany, Marwari College. Darbhanga

Keywords : *Indigenous. Fisheries, North Bihar, Plants, Bair formulation, Fish flots.*

Mankind is in the habit of living in tandem with nature and has been utilizing its resources from pre-historic times. Being endowed with intelligence the humans have also developed the capacity of modifying and nurturing these reserves as per their requirements. The varied natural resources have been utilized for fulfilling the livelihood requirements of food, medicine, cloth, housing material ect.

North Bihar is endowed with a sprawling water resource spectrum and a large section of its populace sustains itself on the diverse fish population that exists in its aquatic environment. The reason is know for indigenous production of air breathing fishes which thrive on the rich organic detritus and are richer source of easily digestible protein, essential amino and fatty acids and other nutrients.

People in this area have been utilizing the various indigenous plant resoures for fisheries purposes. Aquaphytes like Eichhornia crassipes and Alternanthera sp. Are utilized as fish shelter belts, locally known as 'jhangs'. Hollow stems of Phragmites karka are utilized as angles. The local bamboo species are used for making the various types of fishery appliances.

A number of plant products are used as components of bait formulation of which Hedychium spicatum (ekangi) and Curcuma zedoaria (Kachur) constitute the major ingredients. Leaf extracts of Cannabis sativa, essence of flowers of Jasminum sp. Are used for procuring live earth work bait as well as fish poison. Plants of E.crassipers, Aeschynomen sp, and banana pseudoostems are used as fish floats. Woods of Inga dulcis, Syzygium cuminii and Dalbergia sissoo are used to making boats which are used for ishing purposes.

Of late, makhana (Euryale ferox) system, in order to raise the overall fish productivity in this region, has emerged as a potential choice for integral aquaculture projects.

130. Studies on Solid Waste Management Practice in Madhyamgram Municipality, West Bengal, India

Sinjini Dutta Gupta and Subarna Bhattacharyya*

Department of Environmental Studies,
Rabindra Bharati University,
56A, B.T. Road Kolkata-700050.
E-mail : sinjiniduttagupta1@gmail.com

Keywords : *Domestic waste management, rap pickers, bio fertilizer*

The present study was aimed to investigate existing domestic waste management practice in Madhyamgram Municipality, West Bengal, Ward No 24 of this area was selected for assessing existing solid waste management practice. Categorization characterization and handling of the waste was recorded by using a self designed questionnaire. Observation had shown that the mixed waste comprised mostly vegetable debris (58.65%) followed by mental waste (20.80%), plastic (42.90%), paper(55.18%) and food waste (25%). People of higher income family used to accumulate more domestic wastes in their own home flowed by middle class, lower middle class and below poverty level people. Significant statistical correlation was observed with family income and their solid waste handling. Bio-degradable and on-biodegradable wastes were used disposed in an open sold wastes dumping ground which was very near to railway station. Rag pickers used to segregate the mixed wastes and sold the plastics, papers and metal wastes for their livelihood support. They were the only waste managers of the study area. As the bio-degradable part of the waste is higher it could be a potential source for bio-fertilizer.

131. Evaluation of The Quality of Underground Water of Ara and Surrounding, Bihar

MD Shahnawaz and Saiyad Rafat Imam

Deptt. of Chem., Al-Hafeez College,
Veer kunwar Singh University, Ara
Deptt. of Chem., H.D.Jain college,
Veer kunwar Singh University, Ara

Keywords : *Ground water, Physico – chemical study, Borewell, Hand pump, Ara*

Ground water forms a major source of drinking due to non-supply for rural and urban people of India. It is preferred over surface water due to non-availability of other water sources and the consideration that surface soilstrata acts as a natural filter providing safe and pure water. Work on the quality and extent of utilization of underground water in drinking and domestic purposes has been reviewed. A systematic physico-chemical quality study of the ground water in different localities in Ara and its surrounding ahs been taken to evaluate its suitability for domestic purposes. A total of 45 water samples were collected from different hand pumps and analysed for the various physico – chemical parameters like pH, electrical conductivity (EC), turbidity, total dissolved solids (TDS), total hardness (TH), calcium (Ca), magnesium (Mg), chloride (CI), fluoride (F), iron (Fe), sulphate (SO4), nitrate (NO3) and arsenic (As). The results were compared with Drinking water standards.

132. Bucket Water Experiment for Treatment of Arsenic Contaminated Ground Water

Md. Shahbz Rahim, Miss, Sneha Rashmi and Dr. Bihari Singh

Department of Env. Science,
A.N. College, Patna

Keywords : *Bucket water experiement, Arsenic Contaminated ground water, Sodium, Hypochlorite*

Recently ground water Sources in areas along the main stream of Ganga river in Bihar has been found to have Arsenic Content much above the permissible limit

of 50ppb. Excess Arsenic in drinking water is a serious health problem to human. In water Arsenic occurs as As(III) and As(V). As(III) is more poisonous as compared to As(V). Whicle in surface water AS, if present exists mainy as AS(III).

The two forms of Arsenic are reversibly interconverteble through the following redox reaction.

The results of our experiment of perfume in Maner Block, district Parna, Bihar for a period of 3 moths show that if Arsenic contaminated ground water is left exposed to atmosphere in a lidless bucket for 48 hrs, Arsenic Content in the water falls down form 110 ppb to 50ppb (maximum permissible limit) or even below it.

Therefore, it is advised that people living in the areas with ground water contaminated with Arsenic may use of drinking purpose (in absence of any alternative option) after storing it is open buckets. So, that it is in atmospheric contact for 48 hrs.

If the water is treated with a tablet of sodium hypochlorite per 10 litre of water, the chances of microbial contamination is greatly reduced.

133. Cholera Toxin-Its Biochemistry and Genetic Regulation

Rashmi Sinha

M. M. Mahila College,
Ara (Bihar)

Affecting the small intestine through secretion of a protein enterotoxin called the choleratoxin whose action on the mucosal epithelium is responsible for the characteristic diarrhea. The enterotoxin has been characterized and contains 5 blinding (B) subunits of 11,500 daltons (encode by cixB), an active (AI) subunits of 23,500 daltons, and a bridging piece (A2) of 5,500 daltons (both encoded by ctx A) that links A1 to the 5B subunits assembling the toxin in the appropriate 1A:5B proportion. Once it has entered the cell. The A1 subunit enzymatically catalyses the covalent modification of the regulatory protein Gas protein by transferring or attaching an ADPribosyl (ADPR) moiety from NAD to an arginine residue at the GTPase active site of the adenylate cyclase (AC) system forming Gas-ADPT. This ADP-ribosylatio prevents Gas from hydrolyzing GTP, thus causing the protein to

become permanently activated. This process is complex. The activation is normally brief because another regulatory protein (Gi) hydrolyzed GTP, since GTP hydrolysis is the event that inactivates the adenylate cyclase, the enzyme remains continually activated.

The activated adenylate cyclase, the enzyme remains continually activated intracellular cAMP in cells of the intestinal mucosa converting the damage cells into pumps, which extract watr and electrolytes like Na+K+,cr, and HCO-3 from the blood and tissue causing their hyper-secretion into the lumen of the small intestine, Hp,Na+ and other electrolytes actually follow due the osmotic and electricl gradients caused by the loss of cr. The loss of fluids leads to dehydration, anuria, acidosis, cardiac complications, circulatory failure and shock. The secretion of a large volume of isotonic fluid constitutes watery diarrhea that contains enormous numbers of vibrios. This effect is dependent on a specific receptor, monosialosyl ganglioside (GMI ganglioside) present on the surface of intestinal mucosal cells. The determinants for the colonization of the mslall intestine in pathogenic cholerae include invasion, adhesions and neuraminidase during the colonization stage, which has the interesting propelly o fdegrading gangliosides to the monosialosyl form, which is the specific receptor for the toxin V. cholerae is resistant to bilsalts and can penetrate the mucus layer of the small intestinem possible aided by secretion of neuraminidase and proteases (mucinases). Once the cholera bacteria reach the intestinal wall, they do not need the flagella propellers to move themselves any more, so they stop producing the protein flagellin, thus again conserving the energy and nutrients. Specific adherence of V. Cholerae to the intestinal.

134. Intensity of Anar Butterfly Virachola Isocrates (Fabr.) with Period and Crop means in Guava

Sunita Singh, S. Sinha and A. Prasad

Department of Zoology,
D.S.D.(P.G) College, Unnao

Keywords : *Infestation, Guava Fruit*

Guava is a popular fruit crop but several insect pests easily damage the crop. Guava is mainly a crop of U.P. where it is used in large amount by all classes of

society. The experiment have been carried out at D.G. College, Kanpur during 2003-2004. Anar butterfly (virachola isocrates Favr.) is found throughout the year except May and June. Data recorded on the population of oriental fruit fly larvae in period, period x crops, months, crops and months x crops were summarized. Among the 40 periods of populario of Virachola isocrates was found the highest (35.600 per unit) in 3rd week of September and it was followed by 32.219 in the 3rd week of August, 28.285 in the 2nd week of September and 27.180 in the 4th week of December. The minimum population was observed in the 4th week of November i.e. of population 10.794 per unit, respectively. In fact this showed a great range if variation. It was very apparent that population fluctuation varied from September to November.

135. Recycling of Seqae & Industrial Waste for Fish Culture

Archana Sengupta and Rinini Dastidar

Department of Biochemistry,
Vivekananda Institute of Medical Science
Ramakrishna Mission Seva Pratisthan,
99, Sarat Bose, Road
Kolkata-700026.

Keywords : *Recycling, Sewage & Industrial Waste, Waste Recycling, Aquaculture & Physicochemical Properties.*

Intense efforts are being made at treating the domestic sewage to make the effluent suitable for discharge into natural water in the recent past. In this research physicochemical properties of waste water fed fishery at Taratala, Kolkata were assessed to evaluate its suitability for pisciculture. The water sample was analyzed monthy. The present study showed that the desired levels of physicochemical properties of this aquaculture farm were achieved when the water discharge into ponds through traditional purification. Considering all the data, it can be conferred that traditional recycling of sewage through a biological process may be able to contribute into the socio – economic and developmental dimension of sustainability.

136. Status of Soil Enzymes in Different Parts of a Metropolitan City : A Case Study in Kolkata

Chandrima Ghosh, Shreyasi Dutta, Monideepa Sengupta and Srabanti Basu

Department of Biotechnology,
Heritage Institute of Technology,
Chowbaga Road, Anandapur
Kolkata-700107.

Keywords : *Kolkata, soil, amylase, cellulose, phosphatase, protease*

Soil enzymes play key biochemical roles in the overall process of organic matter decomposition in the soil system. They are important in catalyzing several important reactions necessary for the life – processes of soil microorganisms, stabilization of soil structure, decomposition of organic wastes and nutrient cycling. An understanding of the role of soil enzymes in the ecosystem will potentially provide a unique opportunity for an integrated biological assessment of soils due to their crucial role in several soil biological activities. In the present study, and attempt has been made to study the status of some important enzymes in soil samples of a metropolitan city. Activity of amylase, cellulose, protease and alkaline phosphatase were determined in soil sample collected from East Calcutta Wetlands, and agriculture – and pisiculture – based area, situated at eh eastern fringes of Kolkata. Enzyme activate was found to be higher in the samples collected form the parks of north-eastern and sounth-central region indicating a better biological activity of the soil of those two parks.

137. Hydro-Geology of Bhojpur-A Part of Middle Gangetic Plain

Md Shahnawaz and Saiyad Rafat Imam

Deptt. of Chem., Al-Hafeez College,
Veer kunwar Singh University, Ara
Deptt. of Chem., H.D.Jain College,
Veer kunwar Singh University, Ara

Keywords : *Groundwater; Contamination; Quality; Arsenic; Bhojpur District*

This communication describes the ground water quality of different block of Bhojpur district in middle gangatic plan. A total 66 numbers of ground water samples were collected from different locations of these blocks and analysed from the various physico chemical parameters like pH, electrical conductivity (EC), turbidity, total dissolved solids(TDS), total hardness (TH), calcium (Ca), magnesium (Mg), chloride(CI), fluroride(F), iron(Fe), sulphate(SO4), nitrate(NO3) and arsenic(As). Water samples were collected from hand pumps and public water supply. Among the parameters described, elevatedlevels of EC, turbidity. TDS< TH, Ca and Fe were detected according to WHO permissible limits for drinking water. AS concentration in 36.36 to 59.09% ground water samples were found higher than the WHO permissible limit.

138. Role of Iron Oxidizing Bacteria in Making Iron Plaques on the roots of Plant Typha and Making it Tolerant Towards Heavy Metal

Upal Das Ghosh, Chinmay Saha and Dr. Maheshweta Mitra Ghosh

Department of Microbiology,
St Xavier's College, Kolkata

Keywords : *Iron plaques, Radial Oxygen Loss, Phytoremediation*

Constructed wetlands are an inexpensive means of treating wastewater enriched wit heavy metals. The ability of wetlands to cleanup heavy metal toxicity largely depends upon the activity of the plants growing on those wetlands. It's a well known fact that roots and the surroundings rhizosphere of these wetland plants containing a large microbial population with high metabolic activity plays important role in imparting heavy metal tolerance or helping to regulate metal availability to the plant. A predominant wetland plant in this context is the Typha species. One important factor related to this metal hypertolerance is atttricuted to the formation of Fe oxyhydroxide precipitates on the root surfaces of these plants commonly know as Iron plagues there are information's that bacteria may play a role in formation of Iron Plagues. Our present study involves the isolation an characterization of iron oxidizing microbes form the roots of plant Typha and establish their capability to form plaques on the roots of plants grown under lab conitions.

139. The Evaluation of Some Water Quality Properties of Waste Water Fed Fishery for Pisciculture

Archang Sengupta, Mriganka Bhusan Bhandopadhya and Sankar Kumar Ghosh

Department of Biochemistry,
Vivekananda Institute of Medical Science,
Ramakrishna Missio Seve Pratishthan,
99, Sarat Bose Road, Kolkata-700026

Keywords : *Pisciculture, Waste Water, Heavy Metals & Sustainable Development.*

Heavy metals contamination of aquatic ecosystem has been recognized as a serious pollution problem. All heavy metals are potentially harmful to most organisms at some level of exposure and absorption. A study was initiated to assess the heavy metals like Fe, Cu, Pb, Zn and Cd contamination in sewage and industrial effluent fed aquaculture farm named as Mudialy Fishermen Cooperative Society, Taratala, Kolkata, The date of physicochemical properties collected from the proposed farm offered a constant environment for growing fish, This study arrives at a conclusion that properly planed and managed reuse scheme backed with effective regulatory policy measures can lead to a sustainable development.

140. Environmental Impacts of Open Cast in Sccl-Ap

S. Chalapathi Raju

Educational Resource Person Education Department,
Kothagudem-507101.
Khammam Dist. Andhra Pradesh.

Keywords : *EIA, Open cast Mining, Ambient Air quality, Geo-friendly, waste water, Over burden, Biological – Engineering*

Any developmental activity results in environmental degradation as it disturbs the natural existing system. With growing population and planned economic growth for better standards of living, there will be grater demand for exploitation of mineral resources besides other natural resources, increasing environmental pressure with

passage of time. The mining industry plan a vital role in the overall economy and industrial development of any country. Most of the Energy requirements in India (about 70%) are based n coal.

The Technology transferred in pursuit of Social-Economic development has led to increase in Opencast Coal Mining with highly mechanized systems as the productivity is very high compared to underground mining.

In SCCL-AP, the increasing O.C. Mining results in environmental degradation is various section. Ait is polluted with "suspended particulate mater" (SPM) and gaseous emissions like Sox and NOx. The water resources are polluted due to acid mine drainage, heavy silting, greases, oil and other heavy metals. The O.C. result in Noise pollution. The flora, fauna and wild life gets affected due to deforestation and changes in land use patterns.

141. Role of Medicinal Plants on Tai Tribes of North – East India with Special Reference to Tai Phake and Its Conservation

Mamoni Phukan Borgohain

Department of Botany,
Moran College, Sivasagar, Assam

Keywords : *Medicinal plant, Herbal treatment, Tai, Tai Phake, Traditional, Practitioner*

A Plant with therapeutic properties in any part of its body may be termed as medicinal plant. Our beautiful world is endowed with wealth of medicinal plants. The uses of medicinal plants for treatment of various diseases have been found since the dawn of civilization.it is most popular among the tribes of India.

The Tai is one of the largest tribal groups of North-East India. The Tai Phake is the second largest group among them. The system of herbal treatment is traditional and is inherited from generation to generation. They have some manuscripts for herbal treatment which are written, in Tai language. The people of this tribe collect their medicinal plants from the nearby forest. Due to some natural calamities like flood, soil erosion, land sliding etc. they have lost many valuable medicinal plants every year. Therefore some of the practitioners grow some important plants in their own kitchen gardens for continuing their tradition of herbal treatment of various diseases.

142. Physico-Chemical Analysis of Ground Water at some Selected Sites in Muzaffarpur Town

M.Kumar*, S. Sharama[1] and K. E.

*Dept. of Chemistry, B.R.A.BIHAR University,
Muzaffarpur-842001.
[1]Dept. of Zollogy, Dr.J.Mishra College,
Muzaffarpur-842001.
[2]Dept. of Chemistry, Marthoma College, Chungathara,
Nilambur-679334 (Kerala)
E-mail : mkumar@yahoo.co.in

Keywords : *Ground water, Physico-chemical, Analysis*

The result of 12 month from June 2009 to May 2010 continuous study of Physico-chemical analysis of ground water with respect to pH, conductivity, Ca^{2+}, Mg^{2+}, K^{+}, No_3^{-}, Cl^{-},HCo^{-}_3, So_4^{-}, F^{-}, Fe, Zn and Mn at five selected sites in Muzaffarpur town are incorporated here.

143. Estimation of Radioactive Air Pollutants in some Industrial Units

Ajay Gard[a], R. P. Chauhan[b], K. Kant[c] and Sushil kumar[d]

[a]Department of Physics, Arya PG College,
Panipat (Haryana).
[b]Department of Physics,
National Institute of Technology,
Kurukshetra (Haryana).
[c]Principal, aggarwal P.G. College,
Ballabgarh (Faridabad)
[d]Department of Physics, CDLU sirsa (Haryana)
E-mail : gargnimish94@gmail.com,
chauhanrpc@gmail.com

The industrial unit like thermal power plants, fertilizer plants, paper mill etc.. are using coal as fuel. The combustion of coal in various industrial units results in

the release of some poluutants including natural radioactivity to the environment. The radioactive radon gas and it's progeny in the atmosphere, soil, ground water, oil and gas diposits contributes the largest fraction of the natural radiation dose to population, tracking it's concentration is thus fundamental for radiation protection. Keeping this in mind measurements of radon, thoron and their progeny in the environment and soil samples collected from the vicinity of some industrial units at Panipat (Haryana) have been made. The annual effective doses received by the walkers have also been estimated. The radon concentration in the environment of thermal power plant is higher (165+/-42 Bq m^{-3}) as compare to fertilizer plant (1o5+/-21 Bq m^{-3}) which may be due to the use of large quantity of coal as fuel in thermal plants.

144. Dissipation of Tetracycline in Soils under Different Redox Conditions

O. P. Bansal

Chemistrry Departments, D.S.College,
Aligarh-202001 (U.P.),
E-mail : drop31@rediffmail.com

The dissipation kineties of a widely-used veterinary antibiotic tetracycline(TC) was investigated in the laboratory in six different soils under aerobic and anaerobic conditions. The results showed that the dissipation of TC in soils followed first order reaction kinetics and dissipation rates decreased with increasing concentration of TC. The dissipation of TC was faster under aerobic conditions than under anaerobic conditions. The $T_{1/2}$ values for TC dissipation under aerobic conditions ranged from 41.2 256 days for non sterile treatments, and 95.6 to 130 days for sterile treatments, while under anaerobic conditions the half lives of TC ranged in between 57 and 71 days for non sterile soils and in between 100 and 144 days for sterile soils, suggesting that microbes can degrade TC in agricultural soils strong sorption of TC by soil components, dependent on soil nature, soil pH and soil organic matter, also affects the dissipation of TC.

145. Study of Fauna of Nahar Wildlife Sanctuary

Dr. Kalpana Sharma and Satish Kumar Yadav

Dept. of Zoology, GOVT. Colege,
AJMER (RAJ).

Keywords : *Fauna, Reptiles, Birds, Mammals, Wildlife*

Wildlife is the native fauna of particular region which grows without care of human beings. Nahar wildlife sanctuary is situated in Haryana in district rewari, near the nahar village, on kosali mahendergarh road. The study of natural habitat of animals is must to conserve and should have knowledge of their ecological relations. The loss of wild life is a present global crisis so that they may not become extinct. The animals from reptilian, avian and mammalian fauna were observed with the help of binoculars and then photograph with the help of a camera.

Our observation shows that in the avian fauna, 34.2 % passseriforms, 33.3% sturnidai, 16.6% carvidae, 16.1% picnodae, 16.6% muscicapidae, 8.3% placidae, 8.3% dicruridae, and 14.25% from the order coraciiforms, 50% alcedinidae, 10% maropidae, 20% coraciidae, 10% upupidae, 10% bucerotidae, and 11.4% from the order columbiformers, 11.4% from order gruiformers, 10% from order gruiformeres. All remaining orders falconiformers, psittaciformers, cucaliformeres and stringiformeres have availability percentage 28 and their families are falconidae, psittacidae, cuculidae and strigidae respectively present in study area.

From mammalian fauna 27.7% carnivore, 22.2% artiodactyla, 16.6% rodentia, 11.11% arthropodae, 11.1% insectivore, 5.5% lagomorpha, 5.5% chiroptera. The order carnivore has 2 suborders named fisspedia and pinnipedia in the sacnctuary. The order artiodactyla has only 1 suborder, ruminantia in the sanctuary. Three families are present under the order rodentia, namely muridae, seiridae and hytricidae. Under arthropodae, a single family named as cercopathecidae is presnt in sanctuary.

Logomorpha order which included mainly hares has only one family named as liporidae.

Insectivore order has two families; soricidae and erinaceidae, in the sanctuary. The order chiroptera has one suborder; microchiroptera in the sanctuary.

146. Polltion Control in Open Cast Mines

Dr. Keshab Mukhopadhyay
Department of Pharmacology,
College of Medicine and J.N.M. Hospital,
Kalyani, Nadia-741235

Keywords : *Air Pollution, Rain Water harvesting, Plantation, open cast mine*

Abandoned open cast mines are producing air pollution in the coal mines area and are producing health hazards in those areas.

i) If those abandoned mines be filled with soil, night soil (acting as manure) and plants of wood, food, fuel and medicinal value be planted there then those air pollution can be controlled a large

ii) Down going of the surface water is really a problem today. Some of those open cast abandoned coal mines may be used as reservoir of rain water harvesting and will solve.

(a) Water crisis problem in coal belts.

(b) Fish may be cultivated there.

147. Quality of Locally Manufacture Turmeric Powder Samples Availanle in Markets of Kolkata and Neighborin Areas

Suravita Banerjee (Ghosh), Barnilni Mitra,
Shilpasree Saha and Kamala Adak
Department of Home Science,
University of Calcutta,
20B Judges Court Road

Keywords : *turmeric powder, moisture, total ash, acid insoluble ash, metanil yellow*

The work comprises of detection of certain parameters like moisture, total ash and acid insoluble ash of turmeric powders available in local markets of Kolkata and its neighboring areas. Along with this ;the presence of metanil yellow (a very much hazardous extraneous colour) in the collected samples was also examined through chemical test and analysis of microscopical structure. Only a very small percentage (10 %, out of 60 samples) was found to be adulterant free based on the above parameters. Alternatively, from this study, 90% of turmeric powders were found to be adulterated which is really alarming. This gives a brief idea about what kind of malpractices are going on in spice market of Kolkata and its neighbouring areas.

148. Comparative Study of Decolourization of Texdtile Dyes Between Bacterial and Fungal Cultures

K. Jayashree[1], Dr. D. Sarvamangal[1], Dr. P. Appa Rao[2] and P. Vijaya Lakshmi[3]

[1]Githam University,
[2]Imma Labs,
[3]Visakha Govt. Degree College.

Keywords : *Bacterial cultures, Fungal cultures, Dye solution, U. V. Spectrophotometer, Other routine lab requirements, etc.*

Water pollution- The major problem faced by the present generation has many solutions which are both advantageous as well as disadvantageous. 17-20 percent of industrial water pollution comes from textile dying. This paper deals with the biodegradation of textile dyes that contaminate the water bodies. This paper offers a comparative study of biodegradation between Bacterial and Fungal cultures.

149. Characterization of Dicarboxylic Acids in Atmospheric Particles

Dhananjay Kumar Deshmukh and Manas Kanti Deb

School of Stsudies in Chemistry,
pt. Ravishankar Shukla University, Raipur,
Chhattisgarh-492010,
Email : debmanas@yahoo.com

Keywords : *$Pm_{2.5;}$ Dicarboxylic Acids; Urban Area; Oxalic Acid*

Dicarboxylic acids are important components in atmospheric aerosols and can act a cloud condensation nuclei to potentially affect the climate. Thirty sets of weekly $PM_{2.5}$ samples were obtained during the period of July 2009 to November 2009 at Raipur, India using Andersen sampler. The concentrations of $PM_{2.5}$ were determined by gravimetric analysis and dicarboxylic acids by ion chromatography. The average concentrations of $PM'_{2.5}$ were 96.0+/- 48.9 ug m^{-3}. Measurement showed that the highest concentrations of dicarboxylic acids were oxalic acid (732.0 ng m^{-3}) at capital city Raipur followed by phthalic acid (18.9ng m^{-3}) and maleic acid (16.4 ng m^{-3}).

150. Biological Monitoring at Selecyede Petrol Pumps of Kanpur with Respect to Petrochemicals like Benzene

Dr. Nasheed Sultana and Pragati Mishra

Department of Zoology
A.N.D.College,
Kanpur

Keywords : *Petrochemicals, Benzene, Petrol Pump Workers, Kanpur City.*

A BIOLOGICAL Monitoring was conducted at selected Petrol Pumps of Kanpur city to determine the adverse effect of petrochemical like Benzene in the

breathing zone of service attendant. We aimed to ascertain the exposure of petrochemicals to petrol filler attendants refilling the petrol during the working period. The study population includes 25 stations (Petrol Pumps) from different areas of Kanpur. Benzene being one of the major components of any petrochemical substances which is totally undesirable in view of their health effects. The major health risk associate with low concentrations of exposure to benzene has been shown to be leukemia, particular acute non-lymphocytic leukemia & aplastic anemia.

151. Cyanobacteria as Bioindicator for Indexing Pollution Load of Sewage Water

Rajesh Dhankhar and Lalita Rana

Dept. of Environmental Science,
Maharshi Dayanad Univerity,
Tohtak-124001, Haryana
Email : dhankar.rd@gmail.com

Keywords : *Lyngbya sp., Phormidium sp., growth performance, bioindicator.*

In order to analyze the pollution load of sewage water of Rohtak city, Haryana, the isolated *Lyngbya sp.* and *Phormidium sp.* From sewage irrigated soil, were exposed to different concentrations of sewage water and their growth performance was analyzed. It was found that these species were not only able to survive but showed good growth at different concentrations of sewage water. The present study suggests that sewage water does not contain high concentration of toxic contaminants harmful to the soil biota. So, sewage water can be used safely as a source of irrigation after proper dilution.

152. Detecting the Ozone Level in Various Areas of Puducherry

D. Aravindaraja

Artchouna Soupraya Naickar,
Govt. Middle. School – Mudaliarpet,
Cuddalore Main Road, Mudaliarpet,
Puducherry-605004.

Keywords : *Ozone layer, Depletion, Schoenbein, Ozone level, Results.*

Methane (CH_4) contributes to the growing global background concentration of troposphere ozone (O_3), an oxidant air pollutant associated with premature mortality. Methane and ozone are also important greenhouse gases. The principal aim of this study is to create awareness about the Ozone layer and its Depletion, global warming and climate change (by conducting several programmes) among the students and their parents. This study mainly targets at the Detection of Ozone Concentration Level at the troposphere surface of the atmosphere. In this study, we examined the ozone level concentration in 15 important places of Puducherry state . The test was conducted using the Schoenbein paper (exposed under the atmosphere) over a period of 3 weeks. Later the ozone treated Schoenbein papers were analysed to obtain the results. The results showed the areas with low, more ozone and high ozone concentrations. An ozone level concentration map of the surveyed areas of the Puducherry State was finally drawn up from the obtained results.

153. Estimation of Net Primary Productivity of Natural Forest Based on Inventory Data

K. N. Mishra and C. P. Shukla

Ecology Research Centre,
Department of Botany, T.D.P.G. College,
Jaunpur-222 002 (U.P.)
Email : cp.shukla@yahoo.com.

The behavior of energy in ecosystems including transmission and utilization constituents energy circuits. These circuits many be grazing type in which energy is directly consumed by living plants or their parts, and organic detritus circuit involving the accumulation as well as decomposition of dead materials. In nature, every year about 100 billion tons of organic matter is produced on the earth and about the same amount is oxidized back to CO_2 and H_2O during same time interval and thus a sort of rough balance exists between production and consumption. This balance is not exacted and organic production is more than its utilization, presumably due to changes in long geological history. Forest

inventory data (FIS) include forest resources information at large spatial scale and long temporal scale. They are significant sources carbon budget at landscape and regional scales. In this present study 100 database of biomass, volume, NPP and stand age for natural forest (Dewghat) from the literature were synthesized to develop regression equations between biomass, volume, NPP and biomass as well as stand age. Using these regression equation and the FID surveyed by the Forestry Ministry India from 2006-2010, NPP values of Natural forests (*Diospyrous* forests) were estimated. The mean NPP of forests was 4-35 Mg ha^{-1}. NPP varied widely among provinces, ranging from 1-5 to 13-73 $Mgha^{-1}$. Total NPP of *Diospyrous* forests was 10-87$Tgyr^{-1}$ (1Tg = 10^{12}g). NPP values of forests were not distributed event across different places in world. This study may be useful not only for estimating forest carbon of other forest types but also for evaluating terrestrial carbon balance at regional and global levels.

154. Recent Trends in Conservation of Wetland Resource Utilization in Indogangetic Plain

C. P. Shukla and K. N. Mishra

Department of Botany,
T.D.P.G. College,
Jaunpur (U.P.)

Wetland constitute the vital link in the hydrological cycle. They provide a multitude of services like purification and regulation of flours, fisheries, habitat provision to plants, animals and microorganisms providing opportunities for recreation and tourism and so fourth. Their extrinsic hydrological functions act as buffer against such extremes as drought and flooding. In monsoon wetland absorbs and restore water and therefore, reduce the risk of flood. In winter and summer they gradually release water and thus ensure its availability to surrounding and down streams areas, inland wetlands, are important water resource, replenishing ground water and sub soil aquifiers. Wetland harboring a great variety of aquatic macrophytes. Information on psychosocial association for aquatic macrophytes in any water body is of immense importance to understand the wetland ecosystem.

The present study reveals that 49 species of angiosperms belonging to 28 families in habiting the different lakes, ponds, pool and marshy region. *Ipomea* and *Cyperus* are the dominant genera in marshy region. The associatin of Eichornia-Nymphea-Hydrilla and Ipomea-Lemna-Hydrilla were very common. Plants of *Azolla pinnata* and *Potamogeton nodosur* were found in every where. The paper present an account of the wetland resources with seasonal distribution and association of plants on different wetlands of indogangetic plains.

155. Kinetic Modeling for Biodegradation of Catechol in Batch Reactor

Banhi Biswas[1], Neh Nupur[2] and Sudipta Dey[3*]

[1,2]UG Students, Department of Biotechnology,
Heritage institute of Technology, Kolkata
[3]Lecturer, Department of Biotechnology,
Heritage institute of Technology, Kolkata.
E-mail : sudipta.dey@heritageit.edu

Keywords : *Catechol biodegradation, kinetics, inhibition model*

Biodegradation of catechol has been studied under aerobic condition in a batch reactor by microorganism isolated from effluent treatment plant of a coke oven industry. Catechol concentration in the present study was ranged from 100 mg/L to 800 mg/L. Both biodegradation kinetics and microorganism growth kinetics have been studied and kinetic parameters have been estimated. Upto 400 mg/L of initial catechol concentration, 100% degradation was possible to achieve, but a very little percentage of substrate (catechol) removal has been resulted for 500mg/L-800 mg/L of catechol. The growth kinetics showed substrate inhibition after 300 mg/L of catechol. The kinetic data obtained in this study has been fitted to different substrate inhibition models (Haldane, Han-Levenspiel, Edward and Luong model). Among all the kinetic models Luong model fitted the data best (Root mean Square Error =0.004679, R^2=0.98) with maximum specific growth rate of 0.2477 hr^{-1} and half saturation constant of 214.9 mg/L.

156. Genotoxicity of Air Borne Particulate Matter – A Cross Sectional Study among Urban Population

Anusha C Pawar, Jithender Kumar Naik S. and Anitha Kumari. S

Department of Zoology,
University College for Women,
Koti, Hyderabad.

Air borne suspended particulate matter is a serious problem concern with adverse health effects. These concerns have been substantiated by several laboratory investigations and confirmed that the particulate matter is proven to be carcinogenic and also mutagenic in several experimental animals. The ambient air genotoxicants originate from combustion of fuel, waste incineration and industrial processing. The city like Hyderabad is highly sensitized and polluted zone with respect to urban air concern. Nearly about 85,000 motor vehicles fly on the roads every day contributing different high molecular weight organic compounds through combustion of diesel.

Considering the genotoxic nature of high molecular weight organic compounds a cross sectional study was conducted among 65 human subjects exposed to contaminated urban air. PBL was cultured and monitored for CA's and SCE by adopting standard methodology. The analyzed data revealed statistical significant increased frequencies of CA's and SCE. This clearly indicates the genotoxic potency of air borne particulate matter with high molecular weight organic compounds to which the urban populations are frequently exposed.

157. Oxidative Stress and Antioxidant Enzyme Response in Swiss Albino Mice Exposed to Textile Dye Effluent

S. Anitha Kumari, Anusha C. Pawar and Jithender Kumar Naik S.

Department of Zoology,
University College for Women,
Koti, Hyderabad.

Oxidative stress is caused due to an increase in reactive oxygen species (ROS), an impairment of antioxidant defense systems or an insufficient capacity

to repair the oxidative damage. Antioxidant system include antioxidant enzymes (SOD, Catalase, GST) and free radical scavengers like glutathione, Vit-C and Vit-E that remove the ROS there by protecting the organisms from oxidative stress.

Textile dye processing is one which produces broad spectral, complex chemicals of adverse health implications. Generally the effluent contains organic and inorganic compounds with highly toxic dyes and trace elements. These compounds exert the toxic effect on the biotic life by generating the free radicals. In order to assess the toxic nature of the textile dye effluent on the oxidative enzymes, the present study was carried out in kidney tissue of Swiss Albino mice exposed to sub-lethal concentration of the $1/4^{th}$ diluted effluent for an acute period of 22 days. The kidney tissue was isolated, perfused in saline and extracted for the enzymatic assays. The LPO activity was assayed by determining the MDA levels followed by the enzymatic assays such as SOD, Catalase and GST. The investigated results revealed a statistically significant ($P<0.05$) decreased MDA levels and an elevated levels of SOD, Catalase and GST activity as against their respective control group, indicating the defense against oxidative stress, caused due to the production of ROS.

158. Occurrence of Arbuscular Mycorrhizal Fungi in Rhizosphere Soils of some Oil-yielding Plants

A.K. Pandey, Rekha Shukla and Ajay Kumar Gond*

Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University,
Jabalpur-482001
*Corresponding author
E-mail : gondbioscience@gmail.com

Keywords : *AMF, rhizosphere soils, oil-yielding plants*

Arbuscular mycorrhizal fungi (AMF) are most ubiquitous. They form mutualistic relationship with almost all major roles in ecosystem. Mycorrhizal plants are better able to obtain their nourishment in soil and resist and biotic stresses. Arbuscular mycorrhizal fungi are associated with rhizosphere soils of various oil-yielding plants. Nineteen species of Arbuscular mycorrhizal fungi were isolated and identified from the rhizosphere soils of five oil-yielding plants which belonging to five different genera. *Glomus* was represented by ten species. *Gigaspora* and *Acaulospora* by three species and *Enthrophospora* with two species and *Archaeospora* by only one species. *Glomus* genera were the more predominant species that was associated with oil-yielding plants.

159. Isolation And Purification Of Polyphenol Oxidase From Various Plant Sourses And Its Use In Decolourization Of Indstrial Dyes

P. S. Solanki, P. V. Khakke, S. P. Bobade, S. M. Karhade, A. B. Jadhav and S. N. Harke

MGM's Institute of Bioscience and Technology, Aurangabad.

Keywords : *Reactive dyes, Polyphenol oxidase (PPO), Bioremediation, Waste water treatment.*

Reactive dyes are important chemical pollutants from various industries. Polyphenol oxidase (PPO) enzyme shows the activity of decolourization of various industrial dyes such as Malachite green dye. Polyphenol oxidase (PPO) enzyme is isolated from locally available plant sources such as Cabbage, locally available Brinjal, wild Brinjal, Banana peel, Banana pulp, Potato, Apple, Coriander, Mango etc. The enzyme activity is evaluated by using Catechol as substrate. The enzyme is partially purified by Ammonium sulphate precipitation (70%). The decolourization of these phenolic compounds by PPO enzyme is evaluated and confirmed by using U.V. Spectroscopy. The ability of PPO enzyme to decolorize various industrial dyes confirmed that enzyme polyphenol oxidase (PPO) as remarkable potential for its application in Bioremediation and Waste water treatment especially in detoxification of phenolic waste.

160. Studies on Treatment of Dairy Waste Water under Mesophillic Conditions

Dwaraka K, Seema Chaitanya Ch, Srinivasa Rao B. and Meena V.*
Centre for Biotechnology,
Department of Chemical Engineering,
AUCE (A), Andhra University, Visakhapatnam,
*Contact Id : meena_sekhar09@yahoo.co.in.

Keywords : *Anaerobic digester, Hydraulic retention time (HRT), Kinetic studies, Arrhenius theory*

Water management in the dairy industry is well documented, but effluent production and disposal remain a problematic issue for the dairy industry. To enable the dairy industry to contribute to water conservation, an efficient and cost-effective treatment technology has to be developed. To this effect anaerobic digestion offers a unique treatment option to dairy industry. In our present study, an attempt has been made to treat dairy wastewater entirely via anaerobic treatment with HRT of 6 days, using Immobilized Fixed Bed Anaerobic Digester (IFBAD), the effect of various temperatures were studied through laboratory experiments between 20-40^{o}c. Treatment of dairy wastewater with in 28-36^{o}c has shown more positive results in bench scale studies Using Immobilized Fixed Bed Anaerobic Digester system. Kinetic studies were done for temperatures 28-36^{o}c, in which the maximal degradation efficiencies were observed. Through kinetic studies using Arrhenius theory, the activation energy for degradation of waste water is calculated and the value was 12.327kJ/mol K.

161. Effect of Chromium and Lead Toxicity on Germination and Early Seedling Growth in Vegetables Crobs

Mamta Gautam[a], A. K. Singh[b] and R.M.Johri[c]
[a]Research Scholar, M.M.H. College
Ghaziabad
[b]ICAR, KAB II, IARI Campus,
New Delhi-110012
[c]Department of Botany, M.M.H. College
Ghaziabad

Keywords : *Germination, Seedling growth, Root elongation, Heavy metals*

Seed germination is perhaps the most sensitive stage in the entire plant life cycle. A good number of vegetable crops are cultivated crops in the peri-urban areas where wastewaters are frequently used for irrigation. A study was therefore, conducted to investigate the impact of chromium and lead contents in wastewaters on seed germination, seedling length, seedling vigor index, seedling dry biomass, root and shoot length of tomato (*Lycopersicum escluetum*) and brinjal (*Solenum melongera*) under laboratory conditions. Fifty seeds each were replicated three times for each treatment. Treatments consisted of five different concentrations of Cr (0, 0.1, 0.5, 2.5, 7.5 ppm) and Pb (0, 2.5, 5, 7.5, 10 ppm). Distilled water was used as a control treatment. Lead concentrations >2.5 ppm significantly effected seed germination, seedling length, seedling vigor index, seedling dry biomass, root and shoot length of both tomato and brinjal as compared to control. Similarly chromium concentrations >7.5 ppm affected all the parameters studied in both the crops. No germination took place at lead concentration of =5 ppm and chromium concentration of = 7.5 ppm in both crops.

162. Reduction in Mosquito Larvae Density by Spraying of A Traditional Neem Preparation - A Study Report

Dr. P. K. Suhas Narayanan[1], Dr. Sheela B. Karalam[2], Dr. V. C. Deep[3], Dr. P. K. V. Anand[4], Mr. Sasi[5] and Dr. V. Subhose[6]

[1]Governament ayurveda dispensary talikulam-Kerala.
[2]R&D Oushadhi.
[3]NRIP-Cheruthuruthi
[4]Vaidyaratnam Ayurveda college, Thissur.
[5]N.R.I.- Vijayawada.
[6]P.K. District Malaria Officer, Palakkad

Keywords : *Vector borne disease controle-spraying& fogging-Veppenna Pukayila Kashayam-Mosquito Larvae Density-Eco friendly method-People's participation*

Rainy seasonal & Vector born disease outbreaks are global attention seeking epidemics, since the available preventive & curative aspects against it are less successful. Widespread Spraying & Fogging of various chemicals for prevention will become a threat to health & environment. As an alternative, a traditional cost effective preparation of Kerala called VEPPENNA PUKAYILA KASHAYAM used in health & agriculture was field trialed & analysed scientifically.Besides the mild repellant action it showed a significant reduction in mosquitolarvae density. With improved versions of this , the concept of Ecofriendly methods for countering epidemics can be highlighted.

163. Air Quality Management during Common Wealth Games – 2010 : Delhi

Shaveta Kohli, Alok Kumar, F. Rehman,
Srivastava, R. C. and Saha, D.

Air Laboratory Division
Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar,
Delhi-110 032
kohli.shaveta@gmail.com

Keywords : *Air Quality Management, Common Wealth Games, Delhi*

The 19th Commonwealth Games (CWG) is being organized in Delhi, the capital city of India, during October 3 and 14, 2010. This is an event of paramount importance for India and accordingly steps have been initiated at various levels to make the event a great success. With its modern infrastructure in place, Delhi wishes to provide a healthy and enjoyable experience for all. The management of ambient air quality is one of the major concerns for the regulatory agencies. In Delhi, mixed combinations of manual and on-line analyzers (conventional and open path) have been placed at various locations, which would be utilized for monitoring of air quality and it's forecasting during the entire period of the games. The study is an attempt to describe the air quality status during this prestigious event being

organized at Delhi. It is also proposed to make a presentation along with preventive and regulatory measures initiated for this particular event besides establishment of monitoring stations and instantaneous data transmission vis-à-vis implementation of preventive actions at various stages of games.

164. Polycyclic Aromatic Hydrocarbons in Respirable Ambient Particulate Matter (PM10) in Urban Atmosphere of Delhi.

S. K, Tyagi, Dolly Kulshreshtha, P. Krishnamurtthy, A. K. Sen, Amit K. Sharma and D. Saha

Central Pollution Control Board,
Parivesh Bhavan, East Arjun Nagar,
Delhi-110032

Keywords : *Polycyclic Aromatic Hydrocarbons, Benzo(a)pyrene, PM_{10}, Respirable Dust*

Polycyclic Aromatic Hydrocarbons (PAHs) are toxics to human health and animals. These are primarily emitted to air from vehicular exhaust, coal combustions & thermal power plant in urban area. This is a class of organic molecules that consist of 2 or more benzene rings and are commonly produced by pyrolitic combustion of fossil fuel. Some of PAHs like Benzo(a)pyrene (BaP) have shown evidence of human carcinogenic activity. Therefore, CPCB has given National Ambient Air Quality Standards (NAAQS) for Benzo(a)pyrene. CPCB is monitoring 15 particulate PAHs in Ambient Air at 7 monitoring sites in Delhi. The field samples have been collected using Respirable Dust Sampler (RDS) with cut size of PM_{10} and below. Ambient air has been sampled through glass fiber filter paper (EPM2000) at a flow rate of ~1.0 m^3/min. The filters were extracted with residue grade Toluene using ultrasonic apparatus. The resulting sample extract was concentrated to a significantly small volume (i.e. 2ml) prior to analysis using Rotary evaporator. Final concentrated was analyzed using GC-FID with Ultra-2 column (). Multilevel calibration has been performed using Dr. Ernhstrofer's standards of different concentrations (5ng, 10ng, 15ng,20ng). The results of Total PAHs and Benzo (a) pyrene have been discussed in the paper. The monthly mean total PAH in PM_{10} laded ambient particulate matter was found between 24.68 and 33.85 ng/ m^3 and Benzo(a)pyrene was found between 5.08 to 7.07 ng/ m^3 at different

locations during the study period (January – December 2009). The levels of Benzo(a)pyrene are 5 to 7 times higher than the notified NAAQS for B(a)P which reflects urgent need of monitoring of PAHs including B(a)P in other metro cities of India.

165. PAH and VOC Profile during an Accidental Fire at Oil Storage Depo in Jaipur

A. K. Sen, P. Krishnamurthy, Dolly Kulshreshtha and S. K. Tyagi

Central Pollution Control Board,
Parivesh Bhavan, East Arjun Nagar,
Delhi-110032

Keywords : *Polynuclear Aromatic Hydrocarbons, Volatile Organic Compounds, $PM_{10,}$ Oil Depo*

A devastating fir accident has been occurred in an oil storage depo at Sitapur Industrial area, Jaipur on October 29, 2009 and the fire continued till November 11, 2009. The city Jaipur is situated at 26°55' North, 75°49' East & 26.92° North, 75.82°E.The average elevation from sea level is 432 meters. The burning of fuel in the storage tank released dark smoke including organic gases like Polynuclear Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) and inorganic gases like Sulpher-di- oxide, Nitrogen-di- oxide, Carbon monoxide etc. are transported into the surrounding areas. As fuel oils consist of mostly organic compounds such as PAH, VOCs which are highly toxic in nature and affected the humans, animals and vegetation system. Among them benzene and benzo(a)pyrene are known carcinogens. Keeping view of the above, CPCB has conducted an in-depth monitoring of inorganic and organic pollutants of the fire accident areas during Nov 4-5, 2009 to assess the environmental impact of the fire. In this paper, we have mainly emphasized organic pollutants like PAH and VOCs. Ambient monitoring was carried out at 5 locations at a distance of about 1 to 3 km away from the fire in the upwind and downwind directions. PM_{10} Particulate PAH in ambient air was sampled by Respirable Dust Sampler (RDS) equipment using EPM 2000 glass fiber filter paper which was extracted with toluene by ultra sonication followed by pre- concentration to 2 ml by rotary evaporator. The final sample was

analyzed in GC-FID using ultra 2 capillary column. Ambient VOCs were adsorbed in Tenax and Chromosorb sorbent tubes in series by low flow pump and directly thermally desorbed and analyzed in GC-MS-ATD. The minimum and maximum concentration of benzene, toluene, ethylene benzene, m,p-xylene, o-xylene, naphthalene were found as 1.3-38.6 $\mu g/m^3$, 25.9 – 75.9 $\mu g/m^3$, ND – 27.5 $\mu g/m^3$, ND- 41.1 $\mu g/m^3$, ND-6.3 $\mu g/m^3$, ND-9.2 $\mu g/m^3$ respectively. The benzo(a)pyrene in particulate ranges from 2.16 ng/m^3 to 11.55 ng/m^3 and total PAH ranges from 21.51 ng/m^3 to 81.39 ng/m^3. Benzene and benzo(a)pyrene concentrations were observed quite high when compared with National Ambient Air Quality Standards (N AAQS) for benzene i.e. 5 $\mu g/m^3$ and benzo(a)pyrene i.e.,1 ng/m^3.

166. Spent Mycelia for Removal- and Recovery of Cr (VI) from Synthetic Solution as well as Industrial Effluent

Dilip Markandey, V. K. Sachan, N. Semwal and B. R. Naidu

Central Pollution Control Board, Parivesh Bhavan,
ZO- W, Opposite VMC, Ward No.10,
Subhanpura, Vadodara

Keywords : *biosorption, heavy metals, waste mycelia, environmental variables, sorption efficiency, recovery of metals, industrial effluent*

Next to municipalities, industrial operations like electroplating, battery manufacturing, pigment and paint production, tannery etc. contribute significant amount of heavy metals to the aquatic system. These contaminants find their way into the receiving aquatic system through various natural and man made sources and lead to several undesirable effects on natural resources.

There is a great potential in using microorganisms and associated derivatives for resolving the problem of contamination of metals due to discharge of various metal bearing effluents. This approach is certainly economical, which many a times, cannot be achieved through chemical and / or physical reaction with the completeness and efficiency. The microorganisms based decontamination techniques exhibit advantages like easy to realize, profitable, as well as economical. Besides, the microbial methods convert these contaminants into an immobilized insoluble state that can readily be recovered.

Keeping the said point into mind, compressed dehydrated spent mycelia from an antibiotic manufacturing unit was collected and used for preparation of biosorbent to study removal of Cr(VI) from synthetic solution as well as diluted electroplating effluent. The adsorption, desorption and recycling studies indicate the prepared activated carbon effectively used for removal- and recovery of Cr (VI) from synthetic solution as well as diluted effluent. Adsorption data fitted well with the Freundlich adsorption Isotherms. Using NTA and EDTA for desorption, the recovery of the target metal was achieved upto 90% with 4 repeats without deterioration of the sorption/desorption efficiency of the test biosorbent. This paper describes the findings of the said investigations in detail.

167. Impact of Hydro Electric Projects on Water Quality of River Bhagirathi (Ganga) in the High Altitude Region

N. Semwal*, J. S. Jangwan, Dilip Markandey, V. K. Sachan and B. R. Naidu**

Central Pollution Control Board, Parivesh Bhavan, ZO- W,
Opposite VMC, Ward No.10, Subhanpura, Vadodara
** Dept. of Chemistry, HNB Garhwal University Campus,
Badshahi thaul, Tehri Garhwal,
Uttarakhand.

Keywords : *water quality, hydroelectric projects, municipal waste, physico-chemical parameters, benthic components, biological monitoring*

Millions of Hindus from all parts of India and also from overseas flock to Gangotri, Uttarkashi, Devprayag and other spots along Bhagirathi to observe this majestic river and perform various religious activities. The major human activities which have been observed influencing the water quality of river Bhagirathi are; hydro-electric projects (HEPs), municipal waste (sewage & solid waste), religious activities like mass bathing, open defecation, indigenous fishing methods, landslides and soil erosion triggered by road construction.

Over last two decades a number of HEPs have been proposed, built or under construction on a 225 km stretch along the course of the Bhagirathi between Gangotri (3048 MSL) and Devprayag (475 MSL). The artificial alteration in

natural flow of the river water due to reservoirs led to transformation in substratum composition of the river bed and brought about a lot of changes in the water quality characteristics viz., benthic fauna, water temperature, DO, suspended solids, turbidity, pH, metals and nutrient transportation. The alteration in metal and nutrient transportation would adversely affect the agricultural soil fertility of the Great Gangetic Plain and thus the food security of the country. Increase of water temperature and depth and decrease in DO values at HEP reservoirs affects the fauna and thus adversely impact the ecology of the river. The flow variation from Tehri reservoir has shown drastic impact on benthic macro- invertebrates as these animals were completely disappeared from reservoir downstream upto Devprayag.

The saying 'Prevention is better than cure' holds true for mitigation of environmental and social impacts of HEPs. It is worthwhile to abandon projects when the environmental and social costs to be paid are high. This paper briefly describes the physico-chemical and monitoring of benthic fauna of river stretch from Gangotri to Devprayag in the quantitative terms.

168. The Impact of Yagna on Adjacent Air Environment – A Case Study*

A. Pathak and D. Saha

Address for correspondence : Central Pollution Control Board*
'Parivesh Bhawan', East Arjun Nagar, Delhi

Key words : *PM_{10}, $PM_{2.5}$, $PM_{1.0}$, Yagna, Havan*

The religious belief on performing yagna to clean the atmosphere is gathering impetus as reported in some studies. Scientific explanation on betterment of air quality after yagna has become a debatable topic in recent past. This particular study was aimed to see the impact of mass yagna (108 Kund Maha Yagna celebrated in Delhi) on air quality in adjacent air environment. Increase in PM_{10} (93 %), $PM_{2.5}$ (94 %) and $PM_{1.0}$ (104%) concentrations during Yagna indicate addition of ultrafine particles in adjacent areas due to uncontrolled combustion. The number of particles having upto 1µm aerodynamic diameter added in to the air environment may be a major concern of tremendous health hazard even for a short span of exposure.

*The views expressed in this paper are exclusively owned by the authors and the organization in no way related to it

169. Effect of Mixing Height on Air Quality at a Busy Traffic Intersection in Delhi

Mohanan M. N., Ratnesh Kumar and D. Saha

Air Laboratory Division,
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi-110 032

Key words : *Delhi, mixing height, sodar system.*

The air quality data collected at ITO by continuous ambient air quality monitoring station and mixing height data collected by soar system at Parivesh Bhawan, CPCB Head Office are used in this study. Data collected from October 2006 to June 2010 are used to see the variation of air quality and mixing height in different seasons. In post monsoon and winter seasons air quality is more affected by pollution and in monsoon and summer it is better. Correlation of monthly averages of mixing height and air quality parameters measured at ITO are observed. NO2 and SO2 have weak -ve correlation with mixing height. CO and PM2.5 have -ve correlation while O3 have + ve correlation with mixing height. Variation of air quality through different seasons in this study period is more often as mixing height suggests.

170. Air Quality Trend at Traffic Intersection in Delhi - Impact on Implementation of Major Policies

Satheesh M., R. C. Srivastava and D. Saha

Air Laboratory Division, Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi 110032

Keywords : *Air pollution, Delhi, low sulphur diesel, particulate matter Compressed Natural Gas.*

The present is attempt to examine the trend in the level of air pollution and impact of air quality after implementation of number of policy measures for

reducing the air pollution in Delhi. The annual data of the last 10 years (2000-2009) has been analyzed. One of the important measures is conversion of all commercial passenger vehicles viz. buses, taxis and three wheeler auto rickshaws and light commercial goods vehicles to Compressed Natural Gas (CNG). The other policy measure that appears to have a positive impact on air quality trend is the reduction of sulphur content in diesel, introduction of unleaded petrol and reduction of benzene content in petrol. The results show that the policy measures have helped in reduction of sulphur dioxide (SO_2), carbon monoxide (CO) and benzene. Due to the growth in use of diesel fuelled cars and vehicle population, the levels of Particulate Matter (SPM, PM_{10}) and nitrogen dioxide (NO_2) shows an increased trend.

171. Indoor and Outdoor Study of Air-Microflora at Delhi

D. K. Markandey, B. K. Chaudhari and S. D. Makhijani

Central Pollution Control Board, Parivesh Bhavan,
East Arjun Nagar,
Delhi-110 032

Aero-mciroflora is a tem used to define the living microbial contents specially bacteria, fungi, viruses, algae, protozoa of a bio-aerosol. It is a general term which is also used to define collectively the air borne particles or microorganisms, gases, vapouts or fragments of biological origin (e.g. pollengrains, mycotoxins). Bio-aerosols are everywhere in the environment and they are always present and generally pose no problems when various types of them are kept within the reasonable limits. However, some bio-aerosols when breathed it can cause diseases including pneumonia, asthma .rhinitis (e.g.cold hey-fever) and respiratory infection. These health problems caused due to bio-aerosols or aero-microfloral reasons make the study of bio-aerosols very important to humans for adopting useful preventive and curative measures. Aeromcriflora study was conducted with indoor and outdoor samples at CPCB premises and some other places at Delhi during the years 2005, 2008 and 2009. Nutrient Agar was used for the collection of bacterial colonies, Potato Dextrose Agar was used for the collection of fungal colonies,, Plant Count Agar was used for the collection of general microflora, and Mac

Condkey Agar was used for enrichment of pathogenic bacterial flora. Samples were collected over a fortnight and numbers were counted with different media. A few microbes could also be identified. The methodology includes quantification, isolation, pure culturing followed by identification. The report will soon be published by CPCB.

172. Study of the Exhaust Gases from different Fuel based Vehicles for Carbonyls and Methane Emissions

R. C. Saxena*, Anjana Kumari V. and Meetu Puri

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

In recent years, the automobiles are the major contributor to the overall pollution in the country. Carbonyl emissions from the vehicle exhaust causes pollution as well as various types of health hazards and material damages etc. Central Pollution Control Board (CPCB) carried out detailed study to evaluate and characterize carbonyls and methane emissions from different category of vehicle exhaust using various fuels. The paper contains the study details from selection of the vehicles, methodology, findings and the recommendations for control of carbonyls and methane emissions.

173. Status of the Vehicular Pollution Control Programme in India

R. S. Mahwar*, J. S. Kamyotra and S. P. Gautam

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

The growing cities, sharp increasing traffic, trajectory growth, rapid economic development and industrialization, and higher levels of energy consumption has resulted an increase of pollution load in the urban environment. It is also accepted that automobiles have emerged as a critical source of urban air pollution specially in the developing world. Realizing the gravity of the problem, steps are

being taken to introduce better technologies, better fuel quality, shift to environment friendly fuels, and mass transit system for the control of environmental pollution in urban areas.

The Central and State Governments in India have been developing strategies for mitigation measures to improve the urban air quality and make the cities cleaner and greener. Over the past decade or so, the Government of India has notified statutes aimed at regulating and monitoring vehicular emissions across the country.

The paper presents a review of the vehicular emission problems in Indian cities, the various developments that have taken place in the past including the studies conducted for assessment of the air quality in cities, the legislation and standards adopted for the control of vehicle emissions, the role of the various concerned agencies, the steps taken for improvement in the quality of the automotive fuel, the overall impact of these measures and the future strategy to be adopted for vehicular emission reduction and related issues.

174. Environmental Issues Involved in Recycling of used Vehicles

Anjana Kumari V*, R. C. Saxena and R. S. Mahwar

Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi

There are about 7.22 (2004) million in use vehicles in the country and the country's annual production is about 11.18 (2008) million. There is no mandatory end of life for vehicles (ELV) in India. The existing legislation only requires the removal of 15 years old commercial vehicles in certain cities. The vehicles have parts made of different materials which vary from vehicle to vehicle depending on there make and even from model to model. These materials include right from ferrous and toxic metals to synthetic organic materials such as plastics. The recycling/disposal of the vehicles is therefore required to be done in an environmentally sound manner ensuring maximum recovery/reuse/recycle and generation of minimum residues to be disposed in a safe manner. The paper presents the review of environmental issues involved in recycling of used vehicles.

175. Municipal Solid Waste Management in Delhi : The Challenges

Pramila Gupta, Dr. S. Agrawal, Dr. D. D. Basu and Shri J. S. Kamyotra

Keywords : *collection, disposal, NDMC, MCD*

One of the Problems of capital city of India, Delhi is to collect and disposal of municipal solid waste. The total generation of the Municipal solid waste is approx 7000 tones/day and this is projected to rise to 17,000–25,000 tones/day by the year 2021. The three major agencies responsible for the management of solid waste in Delhi are Municipal Corporation of Delhi (MCD), New Delhi Municipal Corporation (NDMC), Delhi Cantonment Board (DCB) .The Delhi is divided into 15 zones out of which MCD is taking care of 12 zones, 2 zones is by NDMC and one by DCB. The waste collected by the concern agencies is being dumped in three working landfill sites namely, Bhalswa, Ghazipur and Okhla Landfill site.

The Central pollution Control Board has been entrusted to monitor the entire operation of Municipal Solid Waste Management. This paper discusses in detail about the present practices, their limitations and the challenges faced by the concern agencies for the disposal of the municipal solid waste. The paper also addresses the SWOT (Strength, weakness opportunity and threat) analysis, limitations of the land for disposal and possible engineering innovation for the mitigation of the challenges.

176. Air Quality in Metropolitan Cities of India

Abida Khatoon, Sanjeev Agarwal, D. D. Basu and J. S. Kamyotra

Central Pollution Control Board
Delhi

Keywords : *PM_{10}, air quality monitoring, metropolitan cities, NAMP*

Central Pollution Control Board has laid down an ambient air quality network in India known as National Ambient Air Quality Monitoring Programme (NAMP)

to assess the air quality of Metropolitan cities as well as important cities. Ambient air quality monitoring is required to determine the existing quality of air, evaluation of the effectiveness of control programme and to identify areas in need of restoration and their prioritization. 146 air quality monitoring stations spread across the 35 metro cities including seventeen cities identified by Honorable Supreme Court as polluted cities. The parameters of the air quality monitored under NAMP are sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), and Particulate Matter size less than 10 micrometer (PM_{10}) at all stations. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with a frequency of twice a week, to have 104 observations in a year as per National Ambient Air Quality Standards revised in November 2009 under Air (Prevention & Control of Pollution) Act 1981. Close examination of the data observed in the decade, revealed a decreasing trend of SO_2. Same is the fate with NO_2 with occasional pulses. PM_{10} revealed an increasing trend and which did not meet the standard in several occasions. This paper shall address the statistical summary of the said parameters, degree of violation of standard and trends.

177. Assessment of Ground Water Quality in NCT of Delhi

Alpana Narula *, R. M. Bhardwaj and D. D. Basu**

Junior Scientific Assistant, scientists

Central Pollution Control Board

The quality of water and its distribution over different regions of the India is uneven and causes problems of scarcity and suitability. It is therefore imperative that this scarce commodity be used as rationally and efficiently as possible. With the rapid increase in population and the increasing demands of irrigation, human and industrial consumption, the available water resources in many parts of India are being depleted and water quality has deteriorated. Ground water quality deterioration in urban areas in India is predominantly due to discharge of untreated or partially treated domestic sewage, industrial effluents and haphazardly disposed municipal and industrial solid waste.

Ground water quality deterioration in urban areas in India is predominantly due to discharge of untreated or partially treated domestic sewage, industrial effluents and haphazardly disposed municipal and industrial solid waste.

pH of Ground water of metropolitan city of Delhi is mostly confined in the range of 6.5-7.8, thus the value is in the permissible limits prescribed by BIS (1991) and WHO (1996) for various uses of water including drinking and other domestic supplies. The value of TDS in 70% of the samples observed to be above the desirable limit but within the maximum permissible limit of 2000 mg/L during both pre- and post-monsoon season and only two samples exceeds the maximum permissible limit of 2000 mg. The conductivity values in the ground water samples of the metropolitan city vary widely from 507 to 12180 µS/cm during pre-monsoon season and 448 to 2804 µS/cm during post-monsoon season with almost all the samples having conductivity value above 1000 µS/cm during pre-monsoon season.Nitrate content in drinking water is considered important for its adverse health effects. The concentration of nitrate in 80% of the samples fall within the desirable limit of 45 mg/L. fluoride concentration observed to be exceeding the permissible limit of 1.5 mg/l in 20% of the samples.

178. Water Quality of Rivers in Cauvery Watershed

Shweta Gaur, R. M. Bhardwaj and D. D. Basu

Central Pollution Control Board,
Delhi

Keywords : *BOD, DO, FC, TC, Conductivity*

The river originates at Talakaveri in Karnataka, flows through Karnataka and Tamil Nadu and outfalling in the Bay of Bengal through two principal mouths. The water quality monitoring of the River Cauvery along with its tributary streams Arkavati, Amravati, Bhavani, Kabbani, Laxmantirtha, Shimsa, Hemavati and Yagachi is carried out at 36 locations and water samples are analysed for pH, Conductivity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Total Coliform (TC) and Faecal Coliform (FC) to assess the spatial and temporal variation. The analytical methods for water and waste water

analysis are done as per American Public Health Association. The river is not meeting to indicator parameters of water quality for various beneficial uses at Pallippalayam, Erode, Tiruchirappalli D/s and Trichy due to wastewater discharges from urban agglomeration and industrial sources. There is a need to restore the water quality of river Cauvery in polluted segment through interception, diversion and treatment of municipal sewage.

179. Longitudinal Water Quality Profile of River Godavari

Shweta Gaur, R. M. Bhardwaj and D. D. Basu

Central Pollution Control Board,
Delhi

Keywords : *BOD, DO, FC, TC, Conductivity*

River Godavari originates in western ghat near Trimbak in Nashik District of Maharashtra and is the longest river basin in peninsular India. The Godavari basin lies in the Deccan plateau, and covers large areas in the States of Andhra Pradesh, Madhya Pradesh, Chhattisgarh and Maharashtra, besides smaller areas in Karnataka and Orissa. The water quality monitoring of the river Godavari is carried out at 35 locations and water samples are analysed for pH, Conductivity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Total Coliform (TC) and Faecal Coliform (FC) to assess the extent of water quality variation. The water samples are analysed as per the analytical method of water and waste water analysis by American Public Health Association. The river is polluted in Maharashtra segment from Nashik to Nanded due to wastewater discharges from urban agglomeration and industrial sector whereas it is relatively clean in Andhra Pradesh with respect to indicator pollution parameters. This paper shall address the spatial and temporal trend of water quality parameter and degree of exceeding the limit with respect to water quality criteria for designated best uses for a decade. In addition to above, the paper shall deliberate statistical summary with respect to each parameter.

180. Water Quality of Sabarmati River System

Sandhya Shrivastava, R. M. Bhardwaj and D. D. Basu

Central Pollution Control Board,

Delhi

Keywords : *BOD, DO, FC, TC, Conductivity*

River Sabarmati rises in the Aravalli hills and outfall in Arabian sea after flowing for 371 km through the states of Rajasthan and Gujarat. The principal tributaries of the river are Sei, Wankal, Harnay, Hathmati, Vatrak and Meshwa. The lower part of the basin in Gujarat has become a haven for industries and many of them being engineering and chemical units generating significant volume of industrial effluents besides municipal sewage from Ahmedabad and other urban centres.The river is significantly polluted from Ahmedabad to vautha although it is the lifeline of the region. Intensive agricultural practices coupled with intensive withdrawal of water for cropping had left the river with lean flows after it entered the Ahmedabad city limits. The water quality monitoring is carried out at 9 locations on the mainstream and one each on tributaries viz. Meshwa, Shedi and Khari. Water samples are analysed for pH, Conductivity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Total Coliform (TC) and Faecal Coliform (FC) to assess the extent of water quality variation. The water samples are analysed as per the analytical methods of water and waste water analysis by APHA (American Public Health Association). The water quality data analysed over a period of eight years indicates that the concentration of BOD varies from 0.1- 475 mg/l and DO is observed in the range of 0 -14.7 mg/l in the mainstream of Sabarmati. The number of faecal coliform bacteria are exceedingly higher than the desired level for various beneficial uses and observed in the range of 4 - 46 x 10^5 MPN/100ml. The river is in need of improvement of water quality by control of point and non point sources of pollution to restore the water quality.

181. Water Quality of Medium and Minor River in the Coastal Tract of India

Ankur Rajpal, Suniti Parashar, R. M. Bhardwaj and D. D. Basu
Central Pollution Control Board, Delhi

Keywords : *Medium and minor river, Water quality of river, Pollution, Monitoring and Assessment,*

The medium and minor rivers out falling to the coastal tract extending from Orissa (Bay of Bengal) to Gujarat (Arabian Sea) are monitored for the assessment of water quality. Water quality observations of sixty medium and minor rivers are analyzed and compared to desired water quality criteria for aquatic resources. Out of the twelve rivers in Maharashtra, ten are not confirming to the criteria where as one in Andhra Pradesh, one in Kerala and all eleven rivers in Gujarat and Daman are exceeding the desired water quality criteria. River water quality is assessed for physico-chemical and bacteriological parameters viz. Temperature, pH, Electrical Conductivity (EC), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Fecal coliform (FC) and Total coliform (TC). Rivers meeting to ambient water quality criteria are Periyar, Pamba, Neyyar, Amaravila, Ayur and Mahi Valayamin in Kerala; Nagavalli, Vamshdhara in Andhra Pradesh; Rushikuliya in Orissa; Zuari, Mandovi and Kalna in Goa, whereas the rivers in Gujarat and Maharashtra mainly Amlakhadi and Damanganga are grossly polluted. The rivers identified are in need of restoration of water quality by taking appropriated action for control of pollution.

182. Water Quality of streams in Brahmaputra Watershed

Suniti parashar*, R. M. Bhardwaj and D. D. Basu****
Senior Scientific Assistant, Scientists
Central Pollution Control Board

Key Words : *Trans-boundary, tributary, water quality analysis, spatial, temporal*

The Brahmaputra also called Tsangpo-Brahmaputra is a trans–boundary river and one of the major rivers of Asia. The Brahmaputra basin extends over an

area of nearly 5, 80, 000 Km and traverses through Tibet (china), India and Bangladesh. In India the basin lies in the states of Arunachal Pradesh, Assam, Nagaland, Meghalaya and west Bengal. It enters India across the sadiya frontiers tract, west of Sadia town into the Assam valley. Here it is joined by two more tributaries viz. the Dibang or sikang and the Lohit, from here onwards the river is known as the Brahmaputra. The river has eight significant tributaries in India. The water Quality monitoring of river Brahmaputra is carried out at 10 locations viz. Kherghat, Dibrugarh, Nimaighat, Dhenukapahar, Pandu, Jogijhoga, Khacharighat, Chandrapur, Sualkuchi and Dhubri. The water samples are analyzed for pH, Conductivity DO, BOD, Total Coliform and Fecal Coliform to assess the extent of water quality variation. The analytical methods of water and waste water analysis are done as per the American Public Health Association. The mean concentration of BOD is meeting water quality at all the monitoring locations whereas occasional pulses of higher concentration are observed at Nimaighat, Pandu , Jogijhoga and Chandrapur locations. This paper shall address the spatial and temporal trend of water quality parameter and its compliance to water Quality criteria for designated best uses and deliberate statistical summary with respect to each parameter.

183. Analytical Performance Evaluation of the Laboratories of Pollution Control Boards and Committees participated in Analytical Quality Control Exercises (AQC) for Water Quality parameters carried out by Central Pollution Control Board

A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board,
Zone Office (South),
Bangalore-560 010
[2]Central Pollution Control Board,
Delhi-110 032

Analytical Quality Control (AQC), a part of Quality Assurance (QA) Programme, plays a vital role in any Environmental Monitoring Programme. The analytical data obtained in a monitoring programme is used for decision making

purpose, upon which the entire scheme is executed by incorporating money, materials and man power. The Central Pollution Control Board (CPCB) is monitoring 1429 water quality monitoring stations comprising rivers, lakes, wells, and ground water spread over 27 states and 6 Union Territories through various State Pollution Control Boards(SPCBs) and Pollution Control Committees(PCCs). The water samples are being analysed in central or regional llaboratories of SPCB/ PCCs for various physico chemical and bacteriological parameters. In order to generate high quality analytical data as a part of Quality Assurance system, CPCB has started regular and organised Analytical Quality Control (AQC) exercise with the concerned laboratories from 1991 onwards as a continuous programme. Till March 2010, twenty five rounds of exercises were carried out for water quality parameters. At present there are 85 laboratories of SPCBs/PCCs participating under this programme.

Two synthetic water samples prepared in laboratory were distributed to all participating laboratories and analysis reports were obtained from laboratories. Robust Statistical analysis of data for arriving *"Reference value", (Median), standard deviation and Z – Scores values* were worked out. A total of 75 laboratories were considered for assessment and the **AQC performance index (API**) in terms percentage was found with score of 60 % and above for 30 laboratories. In general performance of these laboratories for titrimetric methods of analysis is comparatively better than colorimetric methods. The performance of laboratories for various analytical parameters in the order decreasing percentage was as follows :

Chloride(81) < BOD(75) < NH_3-N(73) < TKN(72) < Total Hardness(72) < Conductivity(71) < Calcium(70) < Magnesium (69) < Sulphate(69) < COD(68) < FDS(68) < Sodium(67) < Boron(66) < Potassium(66) < TSS(65) < TDS(65) < Chromium^{+6}(63) < PO4-P(62) < NO_3 – N (61) < Fluoride(60). The overall mean value was found as 68 %. Further it is observed that there is a continuous improvement in the performance of analysis as compared to earlier periods.

This exercise shall be a routine activity of Central Pollution Control Board for improving the analytical capability of the concerned laboratories. This paper deals with interpretation of the analytical results and suggestive measures for improvement of the analytical performance of the laboratories.

184. Estimation of Volatile Organic Compounds (VOCs) and Poly - cyclic Aromatic Hydrocarbons (PAHs) in few Industrial Estates in Southern India

T. K. Radheshyam Balaji*, A. Manoharan*, V. K. Verma*, J. S. Kamyotra and S. P. Gautam****

*Central Pollution Control Board, Zonal Office(South)
Bangalore-560010
**Central Pollution Control Board,
Delhi-110032

Volatile Organic Compounds (VOCs) are emitted by various industrial units such as paints, pharmaceuticals, pesticides, petrochemical refineries, solvent manufacturers, chemical industries etc. Poly cyclic Aromatic Hydrocarbons (PAHs) are produced as byproducts of fuel burning. Some of these compounds have been identified as carcinogenic and mutagenic. Health effects include: irritation of eye, nose, and throat, headache, nausea etc. Few of the VOCs and PAHs are Persistent Organic Pollutants (POPs) that enter the bio-geo chemical cycle and cause severe health effects to human. In Southern India, five industrial estates namely Patencheru/ pashimylaram, Jeedimetla in Andhra Pradesh, Manali and Cuddalore in Tamilnadu and Cochin in Kerala either consume the solvents in bulk or produce solvents The various chemical processes in these industrial units produce VOCs and PAHs either directly or indirectly. A comprehensive monitoring has been carried out in 5 industrial estates to estimate the emissions. 8 hourly monitoring for 24 hours in four directions of the industrial estates were carried out by using Automated Thermal Desorption Tubes attached to personal samplers at constant flow rate of 0.5 liter per minute.

VOCs in these industrial units are found in the range of, 400 – 900(Toulene), 40-400 (Chloroform), 100-200(Xylene) and 10-200·(Benzene) µg/m^3. PAHs are in the range of 0.005-0.5(Naphthalene), 0.003 -0.04(Pyrene), and 0.003-0.05(Benzo (a) Pyrene) µg/m^3. When compared with international Ambient Air quality standards for Toulene, Chloroform, Xylene and Benzene, the observed values were found exceeding the standards. Indian standards laid by Central Pollution Control Board (CPCB) for Benzene (5µg/m^3) is also not meeting the standard whereas the Benzo (A) Pyrene was found within the standard of 1 µg/$m^{3\cdot}$ The study included the probable escape routes from sources and means to control/reduce the emission levels.

185. Co-incineration of Distillery Spent Wash in Cement Kiln as an alternative Waste Management Option - A Case Study

K. Ranganathan[1], K. Vivek[1], H. V. Gayithri[1], A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautham[2]

[1]Central Pollution Control Board, Zonal Office (South),
Bangalore-560 010
[2]Central Pollution Control Board,
Delhi-110 032

Co-processing of high calorific and toxic wastes in cement kiln is emerging as one of the alternative waste disposal methods in the recent years. Distillery spent wash is a waste with high organic and inorganic solids and that requires high care disposal as it causes damage to the environment. An attempt was made for co-processing of concentrated spent wash in cement kiln as it contains significant amount of calorific value. Manufacture of cement is basically energy intensive process in that the chemical and physical process reactions take place at high temperature. Due to the high temperature inside cement kiln, combined with the oxidizing (oxygen-rich) atmosphere and long residence time, cement kilns have been used as a processing option for various types of waste streams. A distillery with an average spent wash generation of 5 KL per KL of alcohol is concentrated using multi-stage evaporator to obtain the spent wash with high calorific value (1800 kCal/kg) and solid contents (50 %). Elemental analysis report shows that the C, H, S and O are 41.1%, 1.6%, 2.1% and 31.0%, respectively. A trail run was carried out in a cement kiln with feed rate of raw meal (205 TPH), coal powder, (18.4 TPH) and the concentrated spent wash (1000 kg/ h). The monitoring results show that the emission parameters are with in the standards prescribed. The organics in the spent wash is completely combusted and the inorganic are maximum melted with the clinker product. The reduction in coal combustion due to spent wash incineration at the rate of 1000 kg/hr is 11 TPD. The clinker product quality is also found with in the specification stipulated by Bureau of Indian Standards.

186. Status of Ambient Noise Levels in State Capitals of Southern India

S. Karthikeyan[1], K. Karunagaran[1], M. Madhusudanan[1], A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board, Zonal Office (South),
Bangalore-560 010
[2]Central Pollution Control Board,
Delhi-110 032

Noise, a form of energy pollution, is a complex sound with little or no periodicity and psychologically it is a sound undesired by the recipient. The ever increasing industrialisation, urbanization and vehicular population add to the noise problem. Noise as a pollutant contributes to a deterioration of the environment as potential hazard to health, communication interferences and nuisance. In order to estimate the extent of violation of National Ambient Noise standards so as to enable the policy makers to formulate policies/programmes for mitigating noise levels and ascertaining the nature and extent of noise pollution problem, a study on ambient noise levels in state capitals of southern states viz. Bangalore, Chennai, Hyderabad, Thiruvananthapuram was carried out.

In Chennai, the noise level ranges from 51 to 89 dB(A) during day and night time for all the zones and the same for Bangalore, Hyderabad, and Thiruvananthapuram ranges from 41.6 to 93.3, 51.4 to 83.8 and 44.7 to 81.1 dB(A) respectively. The noise levels in the four cities are compared with National Ambient Noise Standards and found violating 99% in Chennai, 84% in Bangalore, 88% in Hyderabad and 80% in Thiruvananthapuram at all the zones put together. Almost all the four cities are facing high levels of noise pollution problem.

Attempt has been made to compute and interpret the data applying statistical tools. Suggestions for mitigation of noise in these areas are given for effective control of noise levels.

187. Status of Ozone levels in ambient air at Bangalore

K. Karunagaran[1], M. Madhusudanan[1], A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board, Zonal Office (South), Bangalore-560 010

[2]Central Pollution Control Board, Delhi-110 032

Air Pollution is a major concern in most of the metro cities as it is causing serious health problems and associated economic loss. Bangalore city is witnessing explosive growth of vehicular population and industrialisation thus causing deterioration of ambient air quality. Majority of tropospheric ozone formation occurs when nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs), react in the atmosphere in the presence of sunlight, particularly ultraviolet light. These precursors are mostly emitted by automobiles, gasoline vapours, fossil fuel, power plants, refineries, and certain other industries.

The ozone data monitored through continuous ambient air quality monitoring station (CAAQMS) at Bangalore during 2009 is statistically processed and interpreted.The ozone concentration ranges from 9.0 to 106.6 $\mu g/m^{3.}$ The mean concentration was observed as 33.6 $\mu g/m^3$ with the standard deviation of 9.9 and co-efficient variation of 28.6%. As compared with air quality standard notified by the Central Pollution Control Board, almost all the times, the ozone levels are found within the limit except in few occasions. This paper deals with findings of ozone levels and its further mitigation measures.

188. Abstract of Paper on "Management of Bio-Medical Waste in an Armed Force hospitals in Punjab and Uttar Pradesh"

S. K. Arora, H. P. S. Rathore, R. Rajkumar and Gurnam Singh

Central Pollution Control Board, Zonal Office (North)
PICUP Bhawan, Gomti Nagar Lucknow-(UP)

The Ministry of Environment & Forests notified the Bio-medical Waste (Management & Handling Rules 1998 (BMW Mgt.) in July 1998. In accordance

with the rules every hospital generating BMW needs to set up requisite BMW treatment facilities on site or ensure requisite treatment of waste at common treatment facilities. No untreated BMW shall be kept stored beyond a period of 48 hours. An attempt has been made to critically review the current bio-medical waste management practices followed by an Armed Force Hospitals in Pathankot, Gurdaspur, Amritsar & Jallandhar (Punjab) and Lucknow & Bareilly (Uttar Pradesh). The quantity of the bio-medical waste generated is around 148 kg/day (excluding liquid waste) from above armed hospitals in Punjab and 106 Kg/ day(excluding liquid waste) from above armed hospitals in Uttar Pradesh. The physical composition of the hospital waste was determined during the investigation. Category wise production of the bio-medical waste has also been worked out. Hospital follows strict segregation packing, labeling and disposal as per the Bio-Medical Waste Management & Handling Rules, 1998. Treatment techniques include steam sterilization (autoclaving|) incineration and land filling. The generated liquid effluent is treated with 1% sodium hypochlorite before disposal into the drain.

Intensive Care Unit Operation theatre, labour room, blood bank, pathology, hematology and OPDs are some of the department in the hospitals responsible for maximum generation of waste. Human anatomical waste in usually generated during operation in Operation Theater but a number of specimens is sent to the pathology department for diagnosis. Hence it is a liability of the laboratory to dispose the tissues as bio-medical waste. Category 2 (animal waste), category 5 (discharged medicines and cytotoxic drugs) and category 9 (incineration ash) are not generated in a pathology laboratory. Category 8 includes liquid was generated while washing of laboratory waste and processing of samples on the analyzers. Category 10 is the chemical waste generated while testing and analysis. The waste generated from disposable items (other than waste sharps) contribute the highest portion of the waste while discarded medicines and cytotoxic drugs contribute the least. The stack emission monitoring results indicate almost all the specified parameters are fall within the specified range indicate effective performance of the oil fired incineration.

The paper highlights the collection transportation and disposal procedures adopted by the hospital for effective and efficient treatment of bio-medical waste. It also describes the waste cycling procedures for recyclable hospital waste material and the imitative taken by the hospital to create health and mass awareness among the staff and health workers and waste handlers.

189. "Ambient Air Quality in Residential Area of Lucknow in Uttar Pradesh"

D. K. Soni, R. K. Mishra A. Kumar, Nidhi Nigam, Gurnam Singh, and J. S. Kamyotra

Central Pollution Control Board, Zonal office, Lucknow-U.P.

Keywords : *Ambient air, Particulate Matter, Nitrogen dioxide, Sulphur dioxide*

Ambient air quality is an important aspect of environmental studies due to its direct impact on the health of living organisms. Considering its potential with respect to receptor, the present a study was carried out in residential area of Lucknow- city-U.P. . Lucknow is the capital of Uttar Pradesh and is business hub of the Northern India, is situated at the either bank of the river Gomati (Latitude-26^o 30" & 27^o 10' North and longitude 80^o 30" & 81^o 13' East). The elevation of the city from sea level is 128 meter above from mean sea level (MSL). Lucknow covers an area of about 2528 square kilometer. The study projected diurnal, seasonal, and yearly variation of ambient air quality in residential area of Lucknow city. The present study highlighted the concentration of criteria pollutants i.e. Particulate Matter (PM_{10}) , Sulphur dioxide (SO_2) & Nitrogen Dioxide (NO_2), analyzed during 2008-2010. Monitoring was carried out as per the standard method for five days in week. The PM_{10} concentrations were exceeding the permissible limit of 100 μg/m^3 whereas the concentration NO_2 were found almost well below the prescribed limit except during low mixing height period. The ambient air quality of the area concern is closely associated with meteorological parameters like Temperature, Humidity, wind velocity, wind direction, and rain apart from the anthropogenic sources. During low mixing height period the concentration of air pollutants particularly PM_{10} was found many folds higher than the prescribed limit and the reverse trend noticed during high wind speed and improved ventilation period. Concentration of gaseous pollutant i.e. NO_2 level were always below the permissible limit, except in the winter. Correlation coefficient between of PM_{10} and NO_2 was positive during study period which gives an idea about the sources.

190. "Water Quality of Major River at Interstate Boundaries Flowing Through Northern Part of Country "

D. K. Soni, R. K. Mishra, Sunil Kumar, C. K. Dixit, A. Kumar, V. P. Yadav and Gurnam Singh

Central Pollution Control Board, Zonal office,
Lucknow-U.P.

Keywords : *Interstate boundaries, River monitoring, Physio-chemical.*

Water being the state subject, it is required to have constant vigil on the quality of river water flowing from one state to another to avoid disputes among them. Considering fact, CPCB-Zonal office has developed the network of monitoring at interstate boundaries for river Betwa & Sone in M.P. and U.P., river Ganga in U.P. and Bihar, river Satluj and Beas in H.P. & Punjab and Ram Ganaga in Uttaranchal & U.P. Selected pollution indicative parameter were monitored during 2009-2010 with quarterly frequency as per the protocol notified by Ministry of Environment and Forest, Delhi.

This paper reflect the status of water quality with respect to the physiochemical parameters like Electrical Conductivity (E.C), Chloride (Cl.), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) and Microbiological Parameters i..e. Total Coliform (TC) & Fecal Coliform (FC) monitored at interstate boundaries.

In lean period when the flow in the most of the river reduced remarkably, the pollutants concentration were observed increased in almost all rivers which get regenerated by the onset of monsoon. High level of TC & FC were observed in most of the river at all monitoring locations, which may be due to discharge of sewage. At little location mixing of industrial waste was also observed.

191. Treatment of Water using Sludge-Reagent-Product Technology

P. K. Behera, S. K. Biswas and D. P. Mukhapadhaya

Central Pollution Control Board,
East Arjun Nagar, Sahadra,
Delhi-110032
E Mail : behera.cpcb@nic.in and
pradyumna_73@yahoo.co.uk

In the prevailing global economic recession and environmental degradation, when cost cutting and sustainable development has become an emergent need, absolute or relative reduction in the quantity of materials can not be unattended for, since large amount of resources is spent on water treatment to supply drinking water. In all urban and rural areas, raw water from surface and/or under ground are treated by using coagulant at the rate of 40-150 mg L^{-1} depending on the quality of raw water. The cost of the coagulant substantially contributes to the cost of production of drinking/domestic water. On the other hand, the disposal of large amount of sludge generated from the Water Treatment Plant, is a major problem. Reduction of quantity will minimize the sludge disposal problems. Considering the above fact , Central Pollution Control Board along with Dr. S.K.Biswas came with an innovative idea of regenerating and recycling the alum along with positively charged colloidal particle in water treatment process.

Implementation of this treatment technology in all water works in India is likely to save approximately Rs.55,000,0000 per annum, and that would be the remarkable achievement in sustainable development in terms of alum consumption and sludge volume reduction (90 percent) .This treatment technology titled **"An Integrated Plant for Treatment of Raw Water Using Discarded Sludge to Produce Drinking Water"** has been granted patent ,vide Indian Patent No. 215808, on March 2008.

192. Dioxin and Furan Emission from Common Hazardous Waste Incinerators in Gujarat, India

A. R. Thakkar, P. D. Bharne and B. R. Naidu

Central Pollution Control Board, West Zone Office,
Vadodara, Gujarat

Keywords : *Dioxins, Furans, Hazardous Waste, CHWTSDF, Incinerator, Standard*

Dioxins and Furans are two families of related chemical compounds known as polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. Dioxins are the group of 75 related chemical compounds known as polychlorinated dibenzo-p-dioxins and furans are the group of 135 related chemical compounds known as polychlorinated dibenzofurans. Out of these, 17 pose a major health risk to human health, including 2, 3, 7, 8- tetrachlorodibenzo-p-dioxin (TCDD) is the most toxic compound of the dioxin group.

Dioxins and Furans are present in trace amounts throughout the environment. Minute amounts may be found in the air, food, water, soil and dust. Dioxins and furans are unwanted by products created in manufacturing of chemicals such as some disinfectants, wood preservatives, dyes and dyes intermediate, herbicides etc. They are also emitted during combustion processes such as the incineration of municipal and industrial waste, wood and gasoline burning.

Gujarat state in India accommodates large numbers chemical industries manufacturing variety of chemicals. The state is having around 3, 00,000 industries and out of which 7751 industries generate hazardous waste. As per the National Inventory of Hazardous Waste Generation and Management in India, 2009, published by CPCB, Gujarat generates incinerable hazardous waste to the tune of 1,08,622 Metric Ton Per Annum. For proper treatment and disposal of hazardous waste i.e. landfill, stabilisation and incineration, Common Hazardous Waste Treatment Storage Disposal Facilities (CHWTSDF) are developed in the state, and become pioneer in development of such facilities. There are eight CHWTSDF with landfill facility. Out of eight CHWTSDF, four facilities are having Common Hazardous Waste Incineration Facility (CHWIF) comprising storage facility of incinerable waste and incinerator. Possibility of generation of dioxin and furan while incineration of hazardous waste and municipal waste is very high as reported in many literatures.

The source emission monitoring carried out for Dioxins, Furans and other pollutants at two CHWIF at Gujarat viz M/s Gujarat Enviro Protection & Infrastructure Limited (GEPIL) Surat and M/s Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar. The paper is prepared which includes information on common hazardous waste incineration facilities, type and characteristics of incinerable hazardous waste, technical details of incinerators including air pollution control system, analysis results of source emission monitoring for Dioxins, Furans and other pollutants.

It is observed from the result that the Total Dioxin and Furan detected during the source emission monitoring were 0.0487 ngTEQ/Nm^3 and 0.00396 ngTEQ/Nm^3 at M/s GEPIL, Surat and M/s BEIL, Ankleshwar respectively. The results are well within the Standard (0.1 ngTEQ/Nm^3).

193. Trend analysis of Gaseous and Particulate Emission Data of Vadodara City and Identification of Transport Pathways using HYSPLIT Trajectory Model

Vinay Kumar Upadhyay*, D. Brahmaiah* and B. R. Naidu*

*Central Pollution Control Board. Zonal Office-Vadodara,
Gujarat-390023
E-mail : vinay0408@gmail.com

Keywords : *RSPM, Trend analysis, Mann-Kendall test, ANOVA, Hysplit trajectory model*

An important objective of many environmental monitoring programs is to detect changes or trends in pollution levels over time. Over the period 2005–2009, trend in concentrations of three major atmospheric pollutants were investigated (RSPM, SO_2 and NO_2) using modified non parametric Mann-Kendall test. This trend analysis was supplemented with ANOVA analysis to see significant difference in trend obtained at different sites (industrial, residential and commercial) during years of investigation. The Hybrid Single-Particle Lagrangian Integrated Trajectory model (HYSPLIT) is used to create seasonal air parcel trajectories to understand long distance movement of atmospheric pollutants in Vadodara City. This air mass trajectory results with surface meteorological data was used to interpret high and low concentration episodes in positive trend years.

194. Evaluation of the Status of Heavy Metal Pollution in an Important Ramsar Wetland System of India

U. P. Nasir[a], P. S. Harikumar[b], D. Brahmaiah[a] and B. R. Naidu[a]

[a]Central Pollution Control Board, Zonal Office-Vadodara,
Gujarat-390023
E-mail : nasirchemistry@yahoo.com,
[b]Central Water Analysis Laboratory,
Centre for Water Resources Development and Management,
Kozhikode-673571, Kerala

Keywords : *Heavy metal, sediment quality guidelines, degree of contamination, pollution load index, index of geo-accumulation.*

Indiscriminate industrialization and urbanization led to the increase of Pollution level. Agrochemicals, geochemical structure and industrial wastes create a potential source of heavy metal pollution in the aquatic environment. Wetlands are especially at risk of contamination by different contaminants from anthropogenic sources including heavy metals. A study has been conducted to understand the heavy metal contamination of the Vembanad wetland system, an important Ramsar site on India and its impact to the fresh water region of the Vembanad lake. Surface sediment samples were collected from six stations of the wetland including three from industrial zone and three from fresh water zone. The concentrations of copper, zinc, manganese, cadmium, lead, nickel and mercury were determined in the sediments. Highest heavy metal concentration was determined at industrial zone and lowest was found at southern upstream of the wetland system. Most metal levels in the sediments at the estuarine region exceeded the different sediment quality guidelines. Quality of sediment were evaluated using the numerical value of degree of contamination, pollution load index, sum of toxic units, enrichment factor and geo-accumulation index which showed severe pollution in the industrial zone. The ecotoxicity was determined by using effect range low/effect range median and threshold effect level/probable effect level values of environmental protection agency guideline. The percentage of heavy metal calculated with respect to the industrial zone as the base line and the correlation analysis with organic matter indicated that, mobility of the specific metal has higher impact on its concentration at the fresh water region of the wetland.

195. Assessment of Fluoride Contamination in Mehasana Area of Gujarat State

D. Brahmaiah, Pratik D. Bharne and B. R. Naidu

Central Pollution Control Board,
West Zone Office, Vadodara

Key Words : *Fluoride, Industrial waste, Sewage, concentration*

Water availability is a critical factor in socioeconomic development, limiting progress in many areas such as south Asia and other arid and semi-arid zones. In most parts of the world, the finite supply of freshwater is put to heavy use. Industrial wastes, sewage and agricultural run-off can overload rivers and lakes with chemicals, wastes and nutrients, and contaminate water supplies. At present, the annual freshwater consumption is around 4000 km3 throughout the world with India's consumption being about 10% of it.

Some elements are essential in trace amount for human being while higher concentration of the same can cause toxic effects. Fluoride is one of them. It is a conclusive fact that concentration between 0.6 to1.2 mg/ l is essential to protect teeth decay, while higher concentration (beyond 1.5 mg/l) can cause teeth mottling and still higher concentration of fluoride may lead to different major health hazards. The importance of developing quality drinking water system facilities in any health care programme of the country can hardly be over emphasized.

It is, therefore, imperative that groundwater, free from higher fluoride concentration needs to be explored & where ever the concentration is high, mitigation strategies have to be adopted on urgent basis. Fluorosis was first detected in India among cattle's by farmers of Nalgonda district (A.P) during early 1930's, later the same disease was detected in human beings also. Presently, around 15 number of states declared endemic for fluorosis and Gujarat is one of them particularly Mehasana region.

In this paper an attempt has been made to assess the ground water quality in Mehasana region of Gujarat with respect to fluoride concentration in ground water.

196. Photocatalytic disinfection of fungal population in micro-working environments

Nithia Priya P. M.*, A. Navaneetha Gopalakrishnan, D. Brahmaiah*** and B. R. Naidu*****

*Scientist B, Central Pollution Control Board, ZO(W), Vadodara.
(nithiling@yahoomail.com),
** Director Centre for Environmental Studies,
Anna University, Chennai,
***Scientist "C" &"D" Central Pollution Control Board,
Zonal Office (W), Vadodara.

Keywords : *Photocatalysis, Titanium Dioxide, bio-pollutants, contaminated air, working environments*

Exposure to airborne microorganisms in working environments may result in infectious disease or an irritant response. The contaminated air disperses microorganisms (fungi) into working environments, thereby serving as a route of exposure to occupants. This study mainly focuses on Photocatalytic inactivation of fungi in micro-working environment such as sewage treatment plant and municipal dumping site. Quartz based Photocatalytic reactor (PCR) was fabricated. The catalyst used was TiO_2 (Degussa P25) of different film thickness from 0.57×10^{-6} μm to 5.78×10^{-6} μm with UV source of medium pressure germicidal UV lamps of 15 W and 30 W. PCR was connected to High Volume Air Sampler. Air was drawn and trapped in the trapping medium (Phosphate buffer). The reactor was run for 8 hrs and samples were collected for every 1hour interval for both the sample and control. In sewage treatment plant, maximum percentage reduction was 97% at 15 W in 3.47×10^{-6} μm and 97% at 30W in 2.89×10^{-6} μm thickness of TiO_2. In municipal dumping site, maximum percentage removal was 97% at both 15 W and 30 W in 3.47×10^{-6} μm thickness of TiO_2. The rate constant for critical exposure time $t_{(cet)}$, beyond critical exposure time for fungal removal were arrived. The rate of disinfection follows first order kinetics for all the experimental investigations both during the critical exposure time as well as beyond critical exposure time.

197. Pollution Potential in Jari Industries of Surat, Gujarat, India

Prasoon Gargava*; B. R. Naidu and P. K. Mirashe*****

*Working as Scientist "C", Western Zonal Office,
Central Pollution Control Board, Vadodara, Gujarat.
**Working as Zonal Officer and Scientist "D",
Western Zonal Office, Central Pollution Control Board,
Vadodara, Gujarat.
***Working as Regional Officer, Regional Office-Pune,
Maharashtra Pollution Control Board,
Pune, Maharashtra.

Kaywords : *Jari, Gilding, Electroplating, Cyanide, Heavy Metals, Pollution Load, SMC.*

India, wrapped in the mystique, enhanced with the romance of fabled craft, has one of the finest traditions of embroidery in the world. It has long been known for its embroidery with gold and silver threads called Jari. Jari industries have great influence on local economy, workforce and environment. Economy and workforce are of great concern for city & the persons involved in this sector but the Jari industries are still untouched from pollution control and environmental protection aspect due to their cottage & household type of set-up. The pollution potential caused due to Jari industries is serious and dreadful; therefore, an effort is made to uncover the pollution potential associated with Jari industries of Surat. As such no references are found on the subject, this perspective on pollution potential in Jari industries is probably first of its kind.

Due to the availability of good quantity of water for all the months and the favorable weather conditions, Jari industries are developed in Surat area, however, stray incidents have been identified to start manufacturing of Jari, elsewhere in the country but have less success. There are approximately as many as 2000 to 2500 small gilding benches each producing approx. 50 kg of Jari wire per day located in the walled city area of Surat such as Gopipura, Navapura, Sagrampura, Wadifalia, Mahidharpura, Station Road & Begampura. The Jari industries of Surat are potential source of water pollution, not actually in terms of quantity but in terms of pollution load of Cyanides and Heavy Metals. Jari industries are not equipped with

adequate pollution control measures and many times the community involved in this sector pays the price in terms of human life because of negligence and small accidents.

The main process steps of Jari making are washing of wire in acidic media, dipping in Cyanide solution, reeling and electroplating. The process involves use of acids, cyanide and heavy metal containing solutions. The total effluent generation from all 2500 gilding benches are comes around 375 – 437 m^3/day, say an average of 400 m^3/day (@ 150 – 175 lit/bench/day). The average concentration of silver, copper and cyanide in the effluent generated from acid wash (after silver precipitation), which is going to the SMC sewerage system are 28 mg/lit, 2983 mg/ lit and 230 mg/lit respectively. Hence pollution load, which is going to sewerage system of SMC, works out to be 11.4 kg/day, 1194 kg/day and 92 kg/day respectively (by taking average concentration and average hydraulic load of 400 m^3/day). In nutshell, it is concluded that the units are providing treatment to the effluent in a very crude manner due to which lot of valuable metals are finding their way to the drain or in the atmosphere and also posing adverse impact on environment.

The main pollution is in the water drains containing high amount of copper, cyanide & silver, which needs treatment either on individual or combined basis. Due to location, size and geographical conditions, it is not possible to establish the treatment facility at every individual unit and hence the wastewater discharge may be collected on appropriate intervals with adequate mechanisms and treated in a common treatment system best suited for the purpose. The recovery of precious metal like silver, and copper at commonplace needs to be established. Need of fume extraction system, ventilation and proper handling of Cyanide compounds are some other issues present with significant scope for improvement.

198. Curing of Hides in Tannery Sector

H. P. S. Rathore*, S. K. Arora and M. Q. Ansari
Central Pollution Control Board,
Lucknow

Curing is employed to prevent putrefaction of the protein substance (collagen) from bacterial growth during the time lag that might occur from procuring

the hide to when it is processed. Curing removes excess water from the hides and skins using a difference in osmotic pressure. The moisture content of hides and skins gets greatly reduced. In wet-salting, the hides are heavily salted, then pressed into packs for about 30 days. In brine-curing the hides are agitated in a salt water bath for about 16 hours. Generally, curing substantially reduces the chance of spoilage by bacteria. Curing can also be done by preserving the hides and skins at a very low temperature.

An increasing demand of leather has created the problem of high dissolved solids in the receiving water body which is generated during the process of hide/ skin curing by using the common salt. It is one of the challenging issues in the Tannery sector. To rectify the problem of dissolved solids, presently, Reverse Osmosis process is being used for removing these solids. This process is very costly and can not be used by the small unit members. There are other alternate options for curing of hide/skin like use of insecticide /organic preservation, curing of hides at low temperature by using the liquid nitrogen followed by U.V. exposure, lypholization which will enable the Tannery sector to dissolve the problem of high dissolved solids. The problem of high dissolved solids can also be overcome by segregation of salt baring stream at source or by using Solar/forced evaporation. In this paper a comparison of various curing technologies, associated pollution and economic feasibility has been made.

199. Implications of Water Quality Data for Trend Analysis – A Case Study on Drains

D. P. Mukhopadyay and B. Sasi Devi
(email : dpmcpcb@yahoo.com)

The monitoring system plays crucial role to provide important decision support. For this purpose water quality monitoring has been estimatablished to provide information on environmental processes of major and medium rivers, ponds, wells, drains etc. Huge volume of data are generated by Central Pollution Control Board for framing water quality management system. Now interpretation of these data by using various statistical techniques merit attention. As a part of various monitoring programmes, the drains in and around Delhi are being monitored by CPCB since long. The aim of this paper is to investigate the state of pollution and temporal variation of oxygen demanding substances in terms of BOD and COD.

The variation of water quality parameters is often reported without adjusting (normalizing) them with the flow and the amount of suspended matter and thereby actual dynamics of these parameres remain hidden. Therefore attempt has been made to compute flow-normalized monthly and annual riverine load of these oxygen demanding substances in statistical terms. For this purpose person's correlation technique was applied to assess the degree of association of these oxygen demanding substances with the amount of suspended matter. Strong influence of TSS on chages of values of BOD and COD was encountered in all the drains. Therefore measured concentrations of BOD and COD were separately considered as dependent variable and TSS as independent variable to apply regression technique. Tegression technique gave an idea about percentage apportion of BOD and COD between dissolved and particulate phases. It was further confirmed that temporal trends (monthly and annual) in measured condentrations were extensively influenced by the changes of flow and TSS. Another important aspect has been covered in this study i.e. conventional quality assurance which is complemented with through statistical follow-up of reported values. It was observed that sysnchronous increase and decrease of the measured concentrations data (unadjusted) caused problems in the analysis of temporal trend. The adjustment step provided realistic state of environment and environmental behavior of the oxygen demanding substances. These pertinent information will be obviously useful for appropriate watershed management and within water body management.

PROCEEDINGS
OF THE

NINETY EIGHTH SESSION OF THE

INDIAN SCIENCE CONGRESS

CHENNAI, 2011

PART II (Abstracts)

SECTION OF
ENVIRONMENTAL SCIENCES

President : **Dr. G. Bagyanarayana**

ORAL PRESENTATIONS

1. Effective Screening of Environmental Estrogens (EE_2) using Zebrafish Brain Aromatase Gene (*cyp19a1b*) as a Biomarker

Santosh Winkins*, Yann Le Page, Farzad Pakdel and Olivier Kah

Department of Biotechnology, School of Bioengineering,
SRM University, Kattankulathur, Tamilnadu
UMR CNRS 6026, Université de Rennes 1, Rennes, France
E-mail : santoshmcc@ktr.srmuniv.ac.in

Keywords : *Environmental estrogen, endocrine disruption, fish, aromatase gene*

An environmental estrogen (EE_2) is a compound, either natural or synthetic, which is present in the environment and may alter the hormonal system by mimicking the effects of endogenous estrogenic hormones, potentially leading to rupture of the homeostatic balance. Estrogens correspond to a class of sex steroid hormones best known as being responsible for the development of gender-specific

characteristics and secondary sexual characters in mammals. The estradiol, estriol, and estrone are three major naturally occurring estrogens found in the body. However, mounting evidence shows that many man-made products can mimic the action of estrogens and are called as xenoestrogens or estrogen mimics. In addition, plants can also produce estrogen mimics referred to as phytoestrogens. These natural or synthetic compounds are found almost everywhere in the environment (soil, water, air) and can affect human or wildlife health. Many substances present in the environment can mimic the estrogenic activity: pesticides (DDT methoxychlor, chlordecone, atrazin), plasticizers (bisphenol-A nonylphenol), UV screens (parabens, benzophenone), phytoestrogens (a-zeralenol, genistein) and pharmaceutics (ethinylestradiol, diethylstilbestrol).The effect of EE_2 in mammals, including humans, is extremely deleterious because EE_2 can affect the developing embryos during gestation. Such effects can ultimately affect the reproductive fitness trough alteration of gamete production, sexual differentiation, sex reversal, sexual behaviour or parental care. A number of in vitro assays have been developed to screen and detect EE_2 but each assay has its own disadvantages and less accuracy. In this study, the in vitro assay consists in an ER-negative glial cell line U251-MG transfected with zebrafish ER subtypes and the *cyp19a1b* promoter linked to a luciferase reporter gene. The *cyp19a1b* gene encodes aromatase B, a protein widely expressed in the brain of fish under the control of estrogens. The in vivo assay consists of quantitative-PCR of aromatase B messengers in the brain. Another in vivo assay is based on the use of a transgenic zebrafish that expresses Green Fluorescent Protein (GFP) under the control of the *cyp19a1b* promoter. When exposed to an estrogenic compound, the brain of 5 days old zebrafish embryo becomes fluorescent. The xenoestrogens á-zeralenol, genistein and chlordecone were studied with this effective assay.

2. Spent Mycelia For Removal- and Recovery of Cr (Vi) from Synthetic Solution as Well as Industrial Effluent

Dilip Markandey, V. K. Sachan, N. Semwal and B. R. Naidu

Central Pollution Control Board, Parivesh Bhavan, ZO-W,
Opposite Ward No. 10 VMC Office, Subhanpura,
Vadodara-390023, (0265) 2392831-33,
E-mail : dilipkrmark@yahoo.com

Next to municipalities, industrial operations like electroplating, battery manufacturing, pigment and paint production, tannery etc. contribute significant amount of heavy metals to the aquatic system. These contaminants find their way into the receiving aquatic system through various natural and man made sources and lead to several undesirable effects on natural resources.

There is a great potential in using microorganisms and associated derivatives for resolving the problem of contamination of metals due to discharge of various metal bearing effluents. This approach is certainly economical, which many a times, cannot be achieved through chemical and / or physical reaction with the completeness and efficiency. The microorganisms based decontamination techniques exhibit advantages like easy to realize, profitable, as well as economical. Besides, the microbial methods convert these contaminants into an immobilized insoluble state that can readily be recovered.

Keeping the said point into mind, compressed dehydrated spent mycelia from an antibiotic manufacturing unit was collected and used for preparation of biosorbent to study removal of Cr(VI) from synthetic solution as well as diluted electroplating effluent. The adsorption, desorption and recycling studies indicate the prepared activated carbon effectively used for removal- and recovery of Cr (VI) from synthetic solution as well as diluted effluent. Adsorption data fitted well with the Freundlich adsorption Isotherms. Using NTA and EDTA for desorption, the recovery of the target metal was achieved upto 90% with 4 repeats without deterioration of the sorption/desorption efficiency of the test biosorbent. This paper describes the findings of the said investigations in detail.

3. Ground Water Quality Modeling of Kshipra River Basin of Ujjain District, Madhya Pradesh Using Visual Modflow Software

S. Sharma[1] and R. Annadurai[2]

[1]Remote Sensing & GIS, SRM University
sanchit.sharmadem@gmail.com
[2]Department of Civil Engineering,
Faculty of Engineering and Technology,
SRM University

Keywords : *Visual Modflow, Kshipra River Basin, Ground Water Quality Modeling, Ujjain, Buffer zone.*

The study area Kshipra river basin, Ujjain, Madhya Pradesh is highly polluted due to the khan river is the main tributary of Kshipra River which joins at Triveni ghat is 6 km. South of Ujjain city and carries heavy load of industrial waste. Ujjain is a holy place and facing water crisis due to low amount of rainfall in previous years. The network of observation wells located in the buffer zone of river basin and it covers 80 sq. km. adjacent area extending from Kaliadeh to Quazipura town. The importance of mathematical model is to develop the simulation of ground water. The dug well quality data, surface water quality data analyzed and 25 years rainfall data with its cumulative departure has collected to calibrate the model. Turbidity, nitrate, alkalinity, pH, TSS, total hardness, D.O., B.O.D., total solids parameters has been taken for water quality monitoring. The Visual Modflow software has to calibrate for ground water quality modeling of the study area to predict the ground water quality for next 15 years. This prediction will help to develop a priori action plan including the treatment of surface water pollution to protect the public health.

4. Understanding Climate Change and Adaptation of Species Complexes in Tropical Forest

M. D. Behera[1] and S. K. Behera[2]

[1]Indian Institute of Technology, Kharagpur

[2]National Botanical Research Institute, Lucknow

Reports on climate change predict increase in global temperature. This will have impact in all components including biological such as species reproductive cycles, growing seasons, and species interaction to impact agricultural productivity, besides changing the natural course of many species, and drive many taxa to the verge of extinction. Asia, the most populated continent and home to ~50% of the world's terrestrial plants and animal species is demanding immediate attention to its coastal lands, mountains and wetlands because the species thereof have no alternative habitats under climate change scenario. Climate change studies in India

has received attention of researchers and voluntary organizations, and largely covers diverse issues like, greenhouse gas emissions from India, sea level changes along the Indian coast, its relationship with Indian forests and hydrology of Indian river basins; and sustainable development. However, studies targeting natural vegetation in diverse ecosystems within the country over a considerable period of time are lacking.

A CSIR network project entitled 'Climate change and adaptation of species complexes'under the XIth Five Year Plan is being implemented jointly by 'National Botanical Research Institute, Lucknow' and 'Indian Institute of Technology, Kharagpur' in a test site of tropical deciduous forest. The study aims at developing a forest carbon dynamics model by integrating the field based observations with satellite image derived biophysical outputs in a spatial domain. Permanent plots have been established in the test site at Katerniaghat Wildlife Sanctuary, Uttar Pradesh distributed over various life forms, gregarious and mixed formations to enumerate plant response to present climatic variables at community and ecosystem level. Instrumental observations are being taken to study different plant physiological response. The study would help understanding the adaptation and mitigation scenario in tropics with respect to imminent climate change.

5. Scenarios of Arabian Sea Climate Change under Increased Radioactive Active Gas Concentration and the role of Aerosols in Cclimate Change

Prof. Saroj Deshmukh

Modern College, Ganeshkhind, Pune

E-mail : srjhole45@gmail.com

Origin of research problem : Global Warming and climate change Interdisciplinary Relievance:Enviornmental science, Electronics Physics, Geography related work to be done Reasearch and Development : International Status : KYOTO P rotocol in 1995 . Protocol is signed by almost all countries in the world has made the list of all industrially developed Countries as Annexe 1 and underdeveloped countries as Annexe 2 The protocol states that the countries which are developed should reduce carbon emission to 1990 level by 2000 However all the industrially developed

countries failed to observe the protocol Therefore it was decided to have a financial instrument called as carbon credit for the purpose of reducing carbon emission at global level . 80% of carbon emission is from the developed countries The carbon emission means the word used for greenhouse gases like CO2 ,CO' CFCS, Methane,Water Vapours etc. It is the responcibility Of industries in the developed countries to promote reduction in ca rbon emissions Significance of the study:

Arabian sea is one of the most sensitive regions of the world. Modelling studies have shown that greenhouse gas induced warming over the basin is expected to be much higher than the global average and that the region will experience much drier conditions that at present ,especially during the warm season . Some of these trends have been already observed during recent decades . These changes can have dramatic effects on wide range of sectors in Arabian countries including water management , agriculture, energy production,tourisms, fisheries etc. Despite the fact that this warming /drying signal has been observed for various generations of model projections . There are still substancial uncertainties on the magnitude of this signal on the effects of Arabian air sea feedbacks and on effects of natural (e. g.) dust and anthropogenic aerosols. This last issue is especially critical in view of the fact that Mediterranean receives aerosol fluxes from different sources including desert dust from sahara ,soot from forest fires , agricultural practices and urban and industrial pollution from central and Eastern Europe The large optical depths associate with these aerosols loads can indeed effect the energy budget of the basin. Although global climate models are the primary tools to produce climate change projections Their resolution is still to course to Represent the complexity of morphology and processes of the Arabian sea To address this shortcoming a new generation of high resolution regional coupled climate system . Models have been developed for the basin including atmosphere , ocean, biosphere and chemistry aerosol components They provide powerful tools to jnvestigate the issues of mentioned above. The issue of 20th and 21st century climate change over the Arabian sea under increased greenhouse gas forcing with Particular attention to air sea interaction Changes in Arabian sea circulation atmosphere and ocenic interactions between the Arabian and other regions uncertainty estimates and impact of Natural and anthropogenic aerosols Results from newest regional coupled model simulations will receive special attention in particular with the context of the newly developing international

project CORDEX Coordinated regional climate downscaling experiment that will have the Arabian sea as one of its focus regions (MED-CORDEX) Observations of trends and forcing (e.g.) aerosols both in the atmosphere and oceans will also be reviewed with particular attention to their use for a better understanding of the models and processes for Arabian sea Following things will be studied Changes in Arabian sea circulation of water masses Regional coupled climate system Models for Arabian sea Consensus uncertainties of regional climate projections Impacts of natural / Anthropogenic aerosols on regional climate Interactions between Arabian sea and other regions.

Major work is done on preparing co2 sensors using Lithium chloride CO2 concentration is measured by sending this sensors in atmosphere. At Aaerodrum these experiments are done These sensors can be send in air to get upto 1ppm and 0.001ppm sensitivity Generaly CO2 concentration become less as you go at more and more heighted level. Some humidity sensors and temrature sensors are used to measure humidity and temperature upto 3 yrs.

6. Functions and Complexities of a Reclaimed mine Spoils Ecosystem : A Case Study of Kathara Coalmine Area of Jharkhand

Braj Kishore Sinha and Amita Hembrom

Department of Zoology, S S M College, Ranchi University,
Ranchi-834 008, Jharkhand
E mail : b_kishoresinha@yahoo.co.in
Forest Protection Division, Rain Forest Research Institute,
Jorhat-785001, Assam

Keywords : *Reclaimed mine spoils, homeostasis, resilience, anthropogenic activities, ecesis soil arthropods, ecological model*

Reclaimed mine spoils are byproducts of human development – an ecological footprint, are under twin stresses – anthropogenic and natural. Present paper is an effort to measure these stresses in reclaimed coalmine spoils of Jharkhand and has two sections – first section deals with the experiments and the results, and the second section is based on the observations of the experiment and has an ecological model. An experiment was carried out from year 2006 – 2008 in reclaimed coal

mine spoils of Jharkhand. Experimental sites with different ages of plantations were considered for the study. Soil arthropods along with other physical parameters were collected from 1 meter x 1 meter grid of quadrate seasonally. Shannon, and Simpson Index were calculated for qualitative status assessment. Importance value index and groups and guilds were identified. It was observed that the Shannon diversity index of younger OBD was higher than the 15 and 30 years old OBD. Old age site and forest had higher Diversity Index. Simpson's index was 0.0877, 0.889, 0.869, and 0.887 in four OBD sites, and 0.885, and 0.917 in the forest. Organisms in degraded systems are initially rudrals – create a functional system and establishes as K-select species. It was observed that the system has stresses – homeostatic processes that keep a system in its original state, and other force - resilience pull them out of the *status quo* but in reclaimed mine spoils an additional force anthropogenic activities work synergistically with the forces of resilience that push the system towards non-equilibrium, which is critical for succession and ecesis. Based on findings and functional stresses in the system an ecological model developed for ecesis that is operative in the system.

7. Effect of Seasonal Variation on the Rate of Decomposition of Leaf Litter and Population of Microfungi in *Dipterocarp* Forests in Manipur; North East India

Rajesh Kumar, Ashwani Tapwal* and Debu Moni Baruah

Forest Protection Division, Rain Forest Research Institute,
Jorhat-785001, Assam
*Corresponding author : ashwanitapwal@gmail.
commailto:ashwanitapwal@gmail.com

Keywords : *Dipterocarpus, seasonal variation, leaf litter decomposition, fungal population.*

The earth's climate has been changing throughout the planet's 3.5 billion year history which clearly indicates that the present climate may not remain constant. Climate is the key factor which determines the decomposition or preservation of organic matter and any change in it may affect the rate of leaf litter decomposition. The rate of decomposition of leaf litter is a very important factor as it largely determines the productivity of forest ecosystems. Furthermore, the existing litter layer directly or indirectly influences the diversity of micro-fungi and other soil organisms.

A study was conducted to determine the rate of decomposition of leaf litter of Dipterocarpus tuberculatus in the forests of Manipur; India during April 2008 to March 2009. The impact of seasonal variation on the rate of leaf litter decomposition was evaluated using litter bag technique. The percentage mass loss of leaf litter was found to be maximum during the rainy season and comparatively lower in winter season. Variation in the micro-fungal quantity in different seasons was studied using serial dilution and agar plate methods. The number of fungal colonies per gram of decomposed leaf litter was found to be maximum in the rainy season and minimum in late spring and early rainy season.

8. Virtual Water-Known but Unknown

B. Rajkumar
Depatment of Botany, Osmania University,
Hyderabad-500 007

Keywords : *Virtual water-water foot print-world water trade.*

The begining of 20 th century freshwater is going to be the most scarce resource and its availabilty, exploitation and sustainable use will determine standard of life and livelihood in developed,developing and underdeveloped countries. Of the available fresh water85% is used by agriculture, 10% by industry and 5% for drinking purpose. Crisis of water could lead to conflicts on national and international scales disturbing the peace and progress.

VIRTUAL WATER

'the sum of the water use in various steps of the production chain- a known phenomenon which was coined by Prof. John Anthony Allen, Kings College, London and School of Oriental and African Studies in the year 1993.The virtual water content of a product has three components-Green water, Blue water and Grey water.This enables the Water Foot Print of the nation i.e. gives the nations better consumption based indicator of water use and helps in the water trade practices. Analytically the concept enables to distinguish between Global,Regional and Local levels and thier linkages. It also helps in applied perspective on water problems.

9. Clinical Evaluation of Occupational Lead Exposure on Bus Drivers in various route of South Kolkata, India

Soumendra Darbar* and Tapan Kumar Pal

Bioequivalence Study Centre,
Department of Pharmaceutical Technology
Jadavpur University,
Kolkata-700 032
E-mail : darbarsoumendra@gmail.com.

Keywords : *Lead toxicity, Kolkata, Air pollution, Lead analysis, Health hazards.*

Studies conducted throughout the world has established beyond doubt that elevated blood lead levels may lead to detrimental health effects. It is an environmental toxicant that affects nearly every system in the body. Lead is a highly toxic substance, exposure to which can produce a wide range of adverse health effects. There are many ways in which humans are exposed to lead *i.e.*, through deteriorating paint, lead batteries, household dust, bare soil, air, automobile emission, drinking water, food, ceramics, home remedies, hair dyes and other cosmetics. Lead poisoning, the oldest recognized occupational disease, remains a danger for children and adults. In this study blood lead levels of about 252 adult male bus drivers, age ranges between 20-40 years, working in various route of South Kolkata were investigated. Very little information on the blood lead distribution of the adult male bus drivers is available. This study was undertaken to determine blood lead levels among adults spend most of their time in day and night besides some most congested main roads and crossings of south Kolkata. The results indicated that blood lead levels in the areas close to main roads ranged from 1.6 to 26.42 ìg/dl, with a median level of 12.02 ìg/dl. The blood lead levels of 86.14 % of adult equal or exceeded to 10 ìg/dl, the current international action levels. Automobile emission, dust, congested traffic; prolonged hours of work in the polluted areas, low nutritional status and lack of education were among the factors associated with elevated blood lead levels.

10. Dihydrogen Reduction of Organic Substrates by Using ZSM-5 Anchored Pd(II) Complexes as Catalyst

Priyanka Sagar and Rohit Kumar

Department of Chemistry, SSJ, Campus, Kumaun University,
Almora-263601, Uttrakhand
E-mail : sagarpriyanka_2006@yahoo.co.in

Keyword : *Pd (II) Complexes, ZSM-5, Nitrocompounds, Alkene, Alkyne, Catalytic Hydrogenation.*

The HZSM-5 was used to immobilize the homogeneous Pd (II) complexes of S-triazine derivatives and anthranilic acid. They were found very efficient towards the catalytic hydrogenation of alkenes, alkynes, nitrocompounds, benzaldehyde and benzil at 25^0C and 1.38 x10^3 KNm^{-2} pressure of molecular hydrogen. At this temperature and pressure of molecular hydrogen, ZSM-5 anchored Pd (II) complexes could be used repeatedly. DMF-Toluene (1:2) mixed solvents medium was found suitable for these complexes. No diminished catalytic activity was observed even after 15-20 repeated catalytic runs. This indicated that zero almost negligible leaching out phenomenon of the metal or metal complexes. Immobilized Pd (II) complexes were found more active, stable, thermo potent, eco-friendly and industrially applicable as compare to its homogeneous counterpart.

11. Primary Productivity of Ana Sagar Lake, Ajmer, Rajasthan

Sunil Dubey[1], Vijay Kumar Koli[2], Chhaya Bhatnagar[3] and Mohammed Yaseen[4]

[1]Department of Botany, University College of Science
Mohanlal Sukhadia University, Udaipur-313 001
[2,3]Aquatic Toxicology and Wildlife Research Laboratory
University College of Science, Department of Zoology,
Mohanlal Sukhadia University, Udaipur-313 001
[4]Dept. of Zoology, BNPG College, Mohanlal Sukhadia University,
Udaipur-313 001
Corresponding e-mail : yaseen_bio@rediffmail.com

Keywords : *Productivity, physico-chemical, Ana Sagar, GPP, NPP.*

Primary productivity and physico-chemical parameters were estimated in Ana Sagar Lake, Ajmer from September 2007 to August 2008. The study indicated that Primary productivity of lake was high (GPP 1.93 to 6.24 gC/m3/day and NPP 0.72 to 4.99 gC/m^3/day), which indicate that the lake was in eutrophic category. This productivity was also supported by phosphate (0.14 to 3.2 mg/l), nitrate (14.1 to 26.4 mg/l) and water temperature (16.4 to 28.3ºC).

12. Simple solutions to Tackle Climate Change

V. Venkateswara Sarma

Department of Biotechnology, School of Life Sciences,
Pondicherry University, R.V. Nagar, Kalapet,
Pondicherry-605 014

Keywords : *Multiple cropping, green house gases, carbon dioxide, methane, methylotrophs, carbon sequestration, carbon credits.*

Global warming and climate change are result of emission of Carbon dioxide, methane, and other green house gases which increased from industrial revolution in 18^{th} century. They increase global temperatures due to melting of polar ice caps resulting in rise of sea water thus inundating low lying areas. Though different experts have offered different solutions to mitigate this problem they are mostly expensive. However by adopting simple and cost-effective solutions global warming could be reduced through participatory approaches. These include (i) adopting multiple cropping system as one of the routine strategies where a few trees are planted along the boundary of the main crop in the agricultural fields, (ii) introducing methylotrophs (bacteria that consume methane) in rice fields so that they could reduce methane at the source itself, (iii) growing plants in desert areas by rerouting the sewage water to the desert areas where plants could grow after enough organic load is accumulated over a period of time. If more plants are grown in agricultural lands, waste lands, deserts, then more CO_2 gets fixed into the plants through photosynthesis thus reducing the global warming and climate change. These aspects will be further discussed in the conference.

13. Evaluation of the Status of Heavy Metal Pollution in an Important Ramsar Wetland System of India

U. P. Nasir[a], P. S. Harikumar[b], D. Brahmaiah[a] and B. R. Naidu[a]

[a]Central Pollution Control Board, Zonal Office-Vadodara,
Gujarat-390023
E-mail address : nasirchemistry@yahoo.com
[b]Central Water Analysis Laboratory,
Centre for Water Resources Development and Management,
Kozhikode-673571, Kerala

Keywords : *Heavy metal, sediment quality guidelines, degree of contamination, pollution load index, index of geo-accumulation.*

Indiscriminate industrialization and urbanization led to the increase of Pollution level. Agrochemicals, geochemical structure and industrial wastes create a potential source of heavy metal pollution in the aquatic environment. Wetlands are especially at risk of contamination by different contaminants from anthropogenic sources including heavy metals. A study has been conducted to understand the heavy metal contamination of the Vembanad wetland system, an important Ramsar site on India and its impact to the fresh water region of the Vembanad lake. Surface sediment samples were collected from six stations of the wetland including three from industrial zone and three from fresh water zone. The concentrations of copper, zinc, manganese, cadmium, lead, nickel and mercury were determined in the sediments. Highest heavy metal concentration was determined at industrial zone and lowest was found at southern upstream of the wetland system. Most metal levels in the sediments at the estuarine region exceeded the different sediment quality guidelines. Quality of sediment were evaluated using the numerical value of degree of contamination, pollution load index, sum of toxic units, enrichment factor and geo-accumulation index which showed severe pollution in the industrial zone. The ecotoxicity was determined by using effect range low/effect range median and threshold effect level/probable effect level values of environmental protection agency guideline. The percentage of heavy metal calculated with respect to the industrial zone as the base line and the correlation analysis with organic matter indicated that, mobility of the specific metal has higher impact on its concentration at the fresh water region of the wetland.

14. Application of Semiconductor Oxides Mediated Photocatalysis for Wastewater Treatment

Suja Devipriya, S. Yesodharan and E. P. Yesodharan*

Department of Ecology and Environmental Sciences,
Pondicherry University, Pondicherry-605 014
School of Environmental Studies,
Cochin University of Science and Technology,
Kochi-682022, Kerala
*School of Environmental Studies,
Cochin University of Science and Technology,
Kochi-682022, Kerala

Keywords : *Semiconductor oxides, photocatalysis, TiO_2, Water treatment.*

Semiconductor oxides mediated photocatalysts, as a means of removing chemical and bacterial contaminants from water has been receiving increased attention in recent years mainly due to its capacity to degrade a number of recalcitrant chemicals in gaseous or aqueous systems through relatively inexpensive procedures and the potential of using sunlight as the energy source. The method offers many advantages over traditional wastewater treatment techniques such as activated carbon adsorption, chemical oxidation, biological treatment, etc. Photocatalysis leads to complete mineralization of a variety of hazardous chemical and microbial pollutants into harmless products. The technique is now reaching the preindustrial level, with several pilot plants and prototypes being operational in various countries. This paper reviews major development in this area with special reference to wastewatwer treatment.

15. An Investigation into Water Quality Assessment and some Activity Based Project Work with reference to Ecological significance and its Effectiveness on Climate

Dr. Deepakkumar and J. Pandya

Dhanesh Mehta High School, Crescent Circle,
Bhavnagar-364002, Gujarat.

Why should we not use to apply traditional knowledge to solve our local level environment problem and save our intellectual property like earth, air, and water environment?

Bhavnagar district in Gujarat among 1600 kms coastal area sharply affected with hyper salinity and hyper acidity. There so many attempts have been done during last decade but the traditional approach related with the scientific empowerment improved the structure of acidic soil at coastal area. Farmers have scientific sense and they have implemented in their field. The creative sense should be implemented through the nation wide. So major salinity affected region of India may be solve by this traditional approach.

As far as above combination of formula related to supply in soil of coastal area by local level farmers nowadays scientifically proved to remove the salinity by traditional way of approach still we have not faith with the farmers wisdom which they are experienced with large numbers of attempts at their farms they are not only solving their problems but they are improving the environment of coastal area soil which is highly appreciated for environmental science.

We the teachers will put emphasis on that approach to the children to protect how our farmers take care of mother earth by supplying local level raw material from the coastal area and solved their problems.

To know all this parameters children of our academic field visited 20 villages with the use a questionnaire about our related problems and find out the real views from villagers, member of gram Panchayat, farmers, officers of GUJ.GOV and teacher, to got answers about water quality and after got 1000 views from various villages gained some innovative findings and apply such a useful suggestions to improve water quality assessment.

By doing activity based project work they gained tremendous virtues related to our local environmental issues and gained consciousness about surrounding environmental problems.

The above conceptualisation of agricultural phenomenon related to traditional knowledge and wisdom empowering very high scientifically proved by latest technology of science has made by not a scientist but by the experienced wisdom of farmers the cognitive domain analyse to supply the concentrate affluent of algae has been proved by COUNCIL OF AGRICULTURE RESEARCH INSTITUTE CSMCRI, DEP.OF FOODS AND NUTRITION, CENTRAL FOOD TECHNOLOGY INSTITUTE AND AGRICULTURL UNIVERSITY of Gujarat.

Last but not least we must put emphasize on innovations done by our local level invention, which is highly valuable to develop our agriculture based environment of soil and water.

16. Application of Cow Urine, Butter Milk and Blue Green Algae (Cyano Bacteria) on Crops and Soil To Decrease the Salinity and Improvment of Soil Evironment

Dr. Deepak J. Pandya

Dhanesh Mehta High School, Crescent Circle,
Bhavnagar-364002, Gujarat.
E-mail : pandyadeepakj@rediffmail.com

Why should we not use to apply traditional knowledge to solve our local level environment problem and save our intellectual property like earth, air, and water environment?

Bhavnagar district in Gujarat among 1600 kms coastal area sharply affected with hyper salinity and hyper acidity. There so many attempts have been done during last decade but the traditional approach related with the scientific empowerment improved the structure of acidic soil at coastal area. Farmers have scientific sense and they have implemented in their field. The creative sense should be implemented through the nation wide. So major salinity affected region of India may be solve by this traditional approach.

As far as above combination of formula related to supply in soil of coastal area by local level farmers nowadays scientifically proved to remove the salinity by traditional way of approach still we have not faith with the farmers wisdom which they are experienced with large numbers of attempts at their farms they are not only solving their problems but they are improving the environment of coastal area soil which is highly appreciated for environmental science.

We the teachers will put emphasis on that approach to the children to protect how our farmers take care of mother earth by supplying local level raw material from the coastal area and solved their problems.

The above conceptualisation of agricultural phenomenon related to traditional knowledge and wisdom empowering very high scientifically proved by latest technology of science has made by not a scientist but by the experienced wisdom of farmers the cognitive domain analyse to supply the concentrate affluent of algae has been proved by CSMCRI, DEP.OF FOODS AND NUTRITION, CENTRAL FOOD TECHNOLOGY INSTITUTE AND AGRICULTURL UNIVERSITY.

Last but not least we must put emphasize on innovations done by our local level invention, which is highly valuable to develop our environment.

17. Assessment of Groundwater Contamination by Metals and Nonmetals in Unnao

Namita Mishra and Shadma Naaz

Central Pollution Control Board, Zonal Office,
Lucknow
E-mail : shadma.naaz@gmail.com

Contamination of fluoride and metals reported in the groundwater of Unnao district and evidenced by many cases of fluorosis was assessed. In 30 representative samples collected as to cover whole district, arsenic and fluoride were found in maximum concentrations of 42.2 µg/l and 3.08 mg/l respectively. The fluoride concentration was found higher than above desired limit at 36% of the locations and at only 13% of the locations, it is above 1.5 mg/l i.e., at the unsafe level. Because the concentration of metals found well within the prescribed limits in industrial areas, showing source of contamination from geogenic inputs.

18. Analysis of Water Quality in Chennai City-A Statistical Approach

Dr. T. Senthilnathan[1*], K. V. Parvathavarthini[2] and Shanthi M. George[3]

[1]Professor, Department of Physics,
Vellammal Engineering College, Chennai-66
[2]Asst.Prof., Department of S&H (Physics),
S.A.Engineering College, Chennai-77
[3]Asst. Prof., Department of Physics,
R.M.K. Engineering College, Kavaraipettai

Key-words : *Ground water, physico-chemical parameter, water pollution.*

An investigation was carried out to study the ground water its nutrient status and physico-chemical characteristic of three different locations in Chennai. The present work has been conducted by monitoring two types of ground water (i.e) bore-well and hand pump. Attempts were made to study and analyze the physico-chemical characteristics of the water like temperature, pH, TSS, TDS, BOD, COD, iron ,alkalinity, fluoride , total coliform etc., to give a picture of quality parameter

in both hand pump and bore well of the three locations. The study also included the correlation coefficient analysis between the physico-chemical parameters. The significant values of the observed correlation coefficient is elaborately discussed in this paper and various suggestions to improve the water quality pertaining to the sampling station is also discussed.

19. Effect of Sulphur Dioxide Exposures and Inoculations with *Alternaria Brassicae* on Indian Mustard

Mujeebur Rahman Khan* and M. Mahmud Khan

Department of Plant Protection, Faculty of Agricultural Sciences,
Aligarh Muslim University, Aligarh-202 002, U.P.
*Email : mrkhan777in@yahoo.co.in

Keywords : *Air pollution, Alternaria brassicae, mustard cultivars*

Ten cultivars of Indian mustard, *Brassica juncea* were exposed to 2 (ambient), 25, 50 and 75 ppb SO_2 (5 h day^{-1} on alternate days for 3 months) in open top exposure chambers to evaluate resistance/tolerance against the gas. The exposures at 25 and 50 ppb SO_2 did not incite any measurable injury to mustard cultivars. However, 50 ppb SO_2caused visible injuries to all cultivars screened and led to a significant reduction in plant growth, yield, oil contents and leaf pigments (P=0.05). Effect of SO_2 was studied on leaf blight caused by *A. brassicae* on the mustard cultivars. The fungus was inoculated by spraying one month old plants with 5 ml spore suspension/ plant (10^{5-10} spores/ml). Fungus inoculated plants developed brown to black necrotic circular lesions, and severity of the blight increased on plants exposed to 50 ppb SO_2, but decreased at 75 ppb SO_2. The interaction between the gas and the fungus was found to be dependent of SO_2 concentration. The gas at 25 and 50 ppb SO_2 promoted pathogenesis of *A. brassicae* as a result the cv. Rohini, expressing tolerance to the fungus, became susceptible and exhibited greater blight and plant growth reductions at 50 ppb SO_2; the gas injury was also relatively greater in this treatment. The gas also promoted sporulation of the fungus. Interaction of 75 ppb SO_2 and *A. brassicae* was found to be antagonistic. The study has shown that the effects of SO_2 on Alternaria blight were concentration dependent; the lower concentration (50 ppb SO_2) stimulated the disease whereas 75 ppb SO_2 suppressed the blight.

20. Screening of some Fungi for Removal of Melanoidin Pigment in Molasses Waste Water

Sanjay Patel

Mycological Research Laboratory, Department of Biological Sciences,
Rani Durgavati University, Jabalpur-482001
*Corresponding author E-mail : sanjay.micro@gmail.com

Key words : *Melonoidin; Decolourization; Molasses waste water; Fungi.*

Molasses is one of the most important by products of sugar production process. The molasses based distilleries generate a large volumes of high strength molasses waste water. Distillery molasses waste water is unwanted residual liquid waste effluent during alcohol production.This occurring a pollution which is one of the most critical environmental issue. Molasses waste water is dark brown colour due to recalcitrant melanoidin pigment. Melanoidin pigment is natural condensation product of sugar and amino acids produced by non-enzymatic maillard amino-carbonyl reaction taking place between the amino and carbonyl groups of inorganic substances. It reduces sunlight penetration in rivers and lakes which in turn decrease both photosynthetic activity dissolve oxygen concentration which affect aquatic life. Fungal isolates from effluent were screened for the ability to degrade these pigments. The present research work was to obtain fungi capable of decolorizing treated distillery molasses waste water. The primary screening was carried out in two stages. In the first stage 6 microorganisms had lower capacity of 25% decolourization of molasses waste water. In second stage 4 microorganisms had shown more decolourization of molasses waste water i.e more than 48 percent. An isolate of Trichoderma viride exhibited more decolorization as compared with other fungal isolates.

21. Climate Change and Global Challenges in the 21st Century

S. C. Dubey

Department of Physics, S.G.S. Govt. P.G. College,
Sidhi-486661 (M.P.)
E-mail : subhas1236@rediffmail.com

Keywords : *Climate Change, Global warming, Green House Gases, 11-year Sunspot Cycle, Solar Luminosity.*

During 1978, it has been observed that global changes are increasingly continuously and putting stress on the Earth's climate. Human activities and Industrial Revolution is not only cause of climate change and global warming. Of the many objects in the universe, only two are well known for our climate change and global warming, one is Earth itself and other the Sun. The Sun, which about five billion years old provides an unfailing source of light and energy. Our atmosphere is made up of Nitrogen (78%), Oxygen (21%), with water and other gases making up the remainder. This small remainder is made up of the trace gases Argon, Carbon Dioxide, Neon, Helium, Methane, Hydrogen, Nitrous Oxide and Ozone. The real increase in Co_2 levels in our atmosphere began around the time of the Industrial Revolution (since 1750s). The main Greenhouse Gases ~ Co_2, nitrous oxide and methane have all increased exponentially since the 1750s. Today the use of fossil fuel for power and electricity is increased thousands times in compassion to pre-industrial revolution. Higher concentrations of Greenhouse Gases make the blanket around our globe thicker, trapping more heat and turning the globe into a green house.

Variations in the Sun's total energy output (luminosity) follow a cyclicity of 11 years, are known as 11-year sunspot cycle. There is a close correlation between variations in the 11-year sunspot cycle and Earth's climate. The potential role of solar luminosity in modulating recent climate has been debated for many decades. Before the satellite period solar luminosity had been scaled from proxy data that exists large uncertainty. Recently, variations measured from spacecraft since 1978 are too small to have contributed appreciably to accelerate global warming over the past 32 years. The long-term trends in solar irradiance appear more plausible and produced modeled climates in better agreement. Solar activity varies on shorter-time scales, including the 11-year sunspot cycle and longer-term as Milankovitch cycle. The cyclical nature of the Sun's energy output is not yet fully understood; it differs from the very slow change that is happening within the Sun as it ages and evolves. The geospace is very sensitive to solar and geomagnetic activity, to changes in these activities and its manifestations in the near-Earth space environment and on the Earth. Additional climate forcing by changes in the Sun's output of ultraviolet light, and of magnetized plasmas, cannot be ruled out.

This paper addresses for climate change and global warming studies through space based and ground based observations. The adverse impact of global climate change in our ecosystems and challenges in the 21^{st} century along-with perspective role of solar luminosity change in recent climate change have been discussed.

22. Environmental Crimes and Social Accountability A Legal Perspective

R. Seyon[1] and R. Seyezhai[2]

[1]Advocate & Notary Public,
Mayiladuthurai-609 001.Tamil Nadu
[2]Assistant Professor, Department of EEE,
S.S.N. College of Engineering, Chennai.

Accountability is an organic concept applicable to all sections of hierarchy. But it is little tried. Accountability means responsibility for actions at all levels. The concept of accountability correlates to moral responsibility for an outcome that can be ascribed only to those whose choice of action is the cause of the outcome. In today's democratic world, accountability of society allows responsibility to be jointly negotiated and defined by all who exercise any degree of control over their work. Controls over crimes of environmental pollution can be legally exercised through.

23. Environmental Impact Assessment of A Riverine Ecosystem

Dr. K. Thirumathal

P.G.Department of Zoology,
A.P.A.College for Women, Palani -15.
Email : ID – thirumathalk@yahoo.com

Keywords : *River Amaravathy, Anthropogenic activities, Physical characters, Chemical characters and Biodiversity*

Running waters are paramount to human survival. Rivers are the treasure house of aquatic resources. India is blessed with major rivers. But nowadays the over exploitation leading to the severe impacts to the riverine abiotic and biotic characters. River Amaravathy, at Udumalpet, Tirupur, District, Tamilnadu, India is one of the important rivers of Tamilnadu. Now the river is polluted by different activities of the people living nearby. Hence, the present study has been undertaken at Madathukulam, to identify the pollution status by analyzing the physical, chemical and biological parameters such as phytoplankton and zooplankton.

24. Larvicidal activity of Crude Extracts of *Umbelliferae* Plants against Chikungunya Vector Mosquito *Aedes Aegypti*

Jojo Joseph Vellanikaran[1] and A. P Thomas[2]

[1]Department of Zoology, Kuriakose Elias College,
Mannanam, Kerala-686 561.
E mail : jojojosephv@gmail.com
[2]Director, ACESSD, School of Environmental Sciences,
M.G University, Kottayam, Kerala-686 008.
E mail : ambattu-ktm@sify.com

Keywords : *Larvicidal Activity, Umbelliferae, Phytochemicals, Synergic effect, Chikungunya, Aedes aegypti, Mosquito control, Crude extracts.*

Among the selected twelve Umbelliferae species, the extracts of five could induce significant mortality of *Aedes aegypti* larvae. Crude extracts of three species – *Ferula assa -foetida*, *Eryngium foetidum*, and *Hydrocotyle rotundifolia* exhibited potential larvicidal action. Differential larvicidal activity was seen for various solvent extracts and both *H. rotundifolia* and *E. foetidum* were found lethal to the larvae, the former was more effective. Synergic effect was observed when the crude extracts of *H. rotundifolia* and *E. foetidum* were used together. These two species are potential sources for larvicidal phytochemicals which may be used in mosquito control and eradication of Chikungunya. Isolation of the active principles from the crude extracts of Umbelliferae family may prove useful for the development of safe biocides in future.

25. Bioaccumulation of n-3 PUFA and Methyl Mercury in the Anadromous *Hilsa* (*Tenualosa*) *Lisha* Fish and its Eggs Available in West Bengal, India

Moumita Pal[*] and Mahua Ghosh

Dept. of Chemical Technology,
University of Calcutta 92, A.P.C. Road,
Kolkata-700 009

Keywords : *Hilsa fish, n-3 PUFA, Methyl mercury, Bioaccumulation*

The bioaccumulation of n-3 polyunsaturated fatty acid (PUFA) and organic mercury (methyl mercury) were assessed in various *Hilsa* (*Tenualosa*) *ilisha* fish samples available in West Bengal, India. The total lipid content and fatty acid composition of the lipid in various parts of the fish samples including egg were determined. The average content of organic mercury was also quantified in those tissues which ranged from 0.03-0.05 ìg/g of wet tissue which is quite below than the safe limit given by WHO. The study infers that that phytoplankton diet of Hilsa fish helps them to deposit PUFA rich lipid in their muscle tissues and the high lipid containing part allows them to bioaccumulate a higher amount of organic mercury (methyl mercury).

26. Environmental Radioactive Pollutants and Their Impact on Human Health

R. P. Chauhan

Department of physics,
National Institute of Technology
Kurukshetra-136119
E-mails : chauhanrpc@gmail.com, chauhanrpc@hotmail.com

Keywords : *Radiation; radon; thoron; lung cancer; health*

Radiations are spontaneously emitted by naturally occurring atomic elements like ^{238}U and ^{232}Th ever since their existence on the earth. These radioactive materials emit three types of radiations i.e. alpha, beta and gamma radiations, which differ in their energy and penetrating power. The other radiation sources are nuclear fall out from weapon tests, radioactive releases from nuclear reactor operations and accidents, exposure due to radioactive waste disposal and industrial, medical and use of radio isotopes in the agricultural production. The uranium, thorium rocks and the soil get decayed to a radioactive gas known as radon. Radon, along with its progeny, leak into the atmosphere where people inhale and get their lungs irradiated. Natural radiation is of particular importance because this source is the largest contributor even today to the collective dose of world population. Keeping this in mind the estimation annual effective doses received by the residents

and some industrial workers has been carried out using alpha sensitive solid-state nuclear track detectors (SSNTD). The annual effective radiation dose received by residents varied from 2.7-4.3 mSv while for workers its variation is from 4.1-7.0 mSv.

27. Screening of Dietary Substances : New Blockade Strategy on Quorum Sensing

M. Dhaneesha, D. Arathy Pai and H. Jayalakshmi

Amrita School of Biotechnology,
Amrita Vishwavidyapeetham,
Kollam-690 525

Keywords : *Quorum quenching, fruit extracts, Chromobacterium violaceum*

The increasing occurrence of multiresistant pathogenic bacterial strains has gradually rendered traditional antimicrobial treatment ineffective. Quorum sensing, which is ubiquitous in bacteria, is the cell density dependent expression of species in bacteria mediated by hormone like compounds called autoinducers. Quorum quenching, which is the ability to disrupt quorum sensing, has a great therapeutic potential. The observation that quorum sensing is linked to virulence factor production, suggest that many virulent microbes could potentially be rendered nonpathogenic by inhibition of their quorum sensing systems. Though antimicrobial properties of dietary phytochemicals is well known, their ability as quorum sensing modulators is less studied. The primary objective of this investigation was to determine the quorum sensing inhibition activity of common fruit extracts, viz., *Ananas cosmosus, Citrus sinensis, Vitis Concord Seedless, Punica granatum, Phyllanthus emblica, Anacardium occidentale, Lycopersicon esculentum, Malus domestica, Vitis muscat and Vitis vinifera*. The bacterial strain used was *Chromobacterium violaceum* MTCC 2656. Loss of purple pigment in *Chromobacterium violaceum* is indicative of quorum sensing inhibition by the fruit extract introduced. The experiments were done in triplicate using standard methods. 6 fruit extracts, viz., *Ananas cosmosus, Citrus sinensis, Vitis Concord Seedless, Punica granatum, Lycopersicon esculentum* and *Vitis muscat* expressed quorum quenching activity. *Phyllanthus emblica* showed antimicrobial

activity. Quantitative assessment of pigment inhibition indicated that the quorum quenching activity of the fruits is concentration dependent. *Citrus sinensis* showed lowest quorum quenching activity. The molecules within the extracts that are involved in the inhibition of quorum sensing and the mechanism of quorum quenching are to be studied as a future prospect in order to exploit the wide possibilities of quorum quenching as a possible future treatment scenario for infections caused by bacteria which regulate pathogenocity by means of quorum sensing.

28. Mitigation of Amaranth Dye (Toxic Dye) Through Steam Activated Pigmented Rice Husk Carbon as an Adsorbent From Aqueous Solutions

Beena Janveja[a], Krishan Kant[b], Jyoti Sharma[c],

[a]Dept. Chemistry, K.L. Mehta DN College for Women,
Faridabad (Haryana)-121 001
E-mail : beena_sethi@rediffmail.com
[b]Principal, Aggarwal College, Ballabhgarh,
Faridabad (Haryana)-121 004
E-mail : kkant_67@rediffmail.com
[c]Dept. Chemistry, R.R. College,
Alwar (Rajasthan)-301 001

Keywords : *Steam activated pigmented rice husk carbon, Amaranth dye, adsorption, agitation time, effluent, concentration, adsorbent*

In the present work, the steam activated pigmented carbon prepared from rice husk (B.N. ORYZA SATIVA) was investigated as an adsorbent to remove Amaranth dye from aqueous solutions. The adsorbent was investigated under variable system parameters, such as, initial concentration of the aqueous dye solution, agitation time and adsorbent amount. The results of the present study have indicated that an amount of 0.8g SAPRHC per litre could remove 43% of the dye from an aqueous solution of 10 ppm with agitation time increased from 30 to 300 minutes. The value of q_m are above 0.9 mg g^{-1} also support adsorption potential of SAPRHC. The results obtained indicate that SAPRHC can be used for removing dyes like Amaranth dye from water.

29. Reduction of BOD & COD from Sewage Water by Radiation Technology

Y. AVASN Maruthi[a*], N. Lakshmana Das[a], Kaizar Hossain[a], K. S. S. Sarma[b] K. P. Rawat[b] and S. Sabarwal[b]

[a]GITAM Institute of Science, GITAM University,
Visakhapatnam-530045, Andhra Pradesh
[b]Radiation Technology Development Division,
Bhabha Atomic Research Centre (BARC),
Mumbai-400085
*Corresponding Author : Y. A. Maruthi, Associate Professor,
Dept. of Environmental Studies, GIS, GITAM University,
Visakhapatnam-530045, Andhra Pradesh
E-mail : ymjournal03@yahoo.co.in.

Keywords : *Sewage water, BOD & COD Reduction, and Electron beam irradiation*

The current emphasis on environmental health and water pollution issues, there is an increasing awareness to dispose sewage water safely. Generally sewage water contains several organic and inorganic based chemicals which are toxic and non- biodegradable. Electron Beam treatment of wastewater is very effective to reduce BOD as well as COD. The experimental results elucidated that the percentage of reduction of BOD was 14 more as well as 32 % of reduction in COD with respect to increasing of irradiation doses(0.45 -6 kGy) using E beam Accelerator. EB treated waste water can be used for both irrigation and industrial purposes.

30. Growth of the Brown-tide Alga *Auteococcus Anophagefferens* in Presence of Metalachor : Its Potentiality for Bioremendiation

Sarabanti Basu[a], Megha Takkar[b] and Liping Wei[b]

Department of Biotechnology, Heritage Institute of Technology,
Chowbaga Road, Kolkata-700107
Department of Chemistry and Environmental Science,
New Jersey Institute of Technology, University Heights, Newark,
New Jersey-07102

Keywords : *Aureococcus anophagefferens, metolachlor, growth rate, pigment, lipid*

Metolachlor, one of the herbicides belonging to the chloroacetanilide group, is widely used in crop management of control pre-emergent and early post-emergent broadleaf and grass weeds. It has been detected widely in North American and European surface water, and its wide-spread application in Suffolk Country. NY, coincided with the first brown tide algal bloom in south shores of Long Island (Sufflok Country), NY in 1985-86. Brown tides have been reported and recurred in RI, NY, NJ and other northeastern US embayment since mid 1980's. In the present work, effect of metolachlor an Aureococcus anophagefferens, a pelagophyte responsible for brown tides, has been studied in two sequential batches. The alga was eposed to 400, 800 and 1,600 ug/L metolachlor in artificial sea water medium till they reached their early stationary phase. The cells were again exposed to the respective concentrations and the cells were allowed to grow till the determined for both batches. Cells were harvested for each batch for biochemical studies. A study of pigment profile by HPLC revealed decrease in some pigments of which carotene was worst affected. Amount of non-polar lipids was found to be increased in presence of metolachlor. Residual concentration of metolachlor was reduced in presence of Aureococcus anophagefferens. The study will be helpful in finding out the biochemical basis of the metolachlor resistance of Aureococcus anophagefferens and to check its potentioal for bioremediation of pesticides.

31. Conservation of Rural Wetlands is A Potential Tool to Fully Recharge The Present Deteriorating Under Ground Water In India

Rohtash Chand Gupta

Zoology, Kurukshetra University,
Kurukshetra-136119, Haryana

Considering the scarcity of underground water in cities like Shimala on one had and Shillong and Imphal on the other hand, rain water harvesting technology must be developed to a level where its adoption and implementation is sufficiently practicable. In this Endeavour, one very efficacious policy will be to focus attention on rural India. Customarily, each village possess six to eight ponds which rural

dialect are better known as SAROVARS, JHEELS, TALABS, TALAIAS, POKHARS etc.

In the recent past i.e. about 40 – 50 years ago, the entire rainy water was naturally diverted to these ponds. These ponds were put to multi – farious community use and simultaneously the nearby WELLS were put to use of domestic and agriculture practices. This cycle process was self driven. Now it has been to some extent interfered with due to eutrophication of ponds coupled with urbanization. This negatives process is gradually reaching its nadir. Sooner that letter, all ponds will become the thing of the past. Excessive extraction of underground water for irrigation in rural India will further complicated the situation. In these circumstances, experts from various related field of specialization should join hands to develop a very "SIMPLE EASY TO ADOPT AND IMPLEMENT" a technology whereby rain water in every village is diverted to ponds. In addition, all ponds should be necessarily categorized in official records to avoid encroachment by the REALITY SECTORY. This simple scheme will bear extremely fruitful results in lessen the problem of accelerated underground water depletion and negative effects on irrigation of crops.

In the regard a NATIONAL PROJECT be conceived at the apex level and implemented at village level with the participation spirit between PUBLIC and the EXECUTIVE. Rain water harvesting is the call of the hour in rural India scenario.

32. Organochlorine Insecticide Residues in Human Blood from High and Low Malaria Endemic of Assam

Swapnil Rai, A. K. Chopra, Dinesh Shara and P. M. Gupta

Mangalayatam Univerisity, Beswan,
Aligarh (U.P)-202145
Gurukula Kangri University,
Haridwar (U.K)-249407
E-mail : ssrai31@gmail.com

Keywords : *DDT, HCH, Gas chromatograph, Malaria endemic, Organochlorine*

Organochlorine pesticides have been of tremendous benefit to man and his environment but their inadverte nt use has caused considerable harm to human

health. Exposure of human to these hazardous chemicals occurs directly in the fields and indirectly due to consumption of contaminated diet or by inhalation or by dermal contact. Despite the proliferation of different types of pesticides, organochlorines such as HCH and DDT still account for two third of the total consumption in the country because of their low cost and versatility in action again various pests. Since Assam is an endemic area with perennial transmission where mosquito borne disease are serious health problems, these pesticides are still being used in huge quantities in disease vector control.

Therefore it will be interesting to determine the residual levels of DDT and HCH in human blood samples from district Sonitpur (high malaria and high DDT consumption) and Tinsukia (low malaria and low DDT consumption) of Assam. A total of 233 human blood samples have been collected from these two districts dividing each district into five locations and analyzed using Gas Chromatograph.

All human blood samples were found to be contaminated with different levels of DDT and HCH residues. The results demonstrated that the man levels of total DDT and HCH were 137.57up/l and 172.28up/l for district Sonitpur while the mean levels were 126.29 up/l and 111.39up/l for district Tinsukia.

33. A Study on The Photodegradation of Carboxylic Acids in Presence of Titania Nanocomposites

Ashish Kumar*, Azad Kumar and Rohit Srivastava[1]

*Chemistry Department,
Agra College Agra 1. D.E.I.,
Dayal Baag Agra

Keywords : *Photo-degradation, Water Quality, Carboxylic Acid*

TiO_2 is one of the most commonly used photo-catalyst because of its high oxidation power, stability, and non-toxicity. Cu-TiO_2 nanocomposites was prepared by a adopting the solution impregnation method. After characterization for crystalline phase and particle size by XRD analysis, both the commercially procured TiO_2 and synthesized Cu-TiO_2 nanocomposites were used as photo-catalyst in the photo-degradation of some carboxylic acids (Citric Acid and Acetic Acid,).The degradation

of these acids in the presence of pure TiO_2 and synthesized Cu-TiO_2 was done. The effective photo-degradation was found in case of Citric acid in the presence of Cu-TiO_2 as compared to pure TiO_2.

34. Effect of Calcium and Magnesium induced Hardness on the Toxicity of Lead to Microorganism in aquatic environment as measured by Bio-chemical Oxygen Demand

N. Nazar Khan

Professor & Dean, Academic, Applied Science Department,
VCT Kumaon Engineering College,
Dwarahat-263653 (Almora) Uttarakhand
E-mail : nnazar2000@gmail.com

Keywords : *BOD, Ca-hardness, Lead Toxicity, Microorganism, Mg-hardness, Nitrifying Bacteria Rate Constant, Ultimate BOD*

An experimental study was carried out to observe the effects of water hardness based on calcium and magnesium salt as sulphate at different concentrations ranging from 0 to 400 mg/l as $CaCO_3$ equivalent to Pb toxicity for nitrifying (azobactor) at 20° C and 30° C. The rate constant (K) and ultimate biochemical oxygen demand (L) have been calculated from BOD data taken for 1 to 15 days using Thomas Graphical Method. Glucose was used as the source of carbon for microorganism. The maximum values of BOD and ultimate BOD for nitrifying bacteria were found to be 377.0 and 424.76 mg l^{-1} respectively at 20^0C which was further increased to 385.00 and 438.37 mg l^{-1} respectively at 30^0C in the blank sets without Pb and hardness. While the minimum values of BOD and ultimate BOD were 181.0 and 202.07 mg l^{-1} respectively at 20^0C and increased up to 186.0 and 210.21 mg l^{-1} respectively at 30^0C in the control set lacking hardness but having 5 mg l^{-1} Pb (II) metal as sulphate. It was also observed that the toxicity of Pb to azobactor decreased with increasing calcium as well as magnesium hardness at both the temperatures. The percentage reduction of BOD (over control as without hardness and Pb) was found to decrease from 51.99 18.83 and 54.52 to 19.45 for Ca hardness at 20° C and 30° C respectively. Similarly, for Mg hardness at 20° C and 30° C, the percentage

reduction of BOD was decreased from 51.99 to 14.85 and 51.94 to 15.25 respectively. Rate constant (K) values were found to follow the decreasing order as Mg hardness at 30° C > Mg hardness at 20° C > Ca hardness at 30° C > Ca hardness at 20° C.

35. Monitoring of Herbicide (MH) Toxicity by using Pollen as Indicators Pollen of Mung - A Critical Review

S. A. Salgare

Salgare Research Foundation Pvt. Ltd.,
Prathamesh Society, Shivaji Chowk,
Karjat-401 201 (Maharashtra)
E-mail : drsalgare@rediffmail.com & drsalgare@gmail.com

Keywords : *Genetics and Plant Breeding, Palynology, Crop Physiology, Herbicides, Toxacology, Environmental Sciences.*

Potentiality of the germinability of pollen of *Phaseolus aureus* Roxb. (var. J-781, mung) was noted in all the 4 series *i.e.* F, F-24, F-48, F-72 series investigated. Pollen of F-24 and F-48 series produced higher percentage of the germination with the longer tubes than those of F series. Foliar applications of all the concentrations (5, 10, 25,50, 100, 200-200-1000, 1000-1000-5000 mg/ml) of maleic hydrazide (1, 2-dihydropyridazine, 3-6-dione) failed to suppress the cent percent pollen fertility. However, all the concentrations of MH above 400 mg/ml prevented the germination of pollen of all the 4 series investigated. When there is no germination of pollen the question of the transfer of the male gametes to the female gametophyte does not arises and when there is no transfer of male gametes to the female gametophyte the question of the fertilization and seed settings does not arises. Hence instead of suppressing the pollen fertility which is not possible even with such a high concentrations of MH we should suppress the germinability of pollen with such a low concentrations which gives the birth to the new method of plant breeding - 'Salgare's Method of Plant Breeding'.

It is also confirmed that the pollen development and activity are more sensitive indicators of adverse factors in the botanical environment and the use of an entire vascular plant as an indicator of pollution is a very crud method and rather a wrong choice. There is no evidence of any entire vascular plant exhibiting this much degree of sensitivity.

36. Impact of Hydro Electric Projects on Water Quality of River Bhagirathi (Ganga) in the High Altitude Region

N Semwal, J S Jangwan, Dilip Markandey, VK Sachan and B R Naidu

Central Pollution Control Board, Parivesh Bhavan, ZO- W,
Opposite VMC, Ward No.10, Subhanpura,
Vadodara-(0265) 2392831-33

Millions of Hindus from all parts of India and also from overseas flock to Gangotri, Uttarkashi, Devprayag and other spots along Bhagirathi to observe this majestic river and perform various religious activities. The major human activities which have been observed influencing the water quality of river Bhagirathi are; hydro-electric projects (HEPs), municipal waste (sewage & solid waste), religious activities like mass bathing, open defecation, indigenous fishing methods, landslides and soil erosion triggered by road construction.

Over last two decades a number of HEPs have been proposed, built or under construction on a 225 km stretch along the course of the Bhagirathi between Gangotri (3048 MSL) and Devprayag (475 MSL). The artificial alteration in natural flow of the river water due to reservoirs led to transformation in substratum composition of the river bed and brought about a lot of changes in the water quality characteristics viz., benthic fauna, water temperature, DO, suspended solids, turbidity, pH, metals and nutrient transportation. The alteration in metal and nutrient transportation would adversely affect the agricultural soil fertility of the Great Gangetic Plain and thus the food security of the country. Increase of water temperature and depth and decrease in DO values at HEP reservoirs affects the fauna and thus adversely impact the ecology of the river. The flow variation from Tehri reservoir has shown drastic impact on benthic macro- invertebrates as these animals were completely disappeared from reservoir downstream upto Devprayag.

The saying 'Prevention is better than cure' holds true for mitigation of environmental and social impacts of HEPs. It is worthwhile to abandon projects when the environmental and social costs to be paid are high. This paper briefly describes the physico-chemical and monitoring of benthic fauna of river stretch from Gangotri to Devprayag in the quantitative terms.

37. Relative Biosorpiton of Heavy Metals from Composited Multimetallic Aqueous System

Dilip Markandey, Raj K. Salar, N. Markandey and R. C. Trivedi

Central Pollution Control Board, Parivesh Bhavan, ZO-W,
Opposite Ward No. 10 VMC Office, Subhanpura,
Vadodara-390023, (0265) 2392831-33
E-mail : dilipkrmark@yahoo.com

Heavy metal pollution is an important problem in environmental degradation, stimulating interest in new methods using microorganisms to remove heavy metals. In order to combat this problem, the commonly used procedures for removing metal ions from dilute aqueous streams include chemical precipitation, ion exchange, reverse osmosis and solvent extraction. However, these techniques have certain disadvantages such as incomplete metal removal, high reagent and energy requirements, generation of toxic sludge or other waste products that require disposal. The hazardous wastes generated from metal mining and smelting operations also need to be decontaminated before entering into ecosystem.

Various microbes have shown potential to sequester and concentrate heavy metals from aqueous environments. The biosorption offers an economically feasible technology for efficient removal and recovery of metal(s) from aqueous solutions. The process of biosorption has many attractive features including the selective removal of metal(s) over a broad range of pH and temperature, its rapid kinetics of adsorption and desorption and low capital and operational costs. The biosorbents can easily be produced using inexpensive growth media or obtained as a byproduct from some industry. The composition of the medium may also have a direct effect on both passive adsorption and metabolic uptake. Biosorption includes passive adsorption of heavy metals at binding sites on the envelopes of cells and metabolically mediated uptake.

In the present investigation, an attempt had been made to assess the relative sorption efficiency of various isolates viz. *Rhizopus stolonifer, Penicillium citrinum,*

Aspergillus nidulans, Trichoderma viridae and *Candida tropicalis* under identical experimental conditions for heavy metals like Cd, Cu, Co, Cr (T), Ni and Zn from the multimetallic synthetic solution in the laboratory. The isolate *R. stolonifer* have shown maximum sorption of the test metals. Increase in initial metal concentration from 50 to 150 mg/L, pH 4.5, duration of exposure (5 h) and agitation (150 RPM) were assessed as optimum experimental variables for maximum sorption of target metals. The majority of metals could also be effectively recovered from the isolate like *A. nidulans.* However, the recovery from the loaded biomass of *R. stolonifer* was observed as least in majority of cases. Findings of the present study will be presented in this paper.

38. Water Pollution in Environment of Sugarcane Industries of Madhya Pradesh due to fungal toxicants

A. K. Pandey, Rashmi Dubey and A. K. Awasthi

Mycological Research Laboratories,
Department of Biological Sciences,
Rani Durgavati University,
Jabalpur-482001
E-mail : abhishekawasthi55@ymail.com

The sugar industries are playing an important role in the economic development of the Indian sub continent, but the effluents released produce a high degree of organic pollution in both aquatic and terrestrial ecosystems, which posses a serious health hazard to the rural and semi-urban populations that uses stream and river water for agriculture and domestic purposes, Such harmful water is injurious to plants, animals and human beings. The negative effects of various industrial effluents on seed germination, growth and yield of crop plants have captivated the attention of many workers. The present paper deals with the Environmental pollution caused in sugarcane industries of Madhya Pradesh. A total number of 21 fungal species belonging to 12 Genera of fungi were isolated during our investigation in effluent of various sugarcane industries of M.P. The prevalent fungi were *Aspergillus niger* 100%, *A. flavus* 100%, *Aspergillus candidus* 88.0 % and *A. nidulans* 88.0 % were found to be dominant.The results reported causes lot of losses to aquatic microorganism and agricultural fields of that area.

39. Air Quality Management during Common Wealth Games–2010 : Delhi

Shaveta Kohli*, Alok Kumar, F. Rehman, Srivastava, R. C. and Saha, D.

Air Laboratory Division, Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi-110 032.
E-mail : kohli.shaveta@gmail.com.

Keywords : *Air Quality Management, Common Wealth Games, Delhi*

The 19th Commonwealth Games (CWG) is being organized in Delhi, the capital city of India, during October 3 and 14, 2010. This is an event of paramount importance for India and accordingly steps have been initiated at various levels to make the event a great success. With its modern infrastructure in place, Delhi wishes to provide a healthy and enjoyable experience for all. The management of ambient air quality is one of the major concerns for the regulatory agencies. In Delhi, mixed combinations of manual and on-line analyzers (conventional and open path) have been placed at various locations, which would be utilized for monitoring of air quality and it's forecasting during the entire period of the games. The study is an attempt to describe the air quality status during this prestigious event being organized at Delhi. It is also proposed to make a presentation along with preventive and regulatory measures initiated for this particular event besides establishment of monitoring stations and instantaneous data transmission vis-à-vis implementation of preventive actions at various stages of games.

40. PAH and VOC Profile during an Accidental Fire at Oil Storage Depo in Jaipur

A. K. Sen*, P. Krishnamurthy*, Dolly Kulshreshtha[#] and S. K. Tyagi[$]

*Scientist 'B', # Scientific Assistant, $ Scientist 'D',
Central Pollution Control Board, Parivesh Bhavan,
East Arjun Nagar, Delhi-110032.
Email : scskt.cpcb@nic.in)

Key words : *Polynuclear Aromatic Hydrocarbons, Volatile Organic Compounds, $PM_{10,}$ Oil Depo*

A devastating fire accident has been occurred in an oil storage depo at Sitapur Industrial area, Jaipur on October 29, 2009 and the fire continued till November 11, 2009. The city Jaipur is situated at 26°55' North, 75°49' East & 26.92° North, 75.82°E.The average elevation from sea level is 432 meters. The burning of fuel in the storage tank released dark smoke including organic gases like Polynuclear Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) and inorganic gases like Sulpher-di- oxide, Nitrogen-di-oxide, Carbon monoxide etc. are transported into the surrounding areas. As fuel oils consist of mostly organic compounds such as PAH, VOCs which are highly toxic in nature and affected the humans, animals and vegetation system. Among them benzene and benzo(a)pyrene are known carcinogens. Keeping view of the above, CPCB has conducted an in-depth monitoring of inorganic and organic pollutants of the fire accident areas during Nov 4-5, 2009 to assess the environmental impact of the fire. In this paper, we have mainly emphasized organic pollutants like PAH and VOCs. Ambient monitoring was carried out at 5 locations at a distance of about 1 to 3 km away from the fire in the upwind and downwind directions. PM_{10} Particulate PAH in ambient air was sampled by Respirable Dust Sampler (RDS) equipment using EPM 2000 glass fiber filter paper which was extracted with toluene by ultra sonication followed by pre- concentration to 2 ml by rotary evaporator. The final sample was analyzed in GC-FID using ultra 2 capillary column. Ambient VOCs were adsorbed in Tenax and Chromosorb sorbent tubes in series by low flow pump and directly thermally desorbed and analyzed in GC-MS-ATD. The minimum and maximum concentration of benzene, toluene, ethylene benzene, m,p-xylene, o-xylene, naphthalene were found as 1.3-38.6 $\mu g/m^3$, 25.9 – 75.9 $\mu g/m^3$, ND – 27.5 $\mu g/m^3$, ND- 41.1 $\mu g/m^3$, ND-6.3 $\mu g/m^3$, ND-9.2 $\mu g/m^3$ respectively. The benzo(a)pyrene in particulate ranges from 2.16 ng/m^3 to 11.55 ng/m^3 and total PAH ranges from 21.51 ng/m^3 to 81.39 ng/m^3. Benzene and benzo(a)pyrene concentrations were observed quite high when compared with National Ambient Air Quality Standards (N AAQS) for benzene i.e. 5 $\mu g/m^3$ and benzo(a)pyrene i.e.,1 ng/m^3.

41. Analytical Performance Evaluation of the Laboratories of Pollution Control Boards and Committees participated in Analytical Quality Control Exercises (AQC) for Water Quality parameters carried out by Central Pollution Control Board

A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board, Zone Office (South),
Bangalore-560 010.
[2]Central Pollution Control Board,
Delhi-110 032

Analytical Quality Control (AQC), a part of Quality Assurance (QA) Programme, plays a vital role in any Environmental Monitoring Programme. The analytical data obtained in a monitoring programme is used for decision making purpose, upon which the entire scheme is executed by incorporating money, materials and man power. The Central Pollution Control Board (CPCB) is monitoring 1429 water quality monitoring stations comprising rivers, lakes, wells, and ground water spread over 27 states and 6 Union Territories through various State Pollution Control Boards(SPCBs) and Pollution Control Committees(PCCs). The water samples are being analysed in central or regional llaboratories of SPCB/ PCCs for various physico chemical and bacteriological parameters. In order to generate high quality analytical data as a part of Quality Assurance system, CPCB has started regular and organised Analytical Quality Control (AQC) exercise with the concerned laboratories from 1991 onwards as a continuous programme. Till March 2010, twenty five rounds of exercises were carried out for water quality parameters. At present there are 85 laboratories of SPCBs/PCCs participating under this programme.

Two synthetic water samples prepared in laboratory were distributed to all participating laboratories and analysis reports were obtained from laboratories. Robust Statistical analysis of data for arriving "*Reference value", (Median), standard deviation and Z – Scores values* were worked out. A total of 75 laboratories were considered for assessment and the **AQC performance index**

(API) in terms percentage was found with score of 60 % and above for 30 laboratories. In general performance of these laboratories for titrimetric methods of analysis is comparatively better than colorimetric methods. The performance of laboratories for various analytical parameters in the order decreasing percentage was as follows: Chloride(81) < BOD(75) < NH_3-N(73) < TKN(72) < Total Hardness(72) < Conductivity(71) < Calcium(70) < Magnesium (69) < Sulphate(69) < COD(68) < FDS(68) < Sodium(67) < Boron(66) < Potassium(66) < TSS(65) < TDS(65) < Chromium^{+6}(63) < PO4-P(62) < NO_3 – N (61) < Fluoride(60). The overall mean value was found as 68 %. Further it is observed that there is a continuous improvement in the performance of analysis as compared to earlier periods.

This exercise shall be a routine activity of Central Pollution Control Board for improving the analytical capability of the concerned laboratories. This paper deals with interpretation of the analytical results and suggestive measures for improvement of the analytical performance of the laboratories.

42. Dioxin and Furan Emission from Common Hazardous Waste Incinerators in Gujarat, India

A. R. Thakkar*, P. D. Bharne and B. R. Naidu*****

* Sc. B, ** Sc. C, *** Sc. D, Central Pollution Control Board,
West Zone Office, Vadodara, Gujarat

Key Words : *Dioxins, Furans, Hazardous Waste, CHWTSDF, Incinerator, Standard*

Dioxins and Furans are two families of related chemical compounds known as polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. Dioxins are the group of 75 related chemical compounds known as polychlorinated dibenzo-p-dioxins and furans are the group of 135 related chemical compounds known as polychlorinated dibenzofurans. Out of these, 17 pose a major health risk to human health, including 2, 3, 7, 8- tetrachlorodibenzo-p-dioxin (TCDD) is the most toxic compound of the dioxin group.

Dioxins and Furans are present in trace amounts throughout the environment. Minute amounts may be found in the air, food, water, soil and dust. Dioxins and furans are unwanted by products created in manufacturing of chemicals such as some disinfectants, wood preservatives, dyes and dyes intermediate, herbicides etc. They are also emitted during combustion processes such as the incineration of municipal and industrial waste, wood and gasoline burning.

Gujarat state in India accommodates large numbers chemical industries manufacturing variety of chemicals. The state is having around 3, 00,000 industries and out of which 7751 industries generate hazardous waste. As per the National Inventory of Hazardous Waste Generation and Management in India, 2009, published by CPCB, Gujarat generates incinerable hazardous waste to the tune of 1,08,622 Metric Ton Per Annum. For proper treatment and disposal of hazardous waste i.e. landfill, stabilisation and incineration, Common Hazardous Waste Treatment Storage Disposal Facilities (CHWTSDF) are developed in the state, and become pioneer in development of such facilities. There are eight CHWTSDF with landfill facility. Out of eight CHWTSDF, four facilities are having Common Hazardous Waste Incineration Facility (CHWIF) comprising storage facility of incinerable waste and incinerator. Possibility of generation of dioxin and furan while incineration of hazardous waste and municipal waste is very high as reported in many literatures.

The source emission monitoring carried out for Dioxins, Furans and other pollutants at two CHWIF at Gujarat viz M/s Gujarat Enviro Protection & Infrastructure Limited (GEPIL) Surat and M/s Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar. The paper is prepared which includes information on common hazardous waste incineration facilities, type and characteristics of incinerable hazardous waste, technical details of incinerators including air pollution control system, analysis results of source emission monitoring for Dioxins, Furans and other pollutants.

It is observed from the result that the Total Dioxin and Furan detected during the source emission monitoring were 0.0487 ngTEQ/Nm^3 and 0.00396 ngTEQ/Nm^3 at M/s GEPIL, Surat and M/s BEIL, Ankleshwar respectively. The results are well within the Standard (0.1 ngTEQ/Nm^3).

43. Trend analysis of Gaseous and Particulate Emission Data of Vadodara City and Identification of Transport Pathways using HYSPLIT Trajectory Model

Vinay Kumar Upadhyay*, D. Brahmaiah* and B. R. Naidu*

*Central Pollution Control Board.
Zonal Office-Vadodara,
Gujarat-390023
E-mail : vinay0408@gmail.com,

Keywords : *RSPM, Trend analysis, Mann-Kendall test, ANOVA, Hysplit trajectory model*

An important objective of many environmental monitoring programs is to detect changes or trends in pollution levels over time. Over the period 2005–2009, trend in concentrations of three major atmospheric pollutants were investigated (RSPM, SO_2 and NO_2) using modified non parametric Mann-Kendall test. This trend analysis was supplemented with ANOVA analysis to see significant difference in trend obtained at different sites (industrial, residential and commercial) during years of investigation. The Hybrid Single-Particle Lagrangian Integrated Trajectory model (HYSPLIT) is used to create seasonal air parcel trajectories to understand long distance movement of atmospheric pollutants in Vadodara City. This air mass trajectory results with surface meteorological data was used to interpret high and low concentration episodes in positive trend years.

44. Climate Change in Nanmangalam Reserve Forest and its Environs Near Chennai, Tamilnadu, India

G. Rajah

Vidhya Sagar Women's College (Arts & Science),
Chengalpattu-603111, Tamilnadu

Keywords : *Reserve Forest, Tropical Dry Evergreen Forest, Eucalyptus Plantation, Green House gases, Emission from Automobiles, Deforestation, Mining of Platinum minerals, Encroachment, Loss of Biodiversity*

The study area is a Tropical Dry Evergreen Forest and its surroundings at Nanmangalam near Chennai (India) and it extends over 420 hectares. The altitude

varies from 25m to 70m. It is situated 15 km south of Guindy and is in 13 Degree Northern latitude and 80 Degree Eastern longitude. A survey of this area has brought to light the occurrence of 520 Agiosperm species and many species of animals.

The green house gases especially CO2, SO2, CFC etc., are ever increasing in this atmosphere. The gases emitted from automobiles like Cars, Buses and two wheelers etc., cause air pollution which causes concern to the biodiversity including man. The emission from nearby companies and factories help in the global warming. Mining of blue metals already inside the forest led to decrease of biodiversity and increase in pollution. The blast with the chemicals cause air pollution.

I came to understand that recent findings of platinum and other ores in that area as well as in other areas may lead to mining of that ores leading to air pollution, water pollution and land pollution. It may increase global warming due to excavation of soil which will remove the trees from the forest. Since the forest already suffered from mining of blue metals, we should not encourage another mining of platinum minerals which lead to environmental pollution.

The climate change also induces the area to become desert. It also reduces the mangrove vegetation in the Adayar region in Chennai and other seashore areas of Kanchipuram Dist. Most of the mangrove vegetations disappeared due to man made pollution. Ground water resources are salty due to seepage from sea water. Agriculture is affected in this district due to seasonal changes, erratic rain, unexpected flood and cyclone, rise in temperature and saltish groundwater. The plants biodiversity will be vanished from the area where the mining is undertaken. Now, the question is whether we need fresh oxygen from the plants or green house gases and other pollutants?

The remedy is to involve youngsters, environmentalists, NGO’s and the Government for the reduction in global warming. The Government should reduce the number of plying cars by increasing Car parking fees. The people must be encouraged to travel by public transport. Eco-friendly biodiesel must be used for

running the automobiles. Solar energy should be used for cooking instead of wooden fuels from the forest. Growing of Eucalyptus trees must be stopped in the forest to avoid water scarcity. Afforestation is the time of the hour. We must protect our forest and improve them to the tune of 33% from present level to 21%. We should also produce electricity by means of wind energy. No dead bodies of animals and human beings should be burnt but they must be buried near trees to protect the ecosystem. Let all of us think globally and act locally.

45. Environmental Issues in Recycling of used Vehicles

Anjana Kumari V*, R. C. Saxena and R. S. Mahwar

Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi

There are about 7.22 (2004) million in use vehicles in the country and the country's annual production is about 11.18 (2008) million. There is no mandatory end of life for vehicles (ELV) in India. The existing legislation only requires the removal of 15 years old commercial vehicles in certain cities. The vehicles have parts made of different materials which vary from vehicle to vehicle depending on there make and even from model to model. These materials include right from ferrous and toxic metals to synthetic organic materials such as plastics. The recycling/disposal of the vehicles is therefore required to be done in an environmentally sound manner ensuring maximum recovery/reuse/recycle and generation of minimum residues to be disposed in a safe manner. The paper presents the review of environmental issues involved in recycling of used vehicles.

46. Evaluation of the Status of Heavy Metal Pollution in an Important Ramsar Wetland system of India

U. P. Nasir[a], P. S. Harikumar[b], D. Brahmaiah[a] and B. R. Naidu[a]

[a]Central Pollution Control Board,
Zonal Office-Vadodara,
Gujarat-390023
E-mail : nasirchemistry@yahoo.com
[b]Central Water Analysis Laboratory,
Centre for Water Resources Development and Management,
Kozhikode-673571, Kerala

Key words : *Heavy metal, sediment quality guidelines, degree of contamination, pollution load index, index of geo-accumulation.*

Indiscriminate industrialization and urbanization led to the increase of Pollution level. Agrochemicals, geochemical structure and industrial wastes create a potential source of heavy metal pollution in the aquatic environment. Wetlands are especially at risk of contamination by different contaminants from anthropogenic sources including heavy metals. A study has been conducted to understand the heavy metal contamination of the Vembanad wetland system, an important Ramsar site on India and its impact to the fresh water region of the Vembanad lake. Surface sediment samples were collected from six stations of the wetland including three from industrial zone and three from fresh water zone. The concentrations of copper, zinc, manganese, cadmium, lead, nickel and mercury were determined in the sediments. Highest heavy metal concentration was determined at industrial zone and lowest was found at southern upstream of the wetland system. Most metal levels in the sediments at the estuarine region exceeded the different sediment quality guidelines. Quality of sediment were evaluated using the numerical value of degree of contamination, pollution load index, sum of toxic units, enrichment factor and geo-accumulation index which showed severe pollution in the industrial zone. The ecotoxicity was determined by using effect range low/effect range median and threshold effect level/probable effect level values of environmental protection agency guideline. The percentage of heavy metal calculated with respect to the industrial zone as the base line and the correlation analysis with organic matter indicated that, mobility of the specific metal has higher impact on its concentration at the fresh water region of the wetland.

POSTER PRESENTATIONS

1. 3d City Modelling and Its Application Using Lidar Technology

Sheena A. D. and M. E. Geomatics
Anna University,
Chennai

Keywords : *3D, City model, Visualization, Infrastructure, Disaster Management.*

In this growing phase of urbanization and industrialization there is an emergent need of proper city planning systems. **3D city models** are digital representations of the Earth's surface and related objects belonging to urban areas. **3D city models** are real world representation useful in 3D visualization, planning the city in Infrastructure development, Information system for tourism, Intelligent transportation systems, Environmental aspects, Disaster Management, public rescue operations, real estate market, utility management, Military operations, Training of officers, Simulation of new buildings, Updating and keeping cadastral data, change detection and virtual reality.

LiDAR data (Light Detection and Ranging) is a relatively new technology for obtaining the earth's surface objects. This data when combined with digital orthophotos can be used to create highly detailed Digital Surface Models (DSMs) and eventually Digital 3D City Models. Research in 3D GIS helps to analyse the real world and the related issues using high quality 3D simulations towards sustainable infrastructure.

2. Status of Water Supply, Wastewater Generation and its Treatment in Class-I Cities and Class-II Towns in India

Jitendra Kr Vimal, A. K. Sinha and D. D. Basu
*[1]Jitendra Kr. Vimal, Junior Research Fellow,
Central Pollution Control Board, Delhi
[2]A.K.Sinha, Scientist 'C',
Central Pollution Control Board, Delhi
[3]D.D.Basu, Senior Scientist,
Central Pollution Control Board, Delhi

Keywords : *Water Supply, Municipal Sewage, Water Pollution, Sewage Generation*

Water supply and sanitation are indispensable needs for the improvement of the excellence of life and enhancement of productive efficiency of the people. Almost 80% of the water supplied for domestic use, comes out as wastewater. In most of the cases wastewater is let out untreated and it either sinks into the ground as a potential pollutant of ground water or is discharged into the natural drainage system causing pollution in downstream areas.

Municipal sewage is major source of water pollution in India, particularly in and around large urban centres. In India about 78% of the urban population has access to safe drinking water and about 38% of the urban population has access to sanitation services. The estimated sewage generation from Class-I Cities and Class-II Towns together is 38, 254 MLD, out of which only 11,787 MLD is being treated i.e. there is a capacity gap of 26, 467 MLD. Even the treatment capacity existing is also not effectively utilized due to operation and maintenance problem. Operation and maintenance of existing plants and sewage pumping stations is not satisfactory, as nearly 39% plants are not conforming to the general standards prescribed under the Environmental (Protection) Rules.

Thus, urgent attention is required of all concerned in this regard because if wastewater is not collected and treated properly, it will create directly contribution to the locally available freshwater supplies. Additionally, the cumulative results of untreated wastewater can have broad degenerative effects on both public health and ecosystem.

3. Antibacterial Evaluation of Selected Indigenous Medicinal Plants Against *Streptococcus Pneumoniae*

Radha Vaddavalli* and Dr. G. Bagyanarayana

Department of Botany, Osmania University,
Hyderabad 500 007.
E. mail : vradhika2005@gmail.com.

Keywords : *Antibiotics, Medicinal plants, Streptococcus pneumoniae*

Bacterial pneumonia is one of the four major killing disease world-wide. Pneumococcal disease are killing 140,000 Indian children under five age every year.

Due to antibiotic resistance in *Streptococcus pneumoniae* has been increasing quickly in recent years, and it is obviously urgent to discover new types of antibiotics from natural sources. In order to find new antipneumococcal extracts, an ethanobotanical survey has been conducted in different regions. Based on Auryeda practitioners *Acacia polyacantha, Boerhaavia diffusa, Colius forskholi, Evolvulus alsinoides, Garuga pinnata* are tested against *Streptococcus pneumoniae*. Antibacterial activities of the aqueous extracts of five plants were screened against penicillin-resistant *Streptococcus pneumoniae*. A significant activity has been observed with aqueous extracts of three plants; *Colius forskholi, Evolvulus alsinoides, Garuga pinnata.*

4. Study of the Exhaust Gases from Different Fuel Based Vehicles for Carbonyls and Methane Emissions

R. C. Saxena*, Anjana Kumari V. and Meetu Puri

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

In recent years, the automobiles are the major contributor to the overall pollution in the country. Carbonyl emissions from the vehicle exhaust causes pollution as well as various types of health hazards and material damages etc. Central Pollution Control Board (CPCB) carried out detailed study to evaluate and characterize carbonyls and methane emissions from different category of vehicle exhaust using various fuels. The paper contains the study details from selection of the vehicles, methodology, findings and the recommendations for control of carbonyls and methane emissions.

5. Status of the Vehicular Pollution Control Programme in India

R. S. Mahwar*, J. S. Kamyotra and S. P. Gautam

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

The growing cities, sharp increasing traffic, trajectory growth, rapid economic development and industrialization, and higher levels of energy consumption has

resulted an increase of pollution load in the urban environment. It is also accepted that automobiles have emerged as a critical source of urban air pollution specially in the developing world. Realizing the gravity of the problem, steps are being taken to introduce better technologies, better fuel quality, shift to environment friendly fuels, and mass transit system for the control of environmental pollution in urban areas.

The Central and State Governments in India have been developing strategies for mitigation measures to improve the urban air quality and make the cities cleaner and greener. Over the past decade or so, the Government of India has notified statutes aimed at regulating and monitoring vehicular emissions across the country.

The paper presents a review of the vehicular emission problems in Indian cities, the various developments that have taken place in the past including the studies conducted for assessment of the air quality in cities, the legislation and standards adopted for the control of vehicle emissions, the role of the various concerned agencies, the steps taken for improvement in the quality of the automotive fuel, the overall impact of these measures and the future strategy to be adopted for vehicular emission reduction and related issues.

6. Environmental issues involved in recycling of used vehicles

Anjana Kumari V*, R. C. Saxena and R.S. Mahwar

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

There are about 7.22 (2004) million in use vehicles in the country and the country's annual production is about 11.18 (2008) million. There is no mandatory end of life for vehicles (ELV) in India. The existing legislation only requires the removal of 15 years old commercial vehicles in certain cities. The vehicles have parts made of different materials which vary from vehicle to vehicle depending on there make and even from model to model. These materials include right from ferrous and toxic metals to synthetic organic materials such as plastics. The recycling/disposal of the vehicles is therefore required to be done in an environmentally sound manner ensuring maximum recovery/reuse/recycle and generation of minimum residues to be disposed in a safe manner. The paper presents the review of environmental issues involved in recycling of used vehicles.

7. Isolation of bacteriophages from sewage for removal of human pathogens from water and waste waters

Khadija Banu, Shilpi Yadav, Deepesh Valsan and Pratima Akolkar

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

Keywords : *Bacteriophage, Pathogens, Viruses, Sewage.*

Presence of human pathogens in water and waste waters is a public health concern. Monitoring of Total Coliforms as an indicator of human pathogen may not be adequate to indicate the presence of pathogens and viruses from water and wastewaters. Compared to detection of human enteric viruses in water and waste waters, baceriophage assays were found relatively inexpensive, easy to perform and provided overnight results. Present study deals with the isolation of baceriophages which specifically infected *E. coli*, *Klebsiella, Salmonella, Pseudomonas* and *Vibrio* from sewage. Potential of these phages may be applied for treatment of sewage and ultimate removal of human pathogens from surface waters.

8. Water Quality of A Fresh Water Pond : Chandra Sarovar, Jhalawar

Dr. Prahlad Dube

Biodiversity Research Laboratory,
Department of Zoology, Government College,
Kota, Rajasthan.
Email : dube_prahlad@rediffmail.com

Keywords : *Seasonal variations, physico-chemical parameters, biological characteristics*

Water is considered to be prime necessity of living beings. The importance of fresh water resources and the pollution thereof had been studied and discussed a lot. The climatic factors and catchment area of the water body play an important role in determining the physico-chemical and biological characteristics of water. Jhalawar district is rich in both lentic and lotic water resources. It is a surprising that in spite of so many natural and manmade water resources; very few

benchmark ecological studies are available in scientific literature. Present investigation was aimed at fulfilling this gap and an attempt to generate baseline data about this pond.

Chandra Sarovar is a natural rain-fed pond that was later developed for various kinds of uses. It retains water almost through out the year, except in the drought conditions. Water level keeps on fluctuating and so the physico-chemical parameters and biological characteristics of water.

A total of 20 physico-chemical and biological characteristics of water were studied for a period of two years (2008-2010). Fortnightly collected samples were analysed and results were recorded. Diurnal, Monthly and Seasonal variations were also recorded. Statistical methods were applied to these data and correlation was found out.

9. Characteristic of Effluent of Soda Ash Industry and its Impact on Marine Water in India

Shri Dinabandhu Gouda and Shri Paritosh Kumar

PCI-I Division, Central Pollution Control Board,
East Arjun Nagar, Delhi-32
E-mail : dinabandhu.cpcb@nic.in

Keywords : *Spent brine solution, Suspended solids, Flora and fauna, surface outfall.*

Soda Ash forms an important part of Indian inorganic chemical industry. It is a high volume, low value product and finds application mainly in the production of detergents (40%), glass (25%), chemicals (17%), sodium silicate (11%), pulp & paper and water treatment. The process of brine purification produces effluent as spent brine solution containing clay, silt, sand, calcium and magnesium carbonate, magnesium sulfate and high content of sodium & calcium chloride. The effluent is generally mixed with adequate quantity of seawater to reduce the concentration of suspended solids (SS) and discharged in the sea. The effluent from soda ash industry being heavier than seawater, the best option is to release it through a surface outfall at a location where sufficient dilution is expected. The composition of final effluent indicate that parameters temperature, pH, SS, ammonia and

calcium in the receiving seawater and carbonate contents in sediment around the effluent disposal site has been influenced and can have adverse effects on flora and fauna particularly around the disposal site. The studies were conducted at four locations viz. Mithapur, Porbandar, Sutrapada and Bhavnagar where Tata Chemicals Ltd, Saurashtra Chemicals Ltd, Gujarat Heavy Chemical Ltd and Nirma Ltd, respectively release their effluents.

10. Environmental Issues of Railway Sidings Handling Industrial materials

G. Rambabu*, R. C. Saxena, R. S. Mahwar and J. S. Kamyotra.
Central Pollution Control Board,
Parivesh Bhawan,
East Arjun Nagar, Delhi

The environmental problems arise in railway sidings due to improper storage, collection, transportation and disposal of waste generated, noise pollution, air pollution (dust particles, fugitive emission), untimely operation etc. The materials most involved in the railway sidings are coal, ores, cement etc. The handling to such materials is invariably associated with fugitive emissions from the loading/unloading operations and all associated activities such as movements of trucks, workers etc. It is therefore necessary to develop guidelines for Environmental Management of pollution problems associated during loading and unloading operation at railway sidings. The paper presents a review of the environmental issues of railway sidings handling industrial materials which includes coal, ores, cement etc. The study will cover assessment of the environmental status of some Railway Sidings.

11. Chemical and Bacteriological Water Quality Status in Various Stretches of River Yamuna

Durgapal N. C., Ahuja G. K., Akolkar P. and Kamyotra J. S.
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi-110032

Keywords : *Yamuna River, Dissolved Oxygen, Biochemical Oxygen Demand, Total Coliform and Faecal Coliform*

The entire 1376 Km long Yamuna River from Yamunotri to Allahabad was monitored for chemical and bacteriological parameters during the year 2009 at 21 locations representing various river stretches. Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD) were observed in the range of 6.3- 11.6 mg/l and 1-2 mg/l respectively in the 157 Km. stretch from Yamunotri to Hathnikund barrage (Himalayan stretch). The Total Coliform (TC) and Faecal Coliform (FC) observed in this stretch were in the range of $161x10^2$ – $49x10^5$ Nos./100 ml and 400-$69x10^4$ Nos./100 ml respectively. The 210 km river stretch from Hathnikund barrage to Wazirabad barrage in Delhi (Upper stretch) was found almost dry except D/s Palla during the period April to September due to diversion of water into canals. The values of DO, BOD, TC and FC varied in this stretch between 4.1-11.1 mg/l, 1-7 mg/l, $25x10^3$-$33x10^6$ Nos./100 ml and 600- $83x10^4$ Nos./100 ml respectively. Further downstream in 22 km Delhi stretch between Wazirabad barrage to Okhla barrage the river was devoid of dissolve Oxygen having BOD level of 7-33 mg/l, TC $35x10^5$-$41x10^7$ Nos./100 ml and FC $33x10^4$-$179x10^5$ Nos./100 ml. In 557 km river stretch from Okhla barrage to Chambal River confluence (Mixed stretch) the values of DO, BOD, TC and FC varied between 0.0-17.9 mg/l, 3-32 mg/l, $70x10^3$- $175x10^6$ Nos./100 ml and $3x10^3$- $54x10^5$ Nos./100 ml respectively. In the last 416 Km Yamuna River stretch from Chambal River confluence till its confluence with river Ganga at Allahabad (Diluted stretch) the variations in the values of DO, BOD, TC and FC were 4.5-13.8 mg/l, 1-7 mg/l, $9x10^3$- $67x10^5$ Nos./100 ml and $2x10^3$-$134x10^4$ Nos./100 ml respectively. Study indicated that Delhi stretch of river is severely polluted.

12. Seasonal Variation in Biological Water Quality for Various Designated Best-uses of River Yamuna

Mamta Rani, Pratima Akolkar and H. S. Bhamrah

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi.

Keywords : *Bio-monitoring, Saprobic score, Diversity score, Biological water quality class.*

Bio-monitoring of River Yamuna was carried out from its origin to confluence to River Ganga using Saprobic score and Diversity score of benthic macro-

invertebrates, during October-November,2009 and May-June,2010. The biological water quality indicated Clean water quality Class'A' at Yamunotri and Hanumanchetty during summers and became slightly polluted in water quality Class'B' in winter season. The water quality at these locations may be used as drinking water source after disinfection and for Outdoor bathing. During summer water quality ranged between clean Class 'A' to moderately polluted Class 'C' at Dakpatthar where the river water is mostly used for irrigation and drinking water source of Western and Eastern Yamuna Canals. The biological water quality remained moderately polluted Class 'C'at Delhi (Palla), Mathura, Agra and Allahabad thus indicating its best use as drinking water source after conventional treatment.

13. Study of Ground Water Quality in Industrial Zone of Visakhapatnam

Sk. Rameeza[1*], V. N. V. Srikant[2], D. Mallikarjuna Rao[1] and Ch. Ramakrishna[1]

[1]Department of Environmental Studies,
GITAM University,
Visakhapatnam, A.P
[2]Department of Environmental Studies,
Nagarjuna University,
Guntur, A.P

Keywords : *Industrial area, Water samples and water quality.*

This paper presents quality of water samples from bore wells as well as open wells in and around the industrial zone of Visakhapatnam in order to find out the magnitude of health problems in industrial areas. The natural quality of ground water tends to be degraded by human activities. Ten groundwater samples collected from the study area were measured and mentioned. The study revealed that the water was slightly alkaline (PH: 6.5 – 8.5), moderately hard (TH: 64 – 292), and TDS values ranged from 380 – 1600 mg/l). The study was reported some other important parameters which exceeded the permissible limit and it is unsuitable for drinking purposes.

14. Salinity and Sodicity Problems in Arid and Semi arid Regions of Rajasthan Soils

C. S. Chouhan, K. C. Sharma[1], M. P. Punia[2] and K. K. Sharma[3]

Department of Applied Chemistry, Birla Institute of Technology,
Mesra (Ranchi) Extension Centre,
Jaipur-302017, Rajasthan
[1]Department of Environmental Studies,
Maharshi Dayanand Saraswati University,
Ajmer-305009, Rajasthan
[2]Remote Sensing Division,
Birla Institute of Technology, Mesra (Ranchi)
Extension Centre, Jaipur-302017
[3]Department of Soil Science and Agricultural Chemistry,
S.K.N. College, Jobner-303329, Jaipur, Rajasthan.
E-mail : drcschouhan@gmail.com

Keywords : *Salinity, Sodicity, Arid, Semi-arid, Rajasthan.*

Rajasthan comes in the driest state in the country. Geologically, soils of the state are varied in nature i.e. sandy, saline, alkaline and slightly calcareous. Sand fall is common phenomenon to the state when wind velocity is quite higher during summers. The state receives scanty precipitation. The annual rainfall is below 500mm and temperature reaches upto 46 ^{o}C. Due to extreme of temperature, high evaporative losses ultimately increasing the concentration of soluble salts in surface soils of arid and semi-arid regions of Rajasthan. The soil of the state is low in nutrient contents due to high aridity index. Soils of the state have high pH, electrical conductance, high Na and poor in organic carbon due to sparse vegetation and low biomass available to decomposition to the soil. In these regions, soils have high sodium absorption ratio (SAR) and exchangeable sodium percentage (ESP). Soil salinity adversely affects the agricultural productivity and vast amount of land is converted into barren fields. Generally, saline soils contain soluble salts viz. SO_4^{2-} and Cl^- while sodic soils have exchangeable Na^+ salts. These salts severely retarded the growth of plant as well as soil ecosystem.

15. Impact of Tannery Effluent on Ganga River at Kanpur (U.P.), India

S. D. Tiwari and S. Katiyar

Department of Biochemistry,
Institute of Bioscience and Biotechnology,
C S J M University,
Kanpur-208024

Keywords : *Conductivity, BOD, total solids, river Ganga, DO, summer season, monsoon season.*

The present study was undertaken to asses the quality of water in river Ganga important northern centre areas Kanpur. The water of Ganga suffer from encroachments, dumping and burning of wastes, and unchecked inflow of domestic and industrial effluents. The parameters studied were: colour, odour, temperature, pH, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, and alkalinity. Rapid development, increase in population of the cities and urbanization have resulted in the manifold increase in environmental pollution. The most affected are the water bodies which become highly polluted by industrial effluents. Dumping of solid chemical wastes in Jajmau is the major concern.

A water sample was collected from upstream (P) and downstream (S) of Ganga river along different points (P1 – S3). The river was found to be highly turbid in the monsoon season, but BOD & COD significantly increase in summer while inversely decrease in DO. Study shows that significant negative correlation between BOD & DO ($P<0.05$). The mean range of different parameter observed as conductivity 84-118μs; DO during summer 4.413 ± 0.275 mg/L, monsoon 7.04 ± 0.456 mg/L; BOD during summer 51.71 ± 11.51 mg/L, during monsoon 77.68 ± 7.34 mg/L ($P<0.05$) and TS in summer 1158 ± 155.64 mg/L, monsoon 1245.25 ± 197.23 mg/L. A model study was also conducted and values of different model parameters were estimated.

16. Characterization and Antimicrobial Activity of Silver Nanoparticles Synthesised from *Biophytum Sensitivum*

K. Pillai Raji*[1], Bishwajeet Singh Bhardwaj[2], Deep Punj[2], N. Chandramohanakumar[1] and M. Kailasnath[3]

[1]Rajiv Gandhi Chair in Contemporary Studies,
Cochin University of Science and Technology,
Cochin-682 022

[2]Centre of Excellence in Lasers and Optoelectronic Sciences,
Cochin University of Science and Technology,
Cochin-682 022

[3]International School of Photonics,
Cochin University of Science and Technology,
Cochin-682 022

Email : rajinayana@gmail.com

Keywords : *Bioreduction, silver nanoparticles, Biophytum sensitivum, antimicrobial.*

Biosynthesis of nanoparticles has received increased attention due to a growing need to develop environmentally benign technologies in material synthesis. The possibility of using plants in the deliberate synthesis of nanoparticles is a recent phenomenon. A green, low-cost, reproducible aqueous room temperature synthesis of silver nanoparticles using *Biophytum sensitivum* is investigated. The Ag nanoparticle synthesis is modulated by varying the pH of the reaction medium. The bioreduction of the Ag+ ions was monitored intermittently by measuring the UV-Vis spectra of the solution. The nanoparticles obtained were characterized by Field Emission Scanning Electron Microscopy (FE-SEM), Energy Dispersive Spectroscopy (EDS), X-ray diffraction (XRD), Photoluminescence (PL), Fourier Transform Infrared Spectroscopy (FTIR) and Transmission Electron Microscopy (TEM) techniques. Variation of pH of the reaction medium consisting of silver nitrate and *Biophytum sensitivum* leaf extract gave silver nanoparticles of different shapes and size.

The in vitro antimicrobial activity of the synthesised Ag nanoparticles against common human bacterial pathogens were investigated using Agar disc diffusion technique on Mueller Hinton agar media. Standard antibiotics were used as positive controls. The zone of inhibition of the growth of the bacteria is compared with the

standard antibiotics. Analysis of the Minimum Inhibitory Concentration (MIC) was done. A significant zone of inhibition was obtained against Gram positive and Gram negative organisms. Microbes are unlikely to develop resistance against silver, as they do against conventional and narrow target antibiotics because the metal attacks a broad range of targets in the organisms which means that they would have to develop a host of mutations simultaneously to protect themselves. Biological method of high-yield, fast, and low cost synthesis of silver nanostructures for potential biomedical applications is an eco-friendly alternative with immense potential.

17. Eia For Pollution Control Management at Hospital Morgues and Forensic Tox Lab

Babul Bandyopadhyay*, Suparna Dutta[1], Tapas Kumar Bose[2] and Sankar Sa[3]

*Department of Toxicology Forensic Science Laboratory
Calcutta-700037
[1]Department of Forensic & State Medicine SSKM Hospital
Calcutta-700020
[2]Department of Forensic & State Medicine NRS Medical College
Calcutta-700014
[3]Department of Instrument Central Food laboratory
Calcutta-700016

Keywords : *EIA, Toxicology, Autopsy, Morgue, Odor, Blood, HAZOP, Risk management.*

The strong, unpleasant body and chemical odors are offensive to the employees working at Morgues and Forensic Toxicology Laboratory. Unfortunately, most ventilation systems only re-circulate room air and remove large particulate matter such as dirt, dust, and lint. Noxious body and chemical odors are left free to re-circulate in the air one breathes. Increase in concentration and result in serious indoor air pollution problems e.g. sick building syndrome. The prime objective of the present communication is to assess the environmental impact and heath risk hazard for ensuring as safety measures and pollution free atmosphere for the employees concerned. The Post Mortem and related Toxicology examination

has exposed to a wide variety of infectious agents, including blood borne and aerosolized pathogens - viruses, and Mycobacterium tuberculosis. The continuous exposure of employees in the unusual and polluted atmosphere of toxic and irritably odorous substances enhances the possibility and can lead some adverse health effects and diseases. The risk hazards must be substantially mitigated appropriately. It strictly points out the essential need for Environment Impact Assessment for pollution control management at Hospital Morgues and Forensic Toxicology Laboratory. The discharges of the labs and morgues are to be monitored with equal attention. The risk is always high and especially for those who are highly susceptible and/or highly exposed. The environment exposure for long days in service through different pathways of air, water etc. are awfully bad and frequent contamination of ground water, soil etc. lead to the life at risk. The experimental levels of metals, organic matters, wastes, bacterial and viral infections in the existing system can ensure ultimate harm to health and acute environmental hazards. It can be well checked to a reduced extent in proper designing of EIA control and Management.

18. Analysis & Treatment of Domestic Waste Water

Mr. S. T. Yerule*, Ms. V. A. Bhavsar and Ms. S. M. Patil

Department of Biotechnology, COCSIT College,
Latur, Maharashtra

Keywords : *Domestic water, Activated charcoal, sand bed filter.*

Water is the most vital source of all kinds of life on the earth. Quality of water is adversely affected both qualitatively and quantitatively by all kinds of human activities. So this views the current investigation on analysis & treatment of domestic effluent. The domestic water is analyzed by determining their physico-chemical properties & micro flora which is present in it. The physic-chemical parameters i.e. TS, TDS, BOD, COD, DO & alkalinity analyzed before & after treatment of domestic wastewater. For the treatment primary, secondary & tertiary methods are preferred. In secondary method sand Bed filter 7 activated charcoal filters is used. In the result it is found that after treatment the value of physic-chemical parameter get lowered.

19. Effect of Sodium Fluoride on Growth of Parent and Mutant Strains of Cyanobacteria

Surendra Singh[1] and Archna Tirkey[2]

[1,2]Algal Biotechnology laboratory, Dept. of Biological Sciences,
R.D.V.V., Jabalpur (M.P.)
Email : ID- singhbiosci@yahoo.co.in – archnatirkey2000@gmail.com

In the present investigation the toxicity of NaF in different cyanobacteria was studied. The cyanobacterial strains used were *Anabaena variabilis* (wild type and MHR), *Spirulina platensis* (Parent and Na- resistant strains) and *Nostoc muscorum*. The results showed that in *Anabaena variabilis* (wild type) 35mM, 40mM and 45mM concentration of NaF proved to be lethal (measured in terms of Chlorophyll a content) on 4^{th} day whereas 25mM and 30mM proved to be lethal on 8^{th} day. In case of MHR, the survivability of strain was observed upto 8^{th} day in 30mM, 35mM, 40mM and 45mM concentration of NaF. *Nostoc muscorum* survived upto 4^{th} day in30mM, 35mM, 40mM and 45mM concentration of NaF and 25mM was lethal at 12^{th} day. On the contrary, NaF (upto 45mM concentration) showed no effect on the growth *Spirulina platensis*(wild type and Na-resistant strain).

20. Arsenic Groundwater Contamination in Ballia (U.P.), India

Anupam Porwal, Shridhar Tiwari and S. Katiyar

Department of Biochemistry,
Institute of Bioscience and Biotechnology,
C. S. J. M. University, Kanpur-208024.

Keywords : *arsenic, Ganga river, drinking water, health*

This article is results of our survey on groundwater arsenic contamination in districts Ballia of Uttar Pradesh (UP) in the upstream and downstream of Ganga plain, India. Analyses of 50 well/handpump water samples revealed that arsenic concentrations in 73% exceeded 10 ìg/L, while rest of samples have arsenic level more than 45 ìg/L limits.The age of wells and handpump ranged from more than a year to 22 years, with an average of 5.4 years. Our study shows that older wells

and handpump had a greater chance of contamination. The depth of well and handpump was the major cause of contamination which varied from 5 to 20 m with a mean of 30.5 m. Present study shows the major region of arsenic contamination with reference to Gangatic plain.

21. Microbial Biotechnology for Composting of Municipal Solid Waste Generated from Jabalpur

[1]S. P. Gautam, [2]P. S. Bundela, [3]A. K. Pandey, [2]M. K. Awasthi and [2]S. Sarsaiya

[1]Chairman, Central Pollution Control Board,
New Delhi.
[2]Regional office M.P. Pollution Control Board,
Vijay Nagar Jabalpur (M.P.)
[3]Chairman, Private University Regulatory Commission,
Bhoj University Campus,
Kolar Road Bhopal (M.P.)

Keywords : *composting, consortium, toxicants, phytotoxicity, municipal solid waste.*

The aim of this works was to develop microbial technology for hastening the composting process by optimization of biochemical and biological parameters. The microbial community played a major role in effective degradation of complex molecules, helped in the amelioration of toxicants and quickened the period of composting. The widely followed methods of turned windrow system of composting of organic solid waste have solved the problem of bioerosol, odour and flies affecting the environment. Hence the turned windrow system of composting using microbial consortium was attempt and found to be effective for Jabalpur municipal solid waste. The present study was conducted at ranital trenching site and materials collected from eight different zone of Jabalpur city. During the composting process the microbial community structure belonged to mesophilic bacteria, spore forming bacteria, thermophilic bacteria, cellulolytic fungi Actinomycetes. The population dynamics in relation to physicochemical parameters were studied and temperature 60-70^{o}C, pH 6.5-7.5, moisture 50-60% maintain throughout the composting process in turned windrows. The studies on the environment impact of composting process showed that heavy metals contained were reduced after composting as compared

to other methods. To judge the compost maturity the phytotoxicity test using different seeds was conducted. The study indicated that compost is a good soil conditioner. The management of microbial community structure and the use of microbial consortium proved to be a viable technology in reducing the period of composting and handling the composting of municipal solid waste.

22. Cellulase Production by Dominant Fungi Isolated from Municipal Solid Waste Compost

S. P. Gautam[1], P. S. Bundela[2], A. K. Pandey[3], M. K. Awasthi[2] and S. Sarsaiya[2*]

[1]Central Pollution Control Board,
New Delhi
[2]Regional office, M.P. Pollution Control Board,
Vijay Nagar, Jabalpur (M.P.)
[3]Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University, Jabalpur (M.P.)

Keywords : *Fungi, cellulases, carbon source, cellulose*

Proper biotechnological utilization of municipal solid waste in the environment will eliminate pollution and convert them into useful by products. This situation has urged the technologies and studies various alternative technologies by microbial enzymes. The production of Cellulases (Filter paper activity, endoglucanase and â-glucanase) by dominant fungi like *Aspergillus niger, A. fumigatus, A. nidulans* and *A. flavus* on basal salt medium containing 1% CMC were compared. In the present study, *A. niger* isolated from municipal solid waste compost were produce significant amount of cellulases (1.861 FPase, 1.146 CMCase and 1.382 â-glucosidase in U/ml) while *A. fumigatus* and *A. nidulans* produce 2.248 FPase, 1.084 CMCase, 1.254 â-glucosidase and 1.743 FPase, 0.985 CMCase, 1.136 â-glucosidase respectively. Enzyme produced by *A. flavus was* 0.643 FPase, 0.432 CMCase and 0.662 â-glucosidase. The cellulase enzyme activity of *A. niger* was further tested by using different concentration of carbon sources. The results indicate that 1-1.5% CMC and 1% cellulose & glucose were effective as the carbon sources respectively. The cellulosic waste material can be used as low-cost carbon source for commercial cellulose production.

23. Does any Variation in Distribution Pattern of Mangroves Indicate Global Climate Change?

Punarbasu Chaudhuri

Department of Environmental Science,
University of Calcutta, 51/2,Hazra Road,
Kolkata-70019
Email : punarbasu_c@yahoo.com

Keywords : *Mangrove, Sundarban, Sonneratia caseolaris, Climate change*

A survey was conducted to find out the change in distribution pattern of mangroves along the upper starches of river Hooghly. In this survey it was observed that mangroves were growing naturally on non-saline soil near Kolkata along the banks of the river Hooghly. The chances of natural occurrence of mangroves near Kolkata is very low due to the long distance from Sundarban mangrove forest and fresh water regime of the river Hooghly, though it was reported that mangroves were present in Kolkata during the formation of the city (nearly 320 years ago). Such naturally grown mangrove first noticed by the author near Millennium Park of Kolkata (22°34.224'N, 88°20.565'E), which was a large *Sonneratia caseolaris* [L.] Engler, belonging to the family Sonneraticeae. Another mature tree of the same species was found at Panihati (22°42.192'N, 88°21.944'E), North 24 Parganas, which was situated further 20 km. North of Kolkata. No such tree was found beyond the upstream of this locality. Twenty nine mature trees of the same species with differential growth patterns were also found at different places of the upper stretch of the river Hooghly, starting from the confluence of the river Hooghly and Damodar in the south to Panihati in the north. Though it is reported that *Sonneratia caseolaris* grows in low saline regions but it is interesting that here this plants are growing in fresh water regime. Numerous mangrove associated species (*Derris trifolia*, *Cryptocoryne ciliata*, *Acanthus illicifolius* etc.) were also found sporadically throughout this stretch of the river Hooghly. As a part of this study, salinity, pH of water and salinity, pH and organic carbon content of soil of different locations were determined. In comparison with the previous data the salinity of the water has not been changing significantly in the last two decades. All the places where these plants are observed the salinity is found to be very less in comparison to mangrove habitat. Some experts are asserting that occurrence of these mangroves at and around Kolkata is an indicator of salinity rise

in the river Hooghly which is caused by global warming. However the results obtained so far from this study does not agree with this school of thought; it can only be concluded after the completion of this study. Occurrence of mangrove species in fresh water regime may add certain new directions regarding mangrove adaptations and dispersion ecology associated with the global climate change phenomenon.

24. An Assessment of Biocontrol Potentiality of Mangrove Plants of Indian Sundarban Against Plant Pathogenic Fungi

Punarbasu Chaudhuri

Department of Environmental Science,
University of Calcutta, 51/2,Hazra Road,
Kolkata-19
E-mail : punarbasu_c@yahoo.com

Keywords : *Mangrove plant, Fusarium oxysporum. Biocontrol*

The objective of the present study was to assess the biocontrol potentiality of a few mangrove plants of Indian Sundarban. Leaf, bark, root and reproductive parts of *Bruguiera gymnorrhiza, Rhizophora apiculata, Acanthus ilicifolius, Acrostichum aureum, Aegialitis rotundifolia, Excoecaria agallocha, Aegiceras corniculatum, Phoenix paludosa, Heritiera fomes, Nypa fruticans, Avicennia officinalis, Ceriops decandra* and *Sonneratia caseolaris* were collected and extracted by using eight different solvents namely water, ethanol, acetone, dimethyl sulfoxide, chloroform, petroleum ether, benzene and hexane. A standard plant pathogenic fungi *Fusarium oxysporum* (MTCC No.-284) was procured from Microbial Type Collection Center (MTCC) of Institute of Microbial Technology, Chandigarh for this study. Biocontrol properties was determined by using disc-assay method. Out of the 13 selected mangroves, 12 plant extracts had fungicidal properties against this pathogen. Leaf extracts showed the highest activity followed by bark, root and fruit. Ethanol and acetone were found most effective among the 8 selected solvents. *Ceriops decandra, Heritiera fomes, Nypa fruticans, Bruguiera gymnorrhiza, Aegiceras corniculatum* and *Phoenix paludosa* were found most potential plant species for biocontrol of the test pathogen.

25. Effect of Cellulose and Carboxymethyl Cellulose on Production of Cellulases by *Aspergillus Niger*

S. P. Gautam[1], P. S. Bundela[2], A. K. Pandey[3], M. K. Awasthi[2] and S. Sarsaiya[2*]

[1]Central Pollution Control Board, New Delhi
[2]Regional office,
M.P. Pollution Control Board, Vijay Nagar
Jabalpur (M.P.)
E-mail : surendra_sarsaiya@yahoo.co.in
[3]Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University, Jabalpur (M.P.)

Keywords : *Aspergillus niger*, cellulases, carbon source, cellulose.

Proper biotechnological utilization of municipal solid waste in the environment will eliminate pollution and convert them into useful by products. This situation has urged the technologies and studies various alternative technologies by microbial enzymes. The production of Cellulases (Filter paper activity, endoglucanase and â-glucanase) by *Aspergillus niger* on two different carbon sources were compared. Carboxymethyl cellulose containing media gave the highest mycelia weight of 1.294 mg/flask. Maximum Cellulase enzyme activity (Filter paper activity, endoglucanase and â-glucanase) were obtained from the culture containing carboxymethyl cellulose then cellulose. The waste cellulosic material can be used as low-cost carbon source for commercial cellulose production.

26. Studies on Municipal Solid Waste Management in Jabalpur City-A Case Study

S. P. Gautam[1], P. S. Bundela[2], A. K. Pandey[3] and R. K. Mishra

[1]Central Pollution Control Board, New Delhi
[2]Regional office, M.P. Pollution Control Board,
Vijay Nagar, Jabalpur (M.P.)
[3]Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University, Jabalpur (M.P.)

Keywords : *Municipal solid waste, disposal, Storage*

Solid waste management is a worldwide phenomenon. The present scenario of municipal solid waste management (MSWM) in four study countries of Asia – namely India, China, Sri Lanka and Thailand is highlighted comparing technical, economic, legal and, health issues. It is a big challenge all over the world for human beings. The problem of municipal solid waste management (MSWM) is also prevailing in the urban environment of Jabalpur. Therefore the present study was taken to find out the problems and prospects of Municipal solid waste in Jabalpur city. A detailed investigation was made regarding the methods of practices associated with sources, quantity generated, collection, transportation, storage, treatment and disposal of municipal solid waste in Jabalpur city. The data concerning to municipal solid waste in Jabalpur was obtained through individual field visit, interacting with people and authentic record of municipal corporation and Regional office M.P. Pollution Control Board, Jabalpur. Photographic evidences were also made about generation, storage, collection, transportation, treatment and disposal of MSW. This study reveals that the present system of municipal solid waste management in Jabalpur city was satisfactory.

27. Analysis & Treatment of Industrial Waste Water

S. D. Mahajan*, P. B. Patil, G. V. Naiknaware,
Ms. S. D. Gaikwad and Ms. V. A. Bhavsar
Department of Biotechnology, COCSIT College,
Latur, Maharashtra

Keywords : *Industrial water, Activated charcoal, sand bed filter.*

Water is the most vital source of all kinds of life on the earth. Quality of water is adversely affected both qualitatively and quantitatively by all kinds of human activities. So this view the current investigation on analysis & treatment of industrial effluent. The industrial water is analyzed by determining their physic-chemical properties & micro flora which is present in it. The physico-chemical parameters i.e. TS, TDS, BOD, COD, DO & alkalinity analyzed before & after treatment of industrial wastewater. For the treatment primary, secondary & tertiary methods are

preferred. In secondary method sand Bed filter 7 activated charcoal filter is used. In the result it is found that after treatment the value of physic-chemical parameter get lowered.

28. Impact of Mass Bathing on Water Quality of Shiv Sagar Pond, Khajuraho M.P.

L. N. Gupta, J. S. Parihar*, S. P. Parihar and G. S. Gupta**

Pollution Research Laboratory,
Department of Energy & Environment,
Faculty of Science & Environment,
Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya,
Chitrakoot-485 780, Satna, M.P.
E-mail : lnchitrakoot@gmail.com.
Department of Chemistry* and Botany**
Govt. Maharaja Autonomous P.G. College,
Chhatarpur-471 001, M.P.

Keywords : *Shiv Sagar pond, Mass bathing, Auspicious days, BOD, COD*

The present study, monitoring of water quality of Shiv Sagar pond, Khajuraho was carried out to assess the impact of mass bathing. Shiv Sagar pond is situated at distance of 9 Km from Khajuraho railway station in south direction. The total catchments area of pond was $75x\ 10^2$ square kilometer. Monitoring was performed on various occasions of mass bathing viz. Deepawali, Amavasya, Makar Sankranti, Maha Shivratri, etc. The parameters investigated were temperature, colour, odour, turbidity, transparency, pH, conductivity, total solids, dissolved solids, suspended solids, total hardness, calcium hardness, magnesium hardness, calcium , magnesium, chloride, sulphate, nitrate, DO, BOD, COD, and total coliform. Values of BOD, COD, and total coliform. values exceeded from their permissible limits prescribed by CPCB, BIS and WHO. High values of above parameters were noticed due to the religious offering of various goods i.e flowers, milk, wheat, rice, ghee, oil, flour, etc. in the pond by the large number of pilgrims or devotees. Except BOD, COD, and total coliform, values of all above parameters were found within their permissible limits.

29. The changes in the biochemical and microbiological parameters of tolly nullah in the pre and post metro constructional work

Ayantika Bhattacharjee, Debanjan Mukherjee, Sayantan Goswami*, Soham Bagchi, Richa Mishra, Avika Roy and Sudeshna Shyam Choudhury**

Department of Microbiology,
St. Xavier's College 30, Park Street,
Kolkata-700016, West Bengal.
E-mail : *mail2rip@gmail.com
E-mail : **mantul2000@rediffmail.com

Keywords : *Tolly-Nullah, Metro, Metal, MPN test, IMViC test*

Kolkata, one of the densest cities of India, has only 6% -7% of its land used for vehicular transit. With a view of overcoming the traffic snarls the Government of India and the State Government of West Bengal introduced Metro services in 1984. The existing Dumdum-Tollygunge stretch had been recently extended southwards of Tollygunge till Garia, the extended lines having being built on overhead bridge over the Tolly-Nullah, a canal in the heart of the southern fringe of the city. This project was undertaken to have a comparative study of the water quality of the Tolly-Nullah prior to Metro construction and after it. The sample collected from the waters of the Tolly-Nullah prior to the construction was subjected to colony characterization and IMViC tests resulting in the isolation of- *Enterobacter* spp., *Escherichia* spp., *Klebsiella* spp. and *Aeromonas*_spp. Coliform content was found out by MPN test giving a coliform index of 1600/100 ml. Metal quantification was done by SGS INDIA Pvt. Ltd. Reports showed Cadmium (dissolved) (<0.005mg/l), Chromium (<0.01mg/l), Lead (0.01mg/l), Mercury (<0.001mg/l), Nickel (<0.01mg/l), Zinc (0.07mg/l).

After the construction a new sample was taken and analyzed to give five colonies- *Escherichia* spp., *Enterobacter* spp., *Actinomycetes* spp., *Klebsiella* spp., *Bacillus* spp. The MPN index came out to be 2400/100ml. Metal concentration showed changes with respect to Lead (0.04mg/l), Chromium (0.01mg/l), Zinc (0.1mg/l). The increase in the amount of lead, chromium and zinc refers to the extensive constructional work involving eradication of the local pre-existing slums, digging of the bed-soil, setting up of steel-iron pillars. It involved huge amount of

machineries, steel, iron, zinc alloys. One-third of the pillar remains under water from were there can be metal release into the water. Free chromium metal is not found in water as most water has chromium as a salt. So the increase in chromium can also be traced to the Metro construction. The arrival of some new species of soil-bacteria in the water may be due to extensive digging of soil and addition of huge amount of sludge. In future this site can act as a natural bio-remedial site due to the evolution of newer bacteria which in future may also show metal tolerance.

30. Isolation and Characterization of Plant Growth Promoting Rhizobacteria from Rhizosphere of Some Medicinal Plants

D. Malleswari and G. Bagyanarayana

Department of Botany, Osmania University,
Hyderabad-500 007
E-Mail : malleswari.d@gmail.com

Plant growth promoting rhizobacteria (PGPR) commonly inhabit rhizosphere of plants and enhance plant growth by exerting beneficial effects through production and release of metabolites. In the present study, a total of 102 bacterial isolates were obtained from the rhizosphere of some medicinal plants viz, *Coleus forskohlii, Andrographis paniculata, Withania somnifera, Ocimum sanctum, Aloe vera* and *Tagetes erecta* grown in the gardens at Osmania University and at Central Institute of Medicinal and Aromatic Plants (CIMAP) centre Hyderabad, India. All the isolates were screened for their plant growth promoting activities (PGP) viz, ammonia production, indole acetic acid (IAA) production, phosphate solubilization, HCN production, and antifungal activity. The results showed the bacterial isolates to differ in the levels of PGP activities. The range of percentage of positive isolates for each of PGP activities varied greatly : 96 (94%) isolates showed ammonia production, 27 (29.4%) isolates for IAA production, 51(50%) isolates for HCN production, 27 (26.4%) for phosphate solubilization and 27 (26.4%) isolates for antifungal activity against *Macrophomina phaseolina.* Only 38 isolates were selected as the best and were further tested for the production of chitinase and cellulase enzymes and subjected to seed germination tests. In seed germination tests, all these 38 bacterial isolates showed enhancement of growth promotion in sorghum, green gram and maize.

31. Mitigating Membrane Fouling by Understanding Feed Water Characteristics and Evaluating Coagulation Pretreatment

S. Kumaravel*, A. Anitha and D. Venkatesan****

*Former researcher at University of Duisburg-Essen,
Germany and currently Asst. Prof at the
Department of Chemical Engineering,
Sathyabama University, Chennai.
E-mail : kumars.post@gmail.com
**Asst. Prof, Department of Chemical Engineering,
Sathyabama University, Chennai

Keywords : *Water treatment–membranes– fouling – natural organic matter – pre-treatment - coagulation/flocculation*

In both, industrialized and developing countries, there is growing concern about the ability of traditional drinking water supply systems and existing technologies to cope with present and future demands and threats. Water supply in India faces opportunities as well as challenges promoting the application of advanced treatment technologies such as membrane filtration. Membranes are at the center stage these days when it comes to separation of materials and the use of membrane technology has been growing rapidly during the last few decades. This technology can improve drinking water quality and tackle pollutants of concern such as disinfection by-product precursors or trace organics. Membrane treatment of natural water (surface/sea water) to produce potable/process water and of wastewater for safe disposal is growing at a drastic rate owing to advantages like low energy consumption, no use of harsh chemicals, ease of use and maintenance. Hence it is seen as a sustainable step into the future.

Organic fouling has been identified as the most complicated problem facing MF/UF operations, due to its irreversible nature and difficulties with the cleaning procedure. It also initiates and supports bio-fouling of NF/RO as the organic foulants in the feed water are readily available as nutrients for microbial growth. So a clear understanding of the organic fouling is decisive for improving MF/UF operation performance; not only in the production of potable water from direct treatment of surface water, but also in the pre-treatment line prior to sea water reverse osmosis. Fouling on polymeric membranes is largely dependent on the nature and concentration of organic substances (TOC) in water. Different fractions

of the organic matrix have fairly different fouling tendencies. This paper describes the steps involved in the development and validation of a laboratory-scale unit to obtain water samples with different DOC-fractions with a volume sufficiently high to carry out further experiments on polymeric membranes to test fouling potential and mechanism of organic fractions of different particle/molecular size in natural surface water, and additionally help evaluate use of pre-treatment by coagulation/ flocculation to curtail irreversible organic fouling and provide steady membrane performance. Results indicated that the fractions produced have fairly different fouling potentials on UF/MF submerged capillary polymeric membranes and the influence of coagulation pre-treatment on minimising fouling is also quite different for the different fractions.

32. Estimation of Chromium Tolerance and Uptake by Bacteria Isolated from Rhizosphere of *Lemna* Growing in East Kolkata Wetland

Kaustuv Mukherjee, Sambita Modak, Shilajit Das, Snigdha Bhowmick, Arindam Ray, Sayantan Ghosh and Riddhi Majumder*

Department of Microbiology, St. Xavier's College,
30 Mother Teresa Sarani,
Kolkata-700016. West Bengal.*
E-mail : riddhimajumder@gmail.com

Keywords : *East Kolkata Wetlands, effluent treatment, Chromium uptake, bioremediation, Lemna.*

East Kolkata Wetland is a vast tract of salt-clan having direct connection with the Bay of Bengal. The presence of tanneries near the East Kolkata Wetlands has resulted in the release of chromium, chloride and sulfate rich effluent into these water bodies. Interestingly, a unique consortium of microbes and plants including hydrophytes like *Lemna* is abundant here. To elucidate their high tolerance levels, microbes associated with the rhizosphere of *Lemna* were studied. Three bacteria, isolated and characterized based on Gram's staining, colony formation patterns and enzyme assays, showed increased uptake of chromium indicating a possible role in the removal of chromium from the rhizosphere of plants. Thus, the consortium of microbes found here act as scavengers having increased potency for bioremediation, and along with *Lemna*, can be used for efficient rhizoremediation of effluents in waste-water treatment plants.

33. Short Term Variation in Air Quality Associated with Fire Work Events : A Case Study in Kolkata

R. Saha, S. Ekka, A. K. Naskar, K. N. Nandi, A. Rafique, A. Dubey, D. P. Mukhopadhyay and A. Chattopadhyay.

Central Pollution Control Board,
Kolkata

The effect of fireworks on air quality was assessed from the ambient concentrations of various air pollutants (SO_2, NO_2 & PM_{10}) during Diwali Festival in Kolkata City from 2006 to 2009. The extensive use of fireworks was found to be related to short term variation in air quality. During the festival, the concentration of SO_2 was observed to be increased 4 folds at few sites, whereas the concentration of NO_2, PM_{10} increased 3 folds compared to the data collected on a typical winter day in December. The maximum NO_2 concentration was observed a day after the festival. The diurnal pattern of the above pollutants showed a slight increase in the night. The levels of these pollutants observed during Diwali were found to be moderately high, which can be associated with serious health impact.

34. Assessment of *Acacia Auriculiformis* Hybrids for Raising Energy Plantations in Arid Lands

R. Anandalakshmi*, N. Krishna Kumar and V. K. W. Bachpai

Institute of Forest Genetics and tree Breeding, Coimbatore

Keywords : *Acacia auriculiformis, fuelwood, energy, firewood value index, calorific value*

India is one among the fast developing countries facing scarcity of energy resources and the demand is likely to increase exponentially in the years to come. Despite energy from fossil fuels, green energy sources in the form of biofuel and fuel wood can contribute substantially to combat the increasing energy crisis. Fuel wood from energy plantations not only meet wood energy needs

without affecting agricultural lands but also help green and enrich our waste and unproductive lands. Hence the suitability *Acacia auriculiformis x Acacia mangium* hybrids (*A. auriculiformis* hybrids) for raising large scale energy plantations on poor, arid lands was tested. Individual trees were selected based on growth performance from a two years and four months old trial of *A. auriculiformis* hybrid raised in 1 ha area at Forest Research Station, Vilamundi, Tamil Nadu and evaluated for their fuelwood characteristics. Comparison among the selected hybrid trees showed that tree 2 ranked first with the highest firewood value index (FVI) (207393), lowest ash content (1.85%), highest wood density (0.46 g/cc) and highest calorific value of (28.59 KJ/g). It could also be drawn that selecting hybrids of *A. auriculiformis* from harsh environments which exhibit good performance could be viable strategy for raising energy plantations in arid lands.

35. Biosorption of Selenate using an Agro-industrial Residue

D. Ranjan*, S. H. Hasan

Water Pollution Research Laboratory,
Department of Applied Chemistry,
Institute of Technology, Banaras Hindu University,
Varanasi-221 005 (U.P.),
E-mail : deeksha.ranjan.rs.apc@itbhu.ac.in

Keywords : *Selenium; biosorption; wheat bran; isotherm, thermodynamics; kinetics.*

Present study utilizes wheat bran for biosorption of selenate. Effect of various parameters (pH, temperature, initial metal ion concentration and biomass dose) was extensively investigated on uptake of metal ion. Langmuir, Freundlich and Dubinin-Radushkevich (D-R) isotherm models were applied and all three isotherms fitted well to sorption data. Maximum sorption capacity of wheat bran was found 80.65 ?g/g at 20 °C and pH 2.0. Thermodynamic study revealed sorption to be feasible, spontaneous and exothermic. Pseudo-second order kinetic models fitted well to kinetic data in comparison to pseudo-first-order and both surface adsorption as well as intraparticle diffusion contributed to the rate determining step.

36. Spatial And Temporal Analysis of Rainfall Variations in Tiruchirappalli District, Tamil Nadu

Dr. V. Emayavaramban and C. Ranganathan

Postgraduate Department of Geography,
Periyar EVR College, Autonomous
Tiruchirappalli

Keywords : *Rainfall, monsoon, convection, average, district*

This paper presents the spatial and temporal characteristics of Tiruchirappalli district's rainfall data in the context of climatic variability. Basic data consists of the monthly rainfall totals from 21 stations with a record length of 15 years, during the period 1995–2009. Basic elements of the rainfall climatology have been examined and then normalized rainfall anomaly series have been analysed for long-term trend and fluctuation and changes in runs of dry and wet years, for all of Tiruchirappalli district, rainfall regime regions, and individual stations. Tiruchirappalli district lies in the interior of Tamil Nadu, its climate is hot and dry. The annual mean maximum temperature is 37^{o} C and the mean minimum temperature in 26^{o} C. April and May are the hottest months in the year. The mean annual humidity is 72%. The air is generally dampest in the later half of October and driest in the later half of June. The mean annual rainfall of Tiruchirappalli district is 14993mm. The rainfall is in certain and the major portion of it falls in the months of September, October and November during the north-east monsoon. Rainfall is less during the south-west monsoon. The study area receives convectional rainfall significantly in April and May. Among the 21 stations in the district, Lalgudi gets high amount of rainfall and its average annual fall is 1017.31mm. Tiruchy town and Manapparai are the second and third places to get significant amount of rainfall. Before the year 2004 rainfall recorded in 21 stations, from 2005 it has been recorded in 26 stations.

Tiruchirappalli district is located at the Central part of Tamil Nadu surrounded by Perambalur district in the North, Pudukkotai district in the South, Karur and Dindigul districts in West and Thanjavur district in the East. It lies between 10^{o} 10' and 11^{o}20' of the northern latitude and 78^{o} 10' and 79^{o} 0' of eastern latitude in the centre part of the Tamil Nadu. The general slope of the district is towards east.

37. Mathematical Assessment of Drinking Water Quality and Effect of Monsoon at Moradabad, Uttar Pradesh (India)

Gaurav Kumar Rastogi[1*] and D.K.Sinha[2]

[1]Assistant Professor, Department of Applied Sciences & Humanities,
Sunderdeep Engineering College,
Ghaziabad-201001(U.P.)
Email : gauravsdec@rediff.com.
[2]Associate Professor & Head,
Department of Chemistry, KGK College,
Moradabad-244001 (U.P.)
Email : dkskgk@rediff.com.

Keywords : *Groundwater quality, water quality index, unit weight, quality rating*

Underground drinking water samples at six different sites of hand pump at Moradabad were collected and analysed for pre-monsoon period and after of onset of monsoon for fifteen different water quality parameter following standard method and procedures. With the help of this statistical data, water quality index has been calculated using W.H.O. drinking water standards. Comparison of W.Q.I. values with standard assumptions revealed that the underground drinking water invariably at all the sites for pre-monsoon period and after onset of monsoon as well was found to be severely polluted with W.Q.I. values more than 132. It is also observed that the water quality remained the same or changed slightly after onset of monsoon and there is no improvement in water quality during rains. The results on the basis of calculated values of W.Q.I. are similar to that on the basis of different physic0-chemical parameters. This way assessment of water quality on the basis of W.Q.I. is once again proved and people exposed to water of present study area are prone to health hazards of polluted during water.

38. Bioconversion of a Weed for Sustainable Livelihood

Rakhi Gopalan*. K. P., Rajalakhmi Subramanian and Suguna Yesodharan

School of Environmental Studies,
Cochin University of Science and Technology, Kochi-22
E-mail : *rakhigopalan@gmail.com

Keywords : *watwer hyacinth, oyster mushroom*

The water hyacinth, *Eichhornia crassipes* is an invasive weed whose capacity for growth and propagation cause major management problems in aquatic systems, with considerable socioeconomic impact. Rapid growth rate, and propagation and ability to successfully compete with other aquatic plants give rise to enormous amount of biomass that cover the water surface of a great variety of habitats often interfering with the use and management of water resources. Some of the principal problems are its interference with navigation, water flow, and the recreational use of aquatic systems. It is also responsible for drastic changes in the plant and animal communities of freshwater environments and acts as an agent for the spread of serious diseases in tropical countries. Hence it is pertinent to convert this menace into a resource for sustainable livelihood. Many interventions are being devised for the proper utilization of this bio-resource which includes mushroom cultivation, vermicomposting, paper making, ethanol extraction, etc.

The present research work was carried out to investigate the growth and yield performance of oyster mushroom(*Pleurotus eous*) on water hyacinth when used as a substrate in comparison with other conventional base materials like, paddy straw, coir pith, and saw dust. Mushroom cultivation is a profitable agri-business and oyster mushroom is an edible mushroom having excellent food value. Comparison of the time required for completion of spawn running, fruiting body formation, formation of pinheads and maturation period on different substrates are compared. Results indicated that of the different substrates, time required for all the above growth parameters was minimum in the case of water hyacinth substrate. The macro and micro nutrients in the mushroom were estimated. Moreover, presence of heavy metals in the mushroom were determined was found to be well within the limits prescribed by Prevention of Food Adultration standards. (PFA.)

39. Immunotoxicological Effects of the Pesticide Phosphamidon in the Fish *Cyprinus Carpio*

J. Savarimuthu Michael and *A. J. A. Ranjith Singh

Department of Advanced Zoology and Biotechnology,
Sri. Paramakalyani College, Alwarkurichi-627 412,
Tirunelveli District, Tamil Nadu,
E-mail : singhmispkc@gmail.com

Keywords : *Pesticide- phosphamidon, common carp, Cell mediated immunity, Humoral immunity and Sub-lethal dose*

Pesticides from agricultural activities have every change to pollute aquatic system, ground water table and affect the inhabitants and dependent of aquatic system. In the present investigation sub-lethal effect of an organophosphorus pesticide, phosphamidon (commercially Phamidon) to the fresh water fish, common carp *Cyprinus carpio* were studied. The pesticide phosphamidon at sub-lethal dose is also found to affect the functioning of immune system. The antibody titre values for different types of antigens (S-BSA, HA-BSA,Adj-BSA,SRBC) in the control and phosphamidon exposed fish were traced. In the phosphamidon exposed fish a reduction was observed in the primary and secondary immune response, when different types of antigenic challenges were given. Transplantation of scales was done in phosphamidon exposed fish and it was found that both cell mediated and humoral immunity was inhibited in phosphamidon treated fish.

40. Arsenic in Food Chain : Role of Geological set up from Bihar and Jharkhand (India)

Vikash Kumar Prabhat, Arun Kumar*
and Arvind kumar Dwivedi**
PG Department of Botany,
*Magadh University Bodh Gaya,
Mujhapparpur University,
**Garwa College, Gahwa

Keywords : *Arsenic, Jharkhand, Bihar, irrigation*

Amount of Arsenic in food crops and vegetables are possible difference between two geological set up viz. Bihar and Jharkhand. Arsenic contamination in ground water has become an additional concern visa-a-vis its use for irrigation purposes. Arsenic laden ground water in arsenic becoming irrigating soil enhance arsenic entry into food chain mainly Rice and vegetable. Irrigating a rice field with ground water containing 0.55mg/l of arsenic with a water requirement of 1000mm results a restricted addition of arsenic per hectare per annum in Bihar.

Concentration of Arsenic as high as 80mg/kg of soil was found in an area having arsenic contaminated irrigation and more than mg per kg of arsenic has been found in Arum (Kochu).Vegetables in middle Bihar irrigation of dry crops (Viz.Millet) are with minimum ground water. Relative amount of arsenic in soil and ground water in irrigation field are loss in Jharkhand. So there is less chance of arsenic mobilization in food chain from soil and ground. In Bihar however there has an ample scope to study of arsenic in food chain in middle Bihar and comparison with Jharkhand.

41. Phytotoxicity of Cadmium and Lead in *Hydrilla Verticillata* (l.f) Royle

Alka Singh and Dr. Abha Agarwal

Department of Botany, Bareilly College,
Bareilly-243006, U.P.

Keywords : *Hydrilla verticillata, Phytotoxicity, Heavy metals*

The toxicity of heavy metals Cadmium (Cd) and Lead (Pb) in aquatic plant *Hydrilla verticillata*(l.f) Royle were examined. Plants were acclimatized and exposed to 0.5, 1.0, 2.5, 5.0 ppm of Cd and 2.5, 5.0, 10.0, 20.0 ppm of Pb separately. Plants were harvested for analysis of several physio-chemical parameters after 03 days. Various physio-chemical parameters which were analyzed are Biomass, Chlorophyll, Carotenoid and Proline. Toxicity symptoms of Cd and Pb showed chlorosis and brittleness of leaves at higher meta.

42. Study of Urban Air Quality in Kolkata for Source Identification and Estimation of Ozone, Carbonyls, NOx and VOC Emissions

Meetu Puri*, Anjana Kumara V., R. C. Saxena and R. S. Mahwar

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

The fast urbanization, increasing traffic, economic growth trajectory, industrialization, and higher levels of energy consumption has resulted an increase

in pollution load in the urban environment. It has become essential to keep a continuous watch on emissions and profiles of various air pollutants specially the Hazardous Air Pollutants (HAPs) such as VOCs, Ketones, Aldehydes and Ozone. The Study of HAPs in urban air is even more important in the South-East Asian region including India where high levels of solar irradiation in combination with anthropogenic and biogenic ozone precursors favour photochemical ozone production. The adverse effect of VOCs is well established and includes their high Global Warming Potential (GWP), depletion of ozone layer, loss of bio-diversity etc. Central Pollution Control Board (CPCB) carried out a detailed monitoring study to measure the levels of Ozone, VOCs including carbonyls in ambient air in the metropolitan city of Kolkata.The paper contains the study details from selection of the monitoring locations, methodology, findings and the recommendations for the control of VOCs.

43. Air Pollution Tolerance Index of Plants Growing Near Talkatora Industrial Estate, Lucknow (U.P.)

Arti Trivedi*, Sandeep Shukla and Narendra Kumar

Department of Environmental Science,
Baba Saheb Bhimrao Ambedkar University, (A Central University),
Vidya Vihar, RaeBareli Road,
Lucknow-226 025 (U.P.)

Keywords : *Air pollution tolerance indices (APTI), Relative water content (RWC), Ascorbic acid (AA), Total leaf chlorophyll (TCh).*

The study examined the air pollution tolerance indices (APTI) of twenty five plant species around Talkatora industrial estate**,** Lucknow**,** U. P., India**.** Four physiological and biochemical parameters, which are leaf relative water content (RWC), Ascorbic acid content (AA), total leaf chlorophyll (TCh) and leaf extract pH were used to compute the APTI values. Based on the APTI values the plants were conveniently grouped as Tolerant (APTI value>17), Intermediate (>10<16), Sensitive (<10) and Very Sensitive (<1). The result showed order of ***tolerance*** *Ficus bengalensis > Ficus religiosa >Eucalyptus globlus >Azadirachta indica juss >Hevea brasiliensis >Syzygium cumini > Moringa oleifera* , Plants fall in

intermediate range were *Cassia fistula> Mangifera indica > Anthocephalus indicus > Acacia nilotica>Psidium guayava > Amaranthus spinosus > Bougainvillea spectabilis >Cestrum nocturum > Hibiscus rosa-sinensis > Delphinium denundatum > Ziziphus mauritiana > Calotropis procera.* The rest of plants fall in the ***sensitive*** range include *Dolichos lablab > Murraya koenigii> Callistemon citrinus> Nerium indicum>Tabernaemontana divaricata> Polyalthia longifolia*.

44. Studying the Feasibility of using Coir Pith for the Production of Cellulases

P. Asha and I. S. Bright Singh

School of Environmental Studies,
Cochin University of Science & Technology,
Kalamassery, Kochi, Kerala.
E-mail : haiashahere@gmail.com

Keywords : *Cellulase, Coir pith, saccharification, Aspergillus ochraceous, Chaetomium globosum, Pleurotus sapidus, Bacillus sp, Paenibacillus polymyxa, Submerged fermentation*

Coir pith represents approximately 50 % of the waste from the coir industries in kerala , which could be efficiently utilized to produce ethanol, a promising alternative energy source for the limited crude oil. Due to its high lignin content and crystalline nature , coir pith supported poor fungal and bacterial growth and yields were considerably low. So in the present study partially delignified coir pith was used for the saccharification with five microorganisms namely, *Aspergillus ochraceous, Chaetomium globosum, Pleurotus sapidus, Bacillus sp.* and *Paenibacillus polymyxa.* These were subjected for submerged fermentation with various carbon sources such as delignified coir pith , Whatmann No.1 filter paper and Carboxy methyl Cellulose supplemented with tween 80 as surfactant. *Aspergillus ochraceous* showed the highest total cellulolytic activity on delignified coir pith. Of the surfactants used 1% Tween 80 in the medium increased the production of cellulase several fold than the medium without tween 80. All the cellulase components were optimally active in the assay at pH 5.5 and 50^{o} C and highest activity was observed after 7 days of incubation.

45. Biomass Fuels are the Risk Factor for Chronic Obstructive Pulmonary Disease in Rural Areas

Aakanksha and Ratna katiyar

Department of Botany, University of Lucknow
Lucknow-226 007

There is increasing evidence for a possible association between chronic obstructive pulmonary disease (COPD) and the use of biomass fuels for cooking and heating in rural areas. A study was undertaken to investigate the prevalence of CPOD in rural areas and to measure the association between COPD and indoor biomass fuel air pollution.

The survey was performed in populations aged over 40 years in urban and rural areas of Bakshi ka Talab, Lucknow. Spirometry was performed in all subjects Measurement of indoor and outdoor air pollutants were also performed in a random sample of households. The overall prevalence of COPD in the two areas was 8.4%. The prevalence of COPD in both the whole population and a subpopulation of non – smoking women in rural areas were significantly higher than in urban areas (11% vs 6-4%, and 6.2% vs 1.5% respectively). The use of biomass fuel was higher in rural areas than in urban areas (87.1% vs 0.6%). Pollutant measurements showed that concentrations of carbon monoxide, particulate matter with an aerodynamic diameter = 10 µm, sulpher dioxide and nitrogen dioxide in the kitchen during biomass fuel combustion were significantly higher than those during LPG combustion. So the indoor pollutants from biomass fuels may be an important risk factor for COPD in rural areas.

46. Ecology Of Macrophytes Of Sanjay Gandhi Biological Park Pond, Patna

D. K. Paul and Praveen Kumar

Department of Zoology, Patna University, Patna (Bihar)-800005,
E-mail : dkpaul_31@yahoo.co.in

Keywords : *Pond, Macrophytes, Ecology, Sanjay Gandhi Biological park*

The pond is situated in Sanjay Gandhi Biological Park, Patna, Bihar (India). It is situated in 25° 59´N and 85° 09´E. It is an artificial pond used for boating,

pisciculture and recreation. Its average water depth is 10-12 feet. In the present investigation, several species of macrophytes are recorded in the pond. 24 species of macrophytes are found in this pond, out of which 10 are marginal or sub aquatic, 6 are submerged, 5 are emerged and 3 are free floating. The common species of macrophytes found in this pond are *Pistia stratiotes, Eichhornia crassipes, Poa indica, Cynotis axillaris, Alternanthera philoxeroides* etc. The water temperature fluctuates with the change in atmospheric temperature. The water is greenish in color due to abundance of chlorophyceae. pH of water was noticed above 7. Transparency is low due to abundance of planktons. BOD was noticed low in quantity where as COD was high. No acidity and free carbon dioxide were found in the water. Chloride, nitrate and phosphate and inorganic ions were present but very less in amount. Moderate hardness and alkalinity was found during investigation. It was particularly due to bicarbonate and carbonate ions. Bicarbonate is in high concentration as compare to carbonate. Presence of abundant phytoplankton favors the pond for the growth of herbivorous aquatic organisms.

47. Bactericidal Potential of Aonla Leaves

Vijai Pal, M. L. Chhabra and Indu Jalali

Department of Plant Pathology,
CCS Haryana Agricultural University,
Hisar-125004

Keywords : *Ground water, physico-chemical parameter ,water pollution*

Indian gooseberry popularly known as Aonla (*Phyllanthus emblica* L.) has great importance for its medicinal use not only as an antiscorbutic, but for the treatment of diverse ailments such as anemia, jaundice, cardiac problems, nasal congestion, retention of urine and several problems associated with the digestive system. The leaves are usually used for in digestion and diarrhea as specially in combination with butter milk or fenugreek. Keeping its medicinal value for human beings in view, an attempt was made to find its bactericidal activity if any against plant pathogenic bacteria. For this purpose, aqueous aonla leaf extract was evaluated *in vitro* against *Xanthomonas axonopodis* pv. *citri*, pv. *cyamopsidis*, pv. *malvacearum, X. oryzae* pv. *oryzae* and *Pectobactrerium carotovorum* subsp. *carotovorum* using inhibition zone technique. The results reported herein

indicated that aonla leaves contain some bactericidal metabolites which may be exploited for the control of phytobacterioses caused by these phytopathogen bacteria.

48. Commercial Trawl netting damaging marine ecosystem in coastal West Bengal

Dr. Mahua Das

Bhawanipur Education Society College,
Under University of Calcutta.
E-mail : mdgeo2003@yahoo.co.in.

Keywords : *Commercial trawling ; Marine ecosystem ; Loss of species ; Damage to marine biodiversity ; Disturbed Mangrove ecology*

Commercial fishing plays an important role in the economy of West Bengal as it provides a profitable source of employment and supplies an indispensable animal protein to Bengali diet. Major area of West Bengal coast covers 'Sundarbans', the largest mangrove ecosystem and only mangrove tiger-land in the world declared as the World Heritage Site (1989). It exhibits an excellent breeding and nursing ground of uncountable macro and micro-species of fish, prawn and other marine animals presenting together the largest mangrove foodweb of the world as a part of great marine ecology in West Bengal offshore area. Increasing population with growing demand of fish causes intensification of trawling by large number of commercial fishermen and big MNCs all along the offshore area of West Bengal. Modern bull trawlers use to drag bigger trawl nets through ocean bottom while chasing bottom dweller species of fish. This action is very likely to have destroyed under-sea habitat of many micro-species belonging to the first and second trophic levels of marine food chain. This paper highlights a case study of Shankarpur-Digha fishing zone in coastal West Bengal showing the extent of commercial trawling causing a great loss to a number of marine species like sting ray, cat fish, flat fishes (flounders, soles), silver belly, clupeid fish, halibut, skate, gastropod(*babylonia spirata*), sepia, loligo, squid, mud octopus, nudibranch, sea urchin, sea anemone, squilla(mantis shrimp), protunus crab, gobid fish and marine crab(*doclea ovis*). As all these species belong to primary and secondary trophic levels of the marine food chain, loss of these due to trawling seems to have already created big crisis of food

for a large number of predators in tertiary trophic level. Resultantly, sustenance of sea snail, sea spider, gray sea slug, starfish, sea otter, cuttlefish, ocean pikes, eel, commercial fish & prawn, finfish, barracuda, pinnipeds, sting ray and marine birds are suspected at stake. At the penultimate stage, top consumers or apex species of marine food chain i,e. shark, dolphin and seal will also be affected by food crisis. Above all, the coastal humans themselves who are dependant on seafood will be the worst sufferer. Thus, this paper has proved urgent need for a proper Environmental Management Plan with restrictions on trawling to ensure conservative use of marine resources towards sustainable development of littoral and infra-littoral habitat ecology of West Bengal.

49. Biodegradation Of Antibiotic Wastewater In An Anaerobic Hybrid Reactor – A Kinetic Modelling

[1]P. Mullai and [2]N. Saritha

[1]Department of Technology, Annamalai University,
Annamalai Nagar-608 002, Tamil Nadu
E-mail : sammullaip@yahoo.in
[2]Department of Chemical Engineering,
SRM Engineering College, SRM University,
Katankulathur-603 203, Tamil Nadu

Keywords : *Anaerobic hybrid reactor (AHR); antibiotic wastewater; kinetic modelling; HRT.*

Anaerobic hybrid reactor (AHR) was operated for 156 days at mesophilic temperature (30 – 35°C) for treating antibiotic wastewater at seven hydraulic retention times (HRTs) of 24, 18, 12, 8, 6, 3, 6 h. This paper describes the development of mathematical model for substrate utilization and biomass formation (microbial growth) kinetics. Kinetic parameters were determined through linear regression using the experimental data. As the value of percentage error calculated was 15.27% between the simulated and experimentally observed effluent COD concentration and 1.2% for effluent biomass concentration, this model was found to be a good representation. Besides, the correlation coefficient value (R^2) obtained for the experimental and theoretical effluent COD concentration and effluent biomass concentration also confirmed the suitability of the kinetic model.

50. Reycling Composted Wastes of Sugar Industry to Enrich Soil Fertility

B. Bakiyathu Saliha, T. Balaji, and A.R. Mohamed Haroon

Department of Soil and Environment,
Agricultural College and Research Institute,
Tamil Nadu Agricultural University,
Madurai-625 104, Tamil Nadu

Keywords : *Sugar industry, wastes, recycling, composting, nutrients, crop yield*

Composting is an ecofriendly method of solid waste management which helps to recycle valuable nutrients in the soil and plant systems. The manurial value of different composts prepared from various sugar industry wastes were analysed for their nutrient potentials. The composts prepared from sugarcane trash, pressmud, bioearth prepared from pressmud and distillery spentwash were evaluated for their efficiencies interms of organic carbon, primary, secondary and micronutrients. Among the different composts, biocompost prepared from pressmud and distillery spentwash was found to contain higher organic carbon (15.5 percent), N (2.0%), P (2.5%) and K (3.0%). The pH of the compost was found to be ideal (7-7.5) with a C:N ratio of 15:1. The results of the field experiments conducted to evaluate the efficiencies of the composts indicated that the application of bioearth /biocompost @ 5tha^{-1} and 50% NPK enhanced the available N,P and K status of the soil from 210, 12 and 190 kgha^{-1} to 290, 24 and 410 kgha^{-1} respectively and the maximum cane yield of 115tha^{-1} was recorded in this treatment which was an additional yield of 25kgha^{-1} over 100% NPK alone (90tha^{-1}). The application of composted sugar industry wastes in the form of biocompost not only enhances the soil nutrient status and cane yield but also serves as a means for eco-friendly management of industrial by-products.

51. Ecological Preferences of Lemaneaceae (Rhodophyta) found in the River Systems of Manipur

M. Romeo Singh and *Asha Gupta

Department of Life Sciences,
Ecology Research Laboratory, Manipur University,
Canchipur-795003

Keywords : *Lemanea, Rhodophyta, freshwater, bio-indicator, oligotrophic*

Freshwater red algae (Rhodophyta) occur mainly in running waters. They are generally indicators of good water quality (oligotrophic, ologosaprobic). Many of them are also included on list of threatened algae. Lemanea species locally called as "nungsham" in Manipuri is harvested by the local people because of the fishy smell it produces and sold in the market in dry form and served as a vegetable in dried, fried or roasted form and local delicacy. The plant grows actively during mid winter months (Dec-Feb) and found to be attached to rocks, bricks, stones, shells, clay etc. in the bed of swiftly flowing water of the Imphal, Iril, Thoubal and Manipur rivers. Hydrological investigations were made during the period from April 2008 - March 2009 to evaluate the ecological preferences of species *Lemanea* which shows disjunct distribution found in the river system of Manipur. Of the abiotic parameters included in the analysis, it was found that pH, temperature, transparency, water current; depth, dissolved Oxygen and the presence of stable substrates were the limiting factors influencing the growth of this alga. Discontinuous distribution of it shows the availability of its requirements in the particular habitat. It was found that the alga prefer low nutrients indicating the oligotrophic condition of the rivers during its growing period. This information may be useful in categorizing algae as bio-indicators for monitoring water quality.

52. Sorption of zn, Pb and Cr in Tixtile waste-water using Banana Husk as a Biosorbent

Kalpna Kumari

Department of Chemistry B.P.S. College,
Desari (Vaishali)

Keywords : *Heavymetal, Biosorption, Bananahusk, effluents*

Heavy metals such as chromium, copper, lead cadmium etc in wastewater are hazardous to the environment. The textile effluents contain Cr and Pb which are dominant toxic metals. Biosorption technique has been employed for the treatment of textile processing industrial waste water using banana husk as biosorbant for the metal binding. The concentration of heavy metal zn, Pb and Cr were examined using atomic absorption spectrometry. The concentration of these metals were

detected in the range of 1.04 – 5.38, 0.55 – 2.4 and 0.49 – 8.38 (ppm). Which were higher than the permissible limits recommended by environmental protection agency. The waste water samples were treated using banana husk as biosorbant in a continuous flow system using glass column. There was remarkable decrease in the concentration of zn, Pb and Cr. The other parameters such as pH, turbidity, electrical conductivity (EC), total hardness (TH), total dissolved Solids (TDS), total Suspended solids (TSS), dissolved Oxygen (DO) were also investigated before and after adsorption. The metal binding capacity of banana husk for the removal of heavy metals from the waste water was as zn < cr < Pb.

53. Limnochemical and Limnobiological Status Along with The Energetic Status of Macrozoobenthos and Fishes of Mansarovar Reservoir

Dr. Aruna Chakrawarty

Dept. of Zoology, Govt. Dungar College
Bikaner

Many of the countries are struggling for freedom in order to construct a society where satisfaction of the minimum need of entire population would be the first priority of development. Availability and exploitation of resources needed for the development are connected with the environment. There are several aspects of environment involved in and affecting the developmental process in countries like India.

For the improvement of health of mankind much emphasis should be laid on the quality, particularly caloric contents of food material we consume. Hence, the knowledge of bioenergetics of not only the final consumable food yield (i.e.fish) but even of primary (i.e.phytoplankton), secondary (i.e., zooplankton) and tertiary (i.e., macrozoobenthos) trophic level in an aquatic eco-system is a prerequisite. Since water and biota are inseparable components of any aquatic eco-system, study of water and sediment of the water formation is a basic need.

Mansarova reservoir, an almost circular euphotic water body, is an important pisciculture station used by the Department of Fisheries, Government of Madhya Pradesh for fishing purposes. It is situated in the southern par of the Bhopal city near the Academy of Administration across a tributary of Kaliasot river and a local nullah. Main source of water is rain.

54. Correlation between increasing Pollution Level and Respiratory Distress in the Inhabitants of the City of Joy

Anwesha Saha*[1], Pip Banerjee[1], Priyanka Lahiri[1] and Kaveri Banerjee[1], Avishek Ghosh[1]
Radhika Saraf[2], Mr. Ayan Chandra[2], Dr.Arpita Banerjee[3] and Prof. Sumitra Basu Thakur[3]

[1]Department Of Microbiology,
St.Xavier's College, 30 Park Street,
Kolkata-700016
[2]Department of Statistics,
St.Xavier's College, 30 Park Street,
Kolkata-700016
[3]Department of Respiratory Medicine
Nil Ratan Sircar Medical College and Hospital,
Kolkata-700014, West Bengal

Keywords : *Kolkata, biological air sampler, pulmonary function test (PFT), spirometry, chi-square test, correlation analysis, ANOVA, COPD*

The increasing respiratory problem in Kolkata indicates that it is gradually becoming the pollution capital of the country. This project has been taken up to establish a correlation between the levels of pollution that is encroaching upon our city and the commencement of the chronic respiratory diseases over the common mass of the city. A systematic study was conducted in three different high-rise buildings with varying pollution (i.e. highly polluted, moderately polluted and less polluted area) levels. biological air sampler (LA002), was used to collect air sample from those locations and the microbial load of respective places were determined. Our procedure consists of pulmonary function test (PFT) involving spirometry to detect the respiratory diseases from which the people residing in those buildings at different elevations, were suffering. During PFT, few parameters were taken in concern, i.e. sex, age, height, weight and smoking history of the individuals. Analysis of the collected data was done by using a series of statistical tools. For a Chi-Square test for independence, the p-value for bacterial load is 0.001, while for fungal load it is 0.00021 which indicates a dependence of microbial load upon the height of the buildings. In

a correlation study, the value of Pearsonian correlation coefficient was found to be 0.78 (r^2 = 0.61). This shows that there is moderately high correlation between pollution level and organism load. Analysis of Variance was performed to test whether there is really significant difference between the average organism loads in these three areas. Tests of proportions revealed that the proportion of individuals suffering from COPD and Asthma is significantly more among the smokers. The p-value in case of COPD is 0.0001and for asthma it is 0.00021. From the analysis, it is inferred that the location with high level of pollution imposes a comparatively high level of microbial load in the environment of that area while the area with comparatively lower pollution level corresponds to less organism load as the ground floors of the buildings were taken in consideration. But for the top most floors for three different locations the microbial load was more or less lower as compared to the ground floors. From the study, it is clearly observable, that most of the people residing in the highly polluted area are suffering from major respiratory diseases like COPD(Chronic Obstructive Pulmonary diseases),Asthma and Restrictive lung disorder, while the percentage of people suffering from these diseases are relatively lesser in the less polluted area. Moreover, the injurious smoking habit of individuals is promoting the risk towards COPD and other major respiratory disorders. Even the microbial load of the environment of these three locations have an important role for causing different pulmonary diseases to different extent depending on the pollution levels of the respective places.

55. Species Richnes and Diversity of Algae in Cauvery River and its Tributaries.

J Mahadev, Syed Akheel Ahmed and S. P. Hosmani

DOS in Environmental Science, Mansagangothri,
Mysore-06
DOS in Chemistry Mansagangothri,
Mysore-06
Department of Biotechnology, Mahajana's College,
Mysore.

Keywords : *Algae, Chlorophyceae, Bacillariophyceae, Physico chemical, Cauvery River, Mysore*

The present investigation, Physico-chemical Parameters and fresh water algae and species richness and diversity of the Chlorophyceae and Bacillariophyceae in relation to nutrient status in the Cauvery River in and around Mysore district were carried out between 2008 and 2009. The monitoring of water quality can be done either by direct measurement of physico-chemical parameters of water or by analyzing the inhabiting biota. An algae serves as bio-indicator of water quality and pollution. The diversity of phytoplankton is influenced by the quality of water. 21 species of chlorophyceae, 23 species of Bacillariophyceae. Most influential factors with respect to the abundance of chlorophyceae and Bacillariophyceae are temperature, pH, calcium, free carbondioxide, dissolved oxygen, nitrates, bicarbonates, phosphate and oxidizable organic matter. Decreased diversity of Chlorophyceae and Bacillariophyceae were noted at sites receiving urban waste and agricultural effluents. Positive Correlation was observed between COD, BOD Phosphate and the Phytoplankton divisions. The environmental variables seem to play an important role in determining the species richness and diversity in the Cauvery River.

56. Relationship of Metal Tolerance With Multiple Antibiotic Resistance of Total Heterotrophic Bacteria Isolated From The Soils of Mg University Campus, Kottayam, Kerala

Rinoy Varghese[1], Krishna M. P[1], Harsha H. T[1], Devi K. Balan[1], Jyothy S.[1] and Dr. A. A. Mohamed Hatha[2]

[1]School of Environmental Sciences,
Mahatma Gandhi University,
Kottayam, Kerala.
[2]Department of Marine Biology,
Microbiology and Biochemistry,
Cochin University of Science and Technology,
Cochin, Kerala

In environment, resources such as nutrients are inadequate, a bacterium can produce an antibiotic to eliminate or inhibit neighboring bacteria, thereby limiting

struggle for the limited resources. In order for this strategy to be successful, the bacteria producing the antibiotic should be capable to endure by possessing mechanisms of resistance to the antibiotic they produce. These mechanisms can be transferred to other bacteria, and this has led to a mounting risk to global public health by confounding treatment of infections caused by virtually all major pathogens (Levy, 2002). More recently, however, it has become evident that antibiotic resistance is common not only among pathogenic bacteria of humans and animals but also among environmental bacteria (Chopra and Roberts, 2001). The latter observation is important because bacteria in natural environments likely serve as a pool of resistance genes that ultimately can be transmitted to pathogenic species (Alonso *et al.*, 2001). As an outcome, it is important to build up a more wide understanding of the incidence and diversity of antibiotic resistance in a broad range of environments.

57. Studies on Water Quality of Lakes in Shivaji University Campus, Kolhapur, Maharashtra

Patil Y. Y. and Raut P. D.

Department of Environmental Science,
Shivaji University, Kolhapur

Keywords : *Lakes, water quality*

The drinking water crisis in India has reached explosive proportion due to rapid population growth, urbanization, increasing living standards and diverse human activies. Time is perhaps not too far when pure and clean water may be unavailable for maintaining the normal human life. There is need to study and conserve the water sources. Present study focuses on water quality of lakes of Shivaji University campus, Kolhapur, Maharashtra supplying water to University campus. Lake water quality analysis was carried out, and it was found that facility of pumping and filter station with campus provides good drinking water source. These lakes have also helped to maintain ground water level. The results are discussed.

58. Interaction between Municipal Sewage Water and Ground Water at Warangal town, Andhra Pradesh

Chindam Ravinder*, Pinninti Venkateshwarlu and S.G.D. Khureshi*****

Warangal is one of the major towns in Telangana region. The city is a centre for educational, administrative, industrial and cultural activities. This study was made in Warangal city with a population of over 6 lakhs. The properties of ground water are influenced by the municipal sewage water. Disposal of several toxic pollutants are released into the surrounding environment, some water soluble pollutants percolate into the ground water. This affect the quality of ground water and soils gets deteriorated. The main municipal waste water channel of the city is used for discharging the municipal, house hold, commercial waste waters and it also acts as natural drainage for rain water runoff also. The polluted waters deteriorate the quality of the ground water and may cause serious health hazards. In the present study, an attempt has made to evaluate the quality of the ground water and pollutants present in the municipal sewage water. 7 ground water and 7 municipal sewage water samples were collected and analyzed on 14 parameters. The samples were collected at different locations of municipal sewage water flow channel and ground water sources within 25-50 meters from the selected points near by municipal waste water flow channel.. The results indicate a gradual deterioration of the quality of ground water near the municipal drainage channel is observed. The untreated waste water directly released in to the ground, which pollutes the ground water bodies and the effect may persist for longer time. If necessary precautions are not taken, consequences can be very serious, in terms of damage to the natural resources.

59. Recycling Of Shrimp Biowaste By Safe Eco- Friendly And Economically Viable Process

Kandra Prameela[a]* and Challa Murali Mohan[a]*

[a]Department of Biotechnology, GITAM Institute of Technology,
Rushikonda, GITAM University,
Visakhapatnam-530 045

Keywords : *shrimp bio-waste, chitin, carotenoids, eco-friendly*

Indian shrimp processing industry produces more than 1, 00,000 tonnes of industrial waste. Shrimp is very rich of chitin and natural carotenoids which have many applications including pharmaceutical, cosmetic, biomedical field, fine chemicals and biodegradable packaging films. The traditional chemical method creates a disposal problem due to large amounts of toxic waste that would pollute the environment. This processing is expensive due to enforced environmental controls and disposal measures. To overcome these problems an alternative method has been emerged by using microorganisms which can replace the expensive and non-environment friendly chemical process. This process would minimize pollution problem and maximize profits of the processor.

60. Exploitation of Fungi for Biological Management of Water Hyacinth

Anita Chouksey and Ranu Singh
Mata Gujri Women's College,
Jabalpur (M.P.)

Keywords : *Water hyacinth, weed, Alternaria alternata, Curvularia lunata*

Water hyacinth (*Eichhornia crassipes*) (Mart.) Solms. Laubach is considered one of the world's worst weeds invading lakes, ponds, canals and rivers. During periodical survey of various water bodies of Jabalpur to documents the fungal pathogens of water hyacinth, a total of 30 fungi were recovered from infected and diseased parts of water hyacinth out of which 22 were pathogenic. Among these *Alternaria alternata, Cercospora rodmanii, Curvularia lunata, Rhizoctonia solani, Alternaria eichhorniae* incited severe infection and caused drastic damage to the weed while few others viz. *Fusarium oxysporum, Drechslera indica, Phoma sp., Sclerotium* sp., *Fusarium equiseti, Fusarium solani, Curvularia clavatum, Colletotrichum gleosporioides, Colletotrichum dematium, Helminthosporium sp.,* caused mild diseases to water hyacinth. Several other fungi viz. *Fusarium moniliforme,, Aspergillus clavatus, Aspergillus flavus, Aspergillus nidulans, Aspergillus niger, Penicillium nigricans, Cephalosporium Sp., Penicillium oxalicum,* totally failed to incite any diseases to the weed.

61. Indigenous Remediation Technology for Cleaning up Heavy Metal Ions Present in Soil Around Paper Mills in Saharanpur

Ashok kumar[1*], B. S. Bisht[2] and V. D. Joshi[3]

[1]Department of Biotechnology,
H.N.B.G. University, (A Central University), Srinagar
Garhwal-246174 (Uttarakhand)
[2]Department of Zoology/Entomology,
HNBGU (A Central University), Campus Badshahithaul
Tehri-249199 (UK)
[3]Department of Zoology, Government PG College,
Kotdwara Garhwal (Uttarakhand)

Keywords : *Bioremediation; heavy metals; metal toxicity; physico-chemical analysis; ICP-MS.*

With rapid industrialization all over the world, pollution is on the increase, and India is no exception. One of the modes through which pollutants enter the biosphere is that of industrial effluents. Bioremediation is a low cost method available for reclaiming the soils which have been polluted. The present study was carried out in order to determine the effects caused by paper effluent on soil, as well as upon the macro and micro flora present in its environment, and to develop an indigenous remediation technology for cleaning up heavy metal ions and organic pollutants associated with paper industry effluent. The study was carried out on the effluent and its surrounding soil of Paper Mills Shaharanpur Uttar Pradesh INDIA. Initial recording of data comprised of electrical conductivity, pH and temperature of effluent and soil. The collected samples were processed for further physico-chemical analysis, which included soil field capacity, total soluble salts, organic matter, organic carbon, sulphates, nitrates, phosphorus, potassium and exchangeable cations. The soil and effluent samples were processed for heavy metal analysis using ICP-MS. Similarly, plant material was also digested and analyzed for heavy metals. The present study shows that the metals and other parameters taken in this study, are higher in the almost area in the region of Paper mills.

62. *Lagenidium Giganteum* an Effective Microbial Control Agent for *Aedes* Mosquitoes in the Rubber Plantations

Sareen Sarah John[1] and John K. C[2]

[1]School of Environmental Studies,
Cochin University of Science & Technology,
Kalamassery, Kochi, Kerala.
E-mail : sareensj@yahoo.co.in
[2]School of Applied Life Sciences,
Mahatma Gandhi University, Chuttipara.P.O,
Pathanamthitta, Kerala

Keywords : *Aedes albopictus*, vector control, propogation, *Lagenedium giganteum*

The rubber plantations of Kerala have become the most congenial environment for the propagation of *Aedes albopictus* mosquito, the vector for alpha viruses. All measures adopted for the control of these mosquitoes have yielded unsatisfactory results. This study was focused on the control of *Aedes* mosquitoes in rubber plantations using *Lagenidium giganteum*. These mosquitoes lay their eggs in the latex collecting cups during monsoon and the hatched out larvae grow vigorously and metamorphose in the cups. The adults emerged remain attached on the stems of the tender vegetation in the plantations and later the female mosquitoes look for a blood meal elsewhere.

63. Isolation, Identification and Characterization of Pathogenic Bacteria in Marine Edible Fish of Visakhapatnam Coast

Dr. T. Lalith Govardhan and B. Kanaka Durga

Andhra University,
Visakhapatnam

Keyword : *Isolation, Pathogens, Public Health*

As the fish is highly perishable food item due to bacterial contaminations from the environment, a study was undertaken to isolate the associated pathogenic bacteria of edible marine fish pink perch, Nemipterus japonicus available in local

markets. Raw, frozen and cooked samples of the fish were cultured on various types of enriched and selective medias for 48 hours at 37Oc Bacteria isolated specially pathogens : Escherichia coli, Bacillus cereus, Staphylococcus aureus, Salmonella sp, Vibrio parahaemolyticus, the causative agents of food borne diseases like cholera, dirrhoea, typhoid, paratyphoid fevers have been identified by employin g various standard morphological and biochemical techniques (Cappuccino, 2005 6th edn), number of colonies per ml have been reported in serial dilution samplers by total plate count (TPC) method. The significance of quality and safety if sea fish in processing, storage and cooking to prevent food borne diseases which are mostly prevalent in Visakhapatnam areas would be discussed.

64. Clinical Evaluation of Occupational Lead Exposure on Bus Drivers in various route of South Kolkata, India

Soumendra Darbar* and Tapan Kumar Pal

Bioequivalence Study Centre,
Department of Pharmaceutical Technology,
Jadavpur University, Kolkata-700 032
E-mail : darbarsoumendra@gmail.com

Keywords : *Lead toxicity, Kolkata, Air pollution, Lead analysis, Health hazards*

Studies conducted throughout the world has established beyond doubt that elevated blood lead levels may lead to detrimental health effects. It is an environmental toxicant that affects nearly every system in the body. Lead is a highly toxic substance, exposure to which can produce a wide range of adverse health effects. There are many ways in which humans are exposed to lead *i.e.*, through deteriorating paint, lead batteries, household dust, bare soil, air, automobile emission, drinking water, food, ceramics, home remedies, hair dyes and other cosmetics. Lead poisoning, the oldest recognized occupational disease, remains a danger for children and adults. In this study blood lead levels of about 252 adult male bus drivers, age ranges between 20-40 years, working in various route of South Kolkata were investigated. Very little information on the blood lead distribution of the adult male bus drivers is available. This study was undertaken to determine blood lead levels among adults spend most of their time in day and night besides some most congested main roads and crossings of south Kolkata. The results

indicated that blood lead levels in the areas close to main roads ranged from 1.6 to 26.42 ìg/dl, with a median level of 12.02 ìg/dl. The blood lead levels of 86.14 % of adult equal or exceeded to 10 ìg/dl, the current international action levels. Automobile emission, dust, congested traffic; prolonged hours of work in the polluted areas, low nutritional status and lack of education were among the factors associated with elevated blood lead levels.

65. Nylon 6 Degradation by Lignolytic Fungus *Phanerochaete Crysosporium*

Ms Chonde Sonal G. and Dr. P. D. Raut

Department of Environmental Science,
Shivaji University,
Kolhapur-416004

Keywords : *Nylon 6 degradation, fungus Phanerochaete Crysosporium, lignolytic fungus, Nylon Biodegradation*

A study of Nylon 6 polymer degradation by fungus *Phanerochaete Crysosporium* has been carried out under submerged conditions. The analysis was carried out using viscosity measurements, I R spectroscopy, thermal & mechanical techniques. A colony of fungus was developed that resulted in substantial degradation via crack within 75 days. The groove that weakening & breaking of polyamide bond have been confirmed by weakening in I R band. 50 % molar mass reductions have been observed in viscosity studies. Thermal studies indicated decrease in melting point & crystalinity over the stipulates period.

66. A survey on Mosquito Diversity in Parangipettai Coast, Southeast Coast of Tamil Nadu, India

[a]Balakrishan S., Srinivasan[a] M. and K. Elumalai[b]

Centre of Advanced Study in Marine Biology,
[a]Faculty of Marine Sciences, Annamalai University,
Parangipettai-608 502.
Dept. of Zoology, Govt of Arts College Men's,
Tamil Nadu
E-mail : marugalbalu82@gmail.com

Keywords : *Diversity, Mosquito, Mangrove, Estuarine, Ecosystem*

Diversity of mosquito species was evaluated in different habitats in the Parangipettai coastal ecosystem southeast coast of India. We aimed at verifying changes in these mosquito populations in estuarine consequence. There are different habitats were selected as sampling stations: mangrove, estuarine, salt marsh and backwater ecosystem. Bimonthly collections were made with the Shannon trap and human bait of mosquito activity. Different statistical tools were used in the present study, to know the Shannon - Wiener diversity index (2.37-2.356), Simpson's diversity index (0.9039-0.9016), Margalef richness (2.269-2.001) and Pielou evenness (0.9725-0.9589) mosquitoes. In the present study 11 species 3 genera were recorded in all three habitats. Summer season 107 species, rainy season 148 species and winter season 82 species were recorded. The details were discussed given in the paper.

67. Diversity Of Mosquitoes in Parangipettai Coastal Ecosystem Southeast Coast Of India

[a]Balakrishan S., Srinivasan[a] M. and K. Elumalai[b]

Centre of Advanced Study in Marine Biology,
[a]Faculty of Marine Sciences, Annamalai University,
Parangipettai-608 502.
Dept. of Zoology, Govt of Arts College Men's,
Tamil Nadu
E-mail : marugalbalu82@gmail.com

Keywords : *Diversity, Mosquito, Mangrove, Estuarine, Ecosystem*

Diversity of mosquito species was evaluated in different habitats in the Parangipettai coastal ecosystem southeast coast of India. We aimed at verifying changes in these mosquito populations in estuarine consequence. There are different habitats were selected as sampling stations: mangrove, estuarine, salt marsh and backwater ecosystem. Bimonthly collections were made with the Shannon trap and human bait of mosquito activity. Different statistical tools were used in the present study, to know the Shannon - Wiener diversity index (2.37-2.356), Simpson's diversity index (0.9039-0.9016), Margalef richness (2.269-2.001)

and Pielou evenness (0.9725-0.9589) mosquitoes. In the present study 11 species 3 genera were recorded in all three habitats. Summer season 107 species, rainy season 148 species and winter season 82 species were recorded. The details were discussed given in the paper.

68. Tribal Relocation And Conservation Issues At Mudumalai Tiger Reserve

Sanil R. and Nandini S

Department of Zoology & Wildlife Biology,
Government Arts College,
Udhagamandalam-643 002, The Nilgiris

Keywords : *Mudumalai, tribal rehabiltation, conservation, tiger reserve*

Mudumalai Wildlife Sanctuary is a beautiful and bio-diverse area. It is a home for 390 mammals, 1232 birds, 456 reptiles, 2546 fishes and 45000 species of plants. Not only for the fauna & flora, its also home for many tribes. Most of them are residing in hamlets known as enclaves. *Mondadan chettis, Wyanadan chettis, Kurumbas, Irulas, Kattunayakas, Paniyas* etc., are inhabitants of enclaves in Mudumalai. Mudumalai is declared as Tiger Reserve in 2007. After the declaration, the enclaves in the core zone of Tiger Reserve are requested to be shifted to outer areas. Even though, Government offered many facilities as a part of Rehabilitation, peoples including tribes protested against this. Forest Department is uplifting the tribes by giving the jobs as Mahouts, Forest guards and APW etc. So, they form the major conservation unit in the Sanctuary. In this contest the paper discuss the aspects of rehabilitation and conservation.

69. Solidification And Leachability Of Cr (Vi) In Rice Husk Ash Blended Cement

Neeraj Jain*, A. K. Minocha and Jaswinder Singh

Central Building Research Institute, (a constituent of CSIR)
Roorkee-247 667, India

Keywords : *Chromium; solidification; TCLP; blended cement; XRD; compressive strength*

Investigations were carried out to study the effect of Cr (VI) (1000-3000 mg/l) on solidification and hydration behavior of two cementitious binders viz. OPC and rice husk ash (RHA) blended (10-30 %) cement. The results showed that physico-chemical characteristics of these cements were greatly influenced by Cr (VI). Addition of rice hush ash accelerates final setting as compared to control samples. Retardation in setting time was observed on increase in rice husk ash concentration (10-30 %). Results show that the compressive strength of controls (R0 series) and rice husk ash blended samples (R10, R20 and R30 series) with and without Cr (VI) increases with increase in the curing period and maximum strength was observed with 20 % RHA blended samples. It is also observed that with the increase in Cr (VI) concentrations, the strength of all samples decreases. During Toxicity Characteristics Leaching Procedure (TCLP) test, (pH=~3), it was observed that the leaching from OPC and RHA blended cement is dependent on initial Cr (VI) concentration. The retention capacity of OPC and RHA blended samples was in the range of 92 to 99 % at various curing periods (28-90 days) and maximum retention was observed in case of samples blended with 20 % RHA. The influence of Cr (VI) on hydration of cement was examined by X-ray diffraction which shows the formation of various crystalline phases during solidification in rice hush ash blended cement. The hydration characteristics of OPC and RHA blended cement in presence of Cr(VI) were evaluated by scanning electron microscope (SEM).

70. Arbuscular Mycorrhiza - A Sustainable and a Viable Bio tool to Prevent Soil Pollution & Improve Soil Structure

Dr. K. Ammani

Acharya Nagarjuna University

Arbuscular mycorrhiza (AM), the symbiont of arbuscular mycorrhizal fungi (AMF) and host plant root, has been proved to be able to improve soil structure and enhance plant growth.

In recent years increased pressure for food production has led to the development of intensive agricultural systems that use significant quantities of inorganic fertilizers and pesticides.

Chemicals such as fertilizer and pesticides.are expensive and may cause soil pollution. These Improper agricultural practices can cause harm to ecosystems and healthy crops by destroying soil structure and overloading them with pollutants. Current trend of research is to develop alternative technology to minimise the chemical forms and to encourage the use of biofertilizers. One such promising biofertlizer is the Arbuscular mycorrhiza that plays a crucial role in natural and agricultural systems. It is possible that in certain environments the proper AM management would lead to a substantial reduction of fertilizer, which could translate monetary savings and prevent a pollutant overloa.

Working on mycorrhizas for the past 25 years and established the positive role of AM fungi in several pot culture and field experiments. The present paper deals with the occurrence, distribution & identity of indigenous AM fungi in natural and agricultural systems and the production of glomalin in different soils.

71. Study of Noise Pollution during Deepawali Festival in Kolhapur City of Maharashtra, India

Lad R. J., Patil V. N. and Raut P.D

Department of Environmental science,
Shivaji University Kolhapur,
Maharashtra 416004
E-mail : vishvajeetpatil@ymail.com, drpdraut@yahoo.co.in

Keywords : *Noise pollution, Leq, Deepawali, Firecrackers*

Kolhapur city is district place in the state of Maharashtra with population of 4,93,167. In the recent years it is one of the emerging industrial and commercial city of Western Maharashtra. Problems of pollution along with noise pollution are increasing with time especially during the festival period. In the present study, continuous monitoring of noise levels was carried out during the three festive days of Deepawali in the month of November, 2009 at ten different sites within the Kolhapur city. On the basis of location these sites were divided into industrial, commercial, residential and silent zones respectively. The results showed that there is an enhanced pressure of noise at all sites during the festival of light due to bursting of loud noise firecrackers. All the sites under study showed higher sound level than the prescribed limits of CPCB.

72. Magnetic Iron Oxide Nanoparticles: Oxidative Stress and Cytotoxicity on Rat

N. K. Samal and Paulraj R

School of Environmental Sciences,
Jawaharlal Nehru University,
New Delhi-110067

Keywords : *Nanoparticle, Cytotoxicity, Catalase, Lipid peroxidase, Glutathione*

Magnetic nanoparticles modified with organic molecules have been widely used for various biotechnological and biomedical applications. However there were not much report on the toxic or health effects of such particles. Hence the present investigation has been carried out to address the toxic effect of magnetic iron oxide nanoparticles (MION) on rat. Male wistar rats (8 weeks old) were intra peritoneally injected with different doses of magnetic iron oxide nanoparticle (6.5 nm) for a different period of time. Antioxidative enzyme activity was measured in the liver and brain cells. MION significantly increase oxidative stress in a dose and time-dependent manner in rat liver and brain cells.

73. Dissipation Kinetics of Thirteen House-hold Pyrethroids Pesticide in Whole Lood and for the Determination of Thirteen Pyrethroids Simultaneously and its Metabolites Residue

P. E. Ravi and A. Ramesh

Mass Spectrometry division,
Department of Analytical Chemistry,
International Institute of Biotechnology and Toxicology (IIBAT), Padappai,
Chennai-601 301, Tamil Nadu
Email : 1. pe_ravi2000@yahoo.com

Keywords : *Residues, Dissipation, Whole blood, $DT_{50,}$ $DT_{90.}$ Pyrethroids, Permethrin, Transfluthrin, Cypermethrin, Bifenthrin, Allethrin, Fenpropathrin, Cyfluthrin, Lambda-cyhalothrin, Fenvalerate, Deltamethrin, Prallethrin, Cyphenothrin*

Pyrethroids are house hold insecticides as class of synthetic pyrethroids under pesticides namely as allethrin, bifenthrin, cypermethrin, cyphonothin, cyfluthrin,

lambda-cyhalothrin, deltamethrin, fenvalerate, fenpropathrin, permethrin, prallethrin and transfluthrin. Dissipation kinetics of different pyrethroids in whole blood was studied at three temperatures -10±1^{o}C, 2±1^{o}C and 22±1^{o}C and at two different concentration levels 1µg/ml and 2µg/ml for a period of thirty days. Quantification was done by two different detectors GC-ECD and GCMS-EI selective ion monitoring (SIM) method. A rapid and sensitive method for the simultaneous determination of thirteen pyrethroids pesticide and their stereo isomers in electron ionization gas chromatography-mass spectrometry method was developed in whole blood viz., allethrin, bifenthrin, cypermethrin, cyphonothin, cyfluthrin, lambda-cyhalothrin, deltamethrin, fenvalerate, fenpropathrin, permethrin, prallethrin and transfluthrin. Both the method has the linearity from 1-1000 ng/ml. Recovery studies are conducted at the concentration level 1-1000 ng/ml in whole blood. The recovery of individual compounds in whole blood is 91-103%. Dissipation kinetics of pyrethroids in whole blood was studied at three temperatures -10±1^{o}C, 2±1^{o}C and 22±1^{o}C and at two different concentration levels 1µg/ml and 2µg/ml for a period of thirty days. The DT_{50} and DT_{90} values calculated from the dissipation data collected at 22±1^{o}C are in the range 4.3 to 9.1 days and 14.1 to 30.4 days and showed first order kinetics. Among the pyrethroids studied permethrin showed rapid degradation with the DT_{50} value 4.3days and DT_{90} value 14.1. Cyphenothrin showed remarkably higher DT_{50} and DT_{90} value 14.1 & 30.4 days. The order of the dissipation in whole blood at 22±1^{o}C is Permethrin < Transfluthrin, < Cypermethrin, < Bifenthrin, <Allethrin, < Fenpropathrin, < Cyfluthrin, < Lambda-cyhalothrin, <Fenvalerate, < Deltamethrin, < Prallethrin < Cyphenothrin. Analysis of samples collected from the too lower temperatures (10±1^{o}C & 2±1^{o}C) showed low dissipation indicating high persistence. Sixty numbers of blood samples collected from human volunteers occupationally exposed to the application of different pyrethroids for several years were investigated. None of the samples showed any residues and the results are confirmed by positive spiking.

74. Adsorption of Fluoride on Cotton Nut Shell Waste Based Powdered Activated Carbon

M. Rajan*, G. Alagumuthu and V. Veeraputhiran

PG & Research Department of Chemistry,
Sri Paramakalyani College,
Alwarkurichi-627 412. Tamilnadu
E-mail : rajanm153@gmail.com

Keywords : *Adsorption; Cottonnut shell; Isotherm; Kinetics; Thermodynamics*

In the present study, cotton nut shell, an agricultural waste, was used for fluoride adsorption from aqueous. The experimental isotherm data were analyzed using the linearized forms of Freundlich, Langmuir and Timken equations to determine maximum adsorptive capacities. The equilibrium data fit well to the Freundlich isotherm than the other two. Thermodynamic studies revealed that the spontaneous nature of fluoride adsorption with increase of entropy and an endothermic process. The kinetic data obtained for fluoride adsorption on Zirconium impregnated ground nut shell carbon obeyed the pseudo-second order equation. XRD and SEM patterns of the CTNSC were recorded to get better insight into the mechanism of adsorption process.

75. Studies on Sustainable Agricultural Models in Telangana District of Andhra Pradesh

Mrs. N. J. Kalaivani and Dr. G. Bagyanarayana

Department of Botany, Osmania University,
Hyderabad-500 007.
E-mail : gbagyan@gmail.com

Green Revolution has led to the introduction of high yielding varieties with the increased use of chemical fertilizers and pesticides to get desired yields. Also the Government's budget on major and minor irrigation projects has also led to large scale monocropping of rice and wheat and it led to severe ecological and environmental disturbances because of the perennial flooding of rice and wheat. Also the chemical pest control methods further deteriorate the agro-ecosystems. One million pesticide poisoning cases and 20,000 deaths every year due to high pesticide residues in food chain. This calls for an urgent need for sustainable agricultural practices which includes the Integrated Pest Management (IPM). The current study was intended to carry out in the semi arid environmental conditions with respect to IPM in the regular field crops with the major objectives of formulating the IPM technologies for the major crops to combat environmental and ecological insecurity and their cost effectiveness among the small and medium

farmers. Trails were conducted in the farmer's fields in Rangareddy, Nalgonda and Warangal districts of Andhra Pradesh in the field crops such as cotton, paddy and vegetables. IPM modules for separate crops were employed in different farmer's fields to compare against the conventional pest control method using chemicals. Specific IPM modules have been evaluated to determine their effectiveness against the pest management in different crops. Biopesticides and botanicals were an integral part of the IPM modules. In the present study combined use of *Chrysoperla carnea* and neem oil 0.3% had increased the yield of okra and provided an additional yield of 4126 kg per hectare over the control plots and had registered a CBR of 2.60. The cost of cultivation and the cost of treatment were also less compared to the other combinations *viz., C.carnea* + Bt (Bacillus thuringiensis) application and Bt + neem oil 0.3% applications. It was also found that in tomato effective combination of Bt + HaNPV + neem oil 0.3% had registered the highest yield increase (8199 kg/ha) over the control plots. The treatment schedule had a cost of cultivation + cost of treatment of Rs. 28,643 and had registered a CBR of 2.63. Similarly for the control against *Helicoverpa armigera* in cotton, Nuclear Polyhedrosis Virus (NPV) have been applied at 3 x 10 12 POB /ha in evening hours at 7th and 12th week after sowing resulted in good yields than the normal. The application gave a yield increase of 500 Kgs/ha to the corresponding increased return in income of Rs.12, 000/ha. Based on the results, it is concluded that pest management is an important part in arid/and semi-arid agriculture. Better pest management options are suggested not only based on the cost benefit ration but also for the eco friendliness. Exploration of different methods of pest management methods with a rational thinking so as to give correct appreciation for the ecological conservation and augmentation of biodiversity is the need of the day, derived from the present study.

76. Disaster Medicine, Telemedicine And Integrated Vector Management

G. B. Kale[#] and N. B. Kutemate*

Department of Zoology and *Botany,
G.S.Science, Arts and Commerce College,
Khamgaon District Buldhana-444312 (M.S.)
[#]Email : gokulbkale@gmail.com

Keywords : *UN-SPIDER, Disaster-medicine, Telemedicine, Vector Management.*

UN-SPIDER-United Nations Platform for Space-based Information for Disaster Management and Emergency Response is United Nation's new programme which was established as per UN's resolution 61/110 of 14 December 2006 at their General Assembly meet, with the following mission statement: "Ensure that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle". It is a gateway to space information for disaster management support, by serving as a bridge to connect the disaster management and space communities and by being a facilitator of capacity-building and institutional strengthening, in particular for developing countries. UN-SPIDER is being implemented as an open network of providers of space-based solutions to support disaster management activities. Besides Vienna, the programme also has an office in Bonn, Germany and will also have an office in Beijing, China. Emergency / Disaster Medicine, Telemedicine and Vector-borne Disease Management are the space-based solutions for prevention and control harmful health effects due to disaster optimizing benefits to both health and environment.

77. Comparative Account of Morpho-anatomical, Biochemical and Accumulation of Cr (III) and Cr (VI) in *Zea maize* L. inoculated with Mycorrhiza *Glomus* sp.

Shekhar Mallick

Ecotoxicology and Bioremediation Group,
National Botanical Research Institute,
Rana Pratap Marg, Lucknow-226001.
E-mail : shekharm@nbri.res.in

Keywords : *Chromium III, chromium (VI), vesicular arbuscular mycorrhiza (VAM), Zea mays, stomatal aperture*

The role of vesicular arbuscular mycorrhiza (VAM) in plant nutrition uptake from soil is well documented by several studies, however studies on its role in uptake of toxic metals is very limited. To study the role of VAM in the

uptake of Cr and the related morpho-anatomical and biochemical changes in plants, sand culture experiment was conducted using *Zea mays* L. supplied by four concentrations (mg Kg^{-1}) i.e. 2, 5, 10 and 20 of both Cr(III) and Cr(VI) in 30% Hoagland's nutrient solution. Analysis of the data obtained for stomatal aperture, total chlorophyll, protein content, fresh weight, leaf and root lengths in treated plants revealed that, Cr(VI) was inflicting more toxicity than Cr(III) as the decline in the level of total chlorophyll in plants treated with Cr(VI) was more than Cr(III), along the dose gradient. The accumulation of Cr(VI) increased with a dose dependent manner with levels of Cr higher in roots than in leaves. It was also observed that the levels of Cr(VI) both in leaves and in roots was higher than that of Cr(III) both with treatment with VAM and without VAM, respectively. The level of phosphate uptake in VAM treated plants, were found to increase with increase in Cr concentrations with higher levels in VAM infected plants than grown without VAM, at their respective concentrations.

78. Fluoride Distribution in Drinking Water : A case report from Ottapidaram Block, Tuticorin District, Tamilndau, India

V. Veeraputhiran*, G. Alagumuthu and M. Rajan

PG & Research Department of Chemistry,
Sri Paramakalyani College,
Alwarkurichi-627 412. Tamilnadu
E-mail : liviveera@yahoo.co.in

Keywords : *Fluoride; Ground water, Wilcox, Piper Diagram*

This paper analyzes the most extensive database on fluoride and other chemical constituent distribution in arid tract of Ottapidaram block, Tamilnadu, India where it is the only source of drinking water. The study was conducted in the summer season (May – June, 2009). The water samples, from the total 61 village panchayats were tested, 81.97% had injurious fluoride level above the 1.5 mg/L and having the variation from 0.936 to 4.34 mg/L. Due to the high concentration of fluoride, dental fluorosis was also identified. Overall water quality was found as unsatisfactory for drinking purposes without any prior treatment except at eleven locations out of 61.

79. Emissions of Nitrous Oxide are Affected by Seasonwith Different Crops

Arti Bhatia, S. D. Singh, Vinay Kumar Singh and R. C. Harit

Division of Environmental, Sciences Iari,
New Delhi-10012.

Keywords : *ECD, N2O, NO3, pH, OC*

Flux of N2O from soil was collected in weekly and analyzed using a gas chromatography with electron capture detector (ECD).The rate of emission varies with deferent stases of crop. The maximum emissions of N2O were found between 26-28 and 24-28 day after sowing of arhar and moog crop respectively. Soil sample from 0-15 cm depth were collected to measure the pH, OC and inorganic –N (NH4-N, NO3-N) content. The finding of the experiment can serve as a guideline to understand the relation between NO3-N and emission of N2O from face in arhar and moog.

80. Photocatalytic degradation of Methyl Blue by heterogeneous $PbSnO_3$ photocatalyst under simulated sunlight

A. V. Borhade[1*], V. B. Gaikwad[2] and Y. R. Baste[1]

[1]Post Graduate Department of Chemistry,
HPT Arts and RYK Science College,
Nashik-422005
[2]Post Graduate Department of Chemistry,
K.T.H.M College,
Nashik 422002

Keywords : *Green chemistry, Photocatalyst, photodegredation, Solid stare synthesis*

Light induced photocatalyst $PbSnO_3$ was synthesized by green chemistry approach, with mechanochemical method. The synthesized catalyst was characterized by various analytical investigative techniques like UV-DRS, FTIR Spectroscopy, X-ray Diffraction, SEM and Energy Dispersive X-ray Spectroscopy etc. Avarage

partical size of the catalyst by Scherer's formula is found to be 26.36nm. Photocatalytic activity of $PbSnO_3$ was studied by photodegredation of Methyl blue dye under stimulated sunlight. Complete mineralization of Methyl Blue was successfully achieved by $PbSnO_3$ photocatalyst. In present study, result obtained is evaluated and reported.

81. Air pollution in Kolkata : Yesterday, today and tomorrow

Gaurav Saha[#], Sayantan Goswami, Soumi Sinha Roy, Shibayan Ganguly, Radhika Saraf*, Payel Ganguly, Anwesha Saha and Ayan Chandra[# #]**

Department of Microbiology,
*Department of Statistics,
**Department of Statistics & Microbiology
St. Xavier's College 30, Park Street, Kolkata,
West Bengal-700016.
E-mail : #gourav.saha@gmail.com,
#ayan991@rediffmail.com

Keywords : *Supreme Court, SPM, RPM, SOx, NOx, ANOVA, t-test, Box Plot*

Kolkata, with its vast network of roads lanes and by lanes, is also home to a large number of vehicles (both public and private). Hence the air of Kolkata is filled with the vehicular emissions. In order to check the increasing levels of pollution, the government of West Bengal in accordance with the Supreme Court Order, had banned all public vehicles more than 15 years old from the streets of Kolkata. This order came into existence from 1st August 2009. We have undertaken a study where we are trying to find out whether this ban on vehicles and in turn pollution is successful or not. We have adopted certain statistical tools to analyse the level of pollution that still thrives in the city. We have taken four parameters- SPM, RPM, SO_x, NO_x. We have taken up three seasons in view for three different time periods, one year before the ban, during the year of ban and a year after the ban. We have made a graphical representation of the levels of the four parameters in different seasons and in different years. We have also performed analysis of variance (ANNOVA) to determine whether the average levels of our four parameters differ significantly in the three seasons and in three

years. We have performed a Box Plot to see whether the levels of these parameters significantly differ from their standard values in the residential areas. We also determine the p-value to determine whether the levels of SPM, RPM, SO_X and NO_X have significantly increased or not. After performing this study, we came up to a striking conclusion. We found that the levels of all the four parameters have started to rise again after a slight dip when the ban had been imposed. The levels of SPM and RPM have increased significantly from their standard values but SO_x and NO_x have not shown such a significant rise from their standard values though they are increasing day by day. This means that initially the ban had met with success but with the course of time as more and more vehicles (both public and private) hit the roads, the pollution levels start to rise. Hence an overall monitoring and all round effort is necessary to stop this menace.

82. Nanotechnology : perspectives and present prospects Synthesis of nanofibrils from aquatic weed -Water lilies (*Nymphaea odorata*)

Marimuthu Thiripura Sundari and Atmakuru Ramesh

Department of Analytical Chemistry,
International Institute of Biotechnology and Toxicology (IIBAT),
Padappai-601301, Kancheepuram district, Tamilnadu,
Email : raamesh_a@yahoo.co.in

Keywords : *Nymphaea odorota, Nanofibrils, Weed manangement, Water lilies*

The application of nanotechnology in weed management was successfully demonstrated by using the aquatic weed *Nymphaea odorata*. The weed biomass was chemo - mechanically converted in to nanofibrils. The size of the synthesized nanofibrils measured were below 100 nm. The separation of fibers from the weed is based on alkali treatment at controlled temperature conditions. The fibers were generated and purified by successive chemical treatments and washings. The size and shape of the fibrils was confirmed by Fourier Transform Infrared spectrophotometry (FTIR), Scanning Electron Microscopic (SEM) analysis and by Transmission Electron Microscopic (TEM) image analysis. The data clearly indicates the fiber length is thousands of nanometer and diameter of fiber is in nano range.

83. Be Environmentally Educated Not Literate-Need Of Eco-Education

Arti Gupta

Invertis Institute of Engineering & Technology,
Bareilly (UP)

No any government or NGO project can achieve the goal of sustainable development, until the public has participation in it.

IN the present scenario there is not a single place in the planet earth that remains unpolluted. Over burden of solid, liquid and gaseous waste is adversely affecting the atmosphere, hydrosphere, lithosphere and even biosphere. Man himself is responsible for the degradation of quality of life. The present study reveals the reduce of waste generation, enhancing awareness for the conservation of natural resources, control over population, refuse the use of non-biodegradable substances and use of eco-friendly products. Hopefully this exercise will give fruitful results to conserve our single home i.e., PLANET EARTH.

84. A Study to determine a dynamically changing blend of Diesel Fuel with Biofuel to achieve an efficient compromise between power and exhaust pollution for varying conditions

Dhruba Jyoti Purkait#, Tathagata Guha Mazumder^,
Sayantani Goswami *and Arijita Chakraborty and B. B. Ghosh.**

#Department of Physics, St Xavier's College, Kolkata.
^Department of Computer Science,
Institute of Engineering and Management, Kolkata.
*Department of Microbiology,
University of Calcutta, Kolkata
**Department of Biochemistry,
University of Calcutta, Kolkata

Keywords : *Bio-diesel, emissions, blend ratio, power requirement, optimum blend, emission level*

Low fuel reserves and pollution have made Bio-diesel an attractive modern day fuel. The hurdle in Bio-diesel use, however, is a combination of low calorific value and detrimental effects on standard diesel engines when used in unblended

form. In this investigation an unmodified two-cylinder diesel engine, SVA-2 manufactured by Alamgir.

Industries was used. Four different emissions i.e. NO_X, CO, HC and PM (particulate matter) were chosen and their levels in g/kWH were observed for varying blends of bio-diesel prepared in the laboratory with diesel fuel (Bharat Petroleum). The increase in power requirement and thus, fuel consumption (100% diesel) for an engine per hundred Kilograms increase in load was also recorded. Results showed an increase of 11.2% in NO_X emissions, decrease of 47% in PM and 55% in CO levels and 73% decrease in HC levels. There was a 13% increase in the power requirement over a graduated increase of 600Kg. The fuel consumed per Km rose by 12.7% in the same range. This data and the specifications of the engine were fed to a computer program which generated then, an optimum blend ratio to keep a vehicle moving at a steady speed of 40km/h, taking care of both power and emission, for a given weight increase. The blend ratio changes dynamically with increase or decrease in weight, thereby generating an optimum blend for maximum possible power efficiency and minimum possible emission levels at a steady speed.

85. Atrazine Biodegradation by Soil Isolates

Kale A. S.[1] and Mrs J. N.

[1]Department of Microbiology,
S.V.K.T.. College Deolali Camp, Nasik.
[2]Department of Microbiology,
S.V.K.T.. College Deolali Camp, Nasik

Keywords : *Atrazine, biodegradation, Bioremediation, Chemical oxygen demand, shakeflask, bioreactor*

Atrazine, a herbicide, belongs to S- triazine group, widely used in corn, sugarcane fields. It is frequently detected as a ground water and soil contaminant. An atrazine degrading bacterial cultures were isolated from an agricultural soil, previously impacted by herbicide spill. Fifteen atrazine degrading isolates were isolated, out of which two best degraders were studied for biodegradation studies depending on their high substrate tolerance. The isolated organisms were identified by using 16S rRNA technique Pseudomonas *putida* (ATZ-2) and *Leucobacter komagatae* (ATZ-7).

Atrazine estimation was done by U.V. Specrophotometer at 220 nm. The organisms were capable of using atrazine as a sole source of carbon and nitrogen under aerobic condition. The substrate tolerance of both organisms was found to be 400 ppm. Glucose and ethanol served as good additional carbon sources whereas, ammonium chloride and peptone as good nitrogen sources for carrying out of atrazine degradation. There was no significant influence of different metal ions on biodegradation of atrazine. pH 7 and 27^0c temperature was found favorable for growth of both organisms. As the cell population density increases, the biodegradation activity was found to be increased. Bioreactor and Shake flask studies showed that complete biodegradation of atrazine taken place in 120 hours. Decreasing levels of COD indicated that atrazine is degraded in to non toxic products.

86. Study of Microbial Contamination in *Amaranthus Gangeticus* Life Stages

N. Sundara Rami Reddy, A. Dattatreya and G. V. N. S. Devi Ram

Department of Microbiology, GIS, GITAM University,
Visakhapatnam-45

Keywords : *Bacterial contamination, Amaranthus gangeticus, nutrient agar.*

The study was conducted to determine various microbial species responsible for the contamination of leafy vegetables during their entire life cycle till they are harvested. *Amaranthus gangeticus(*Redroot pigweed). Were cultivated in different areas. Bacterial species observed were *Escherichia coli, Pseudomonas aeruginosa, Staphylococcus and Streptococcus sp*, fungal species *Aspergillus niger, Aspergillus flavus*. The results have shown that out of the samples examined high percentage of contamination occurs in traffic area followed by village garden, then house garden which has been least. *Staphylococcus sp* accounts for a high percentage of occurrences with 52.5%, *Escherichia coli* having 17.9%, then *Pseudomonas aeruginosa* with 20% and 9.5% for *Streptococcus*. Therefore, consumption of these types of vegetables unhygienically paves way for ingestion of considerable numbers of human pathogenic bacteria. This ultimately results in establishment and manifestation of diseases in the final host.

87. Biochemical Screening of Cyanobacterial Isolates Exposed to Common Rice Field Pesticides from Coastal Areas of Visakhapatnam

G. V. N. S. Deviram*, Saidani, Gaurav Pant and R Gyana Prasuna

Department Of Microbiology,
GITAM Institute Of Science, GITAM University,
Visakhapatnam, Andhra Pradesh

Keywords : *Biofertilizer, Cyanobacteria, Pesticide, Protein*

Pesticide contamination in aquatic ecosystem is one of the reasons for global environmental concern. With the increased use of pesticides, Cyanobacteria is also affected which are potent biofertilizer. In order to know the stress response of Cyanobacteria against pesticides, *Anabaena Sp and Aulosira Sp* were studied with graded concentrations of organophosphate pesticide O,S dimethyl – acetyl phosphoramidothiate 'Acephate' with different parameters like photosynthetic pigments, protein content of pesticide treated cells and the free cells. Acephate concentrations higher than 4µg/mL led to a significant decrease in chlorophyll a (Chl-a) biomass yield and protein content. However at high concentrations of pesticide, the pesticide adapted cells exhibited survivability of 10-12 days as compared to their free living counter parts.

88. Nanotechnology in Groundwater Remediation

C. S. Rajan

Chemical Department of Chemical Engineering Sathyabama University,
Chennai-600 119.
Email : csrajan.23@gmail.com

Keywords : *In situ, zero iron nanoparticle (nZVI), carbon nanotube (CNT), toxicology, contamination, remediation.*

Nanotechnology is an area of extensive research in recent years. Nanoparticles have benefited multiple sectors using their nano-scale applications. This review summarizes on the use of nanomaterials such as zero valent iron (nZVI) and carbon nanotubes (CNT) in the environmenta clean up like ground water remediation for

drinking and reuse. However, there are concerns regarding the potential risks associated with the use of nanomaterials to the environment and human health. An understanding of the relationship between the properties of nanoparticles would provide an effective strategy to tackle the deleterious effects.

89. Ayurvedic Bioinformatics : Establishing an *In-Silico*-Ayurvedic Medication for Alzheimer's Disease

[1]Sumit Raj and [2]Pasupuleti Renuka

Department of Bioinformatics, Sathyabama University
Chennai, Tamil Nadu

Keywords : *Alzheimer's disease, Ayurveda, Canscora decussate, Nardostachys jatamansi, Mucunapruriens, Drug designing*

Alzheimer's disease is an incurable, degenerative, and terminal disease. It is associated with mutations in Amyloid Precursor Protein (APP), Presenilin 1 (PS1), Presenilin 2 (PS2), or Apolipoprotein E (APOE). 3D structures of these protein were designed using Homology Modeling. Active compounds of medicinal herbs – Canscora decussate, Nardostachys jatamansi and Mucuna pruriens were selected as these three herbs have properties of memory enhancement. Chemical structures of the active component of these three herbs were drawn using chemsketch, combined and converted to *.pdb. The four proteins were successfully docked with – Canscora decussate, Nardostachys jatamansi and Mucuna pruriens active component combination.

90. Effect of Electric Current on Growth and Heterocyst Differentiation in Cyanobacteria

R. R. Gyana Prasuna[1], Gaurav Pant[2*], Saidani[3] and G. Deviram[4]

[1]Associate Professor, Head of Department,
Department of Microbiology, GITAM University Visakhapatnam,
A.P.-530 045.
[2,3,4]Research scholar, Department of Microbiology,
GITAM University, Visakhapatnam,
A.P.-530 045

Keywords : *Anabaena, Heterocyst, Electric chamber, Applied electric field.*

Filamentous cyanobacteria "*Anabaena*" were subjected to an externally applied electric field of 10 amperes for 2 hours. The effect of electric current was seen on the growth, survival and heterocyst differentiation of the cyanobacterial strain. An electric chamber for the experiment was constructed. Interesting growth pattern with remarkable increase in the percentage of heterocyst were observed when treated cell were compared with control. An increase in the heterocyst percentage to 10.22% was marked in 80 minutes treated sample with development of dimer and trimer forms of heterocyst. These results suggest that possibly treated cells can fix more nitrogen as compared to normal, untreated cyanobacterial cells.

91. Eco-friendly Pyramidal Type Earthenware Storage System for Rural House hold Storage of Vegetables

A. M. Murugan and *A. J. A. Ranjith Singh

Department of Advanced Zoology and Biotechnology,
Sri. Paramakalyani College, Alwarkurichi-627 412,
Tirunelveli District, Tamil Nadu
E. mail : singhspkc@gmail.com

Keywords : *Pyramid, storage, vegetables, nutritive value, organoleptic value*

With view to investigate the influence of pyramidal structure for vegetable storage experiments were conducted for a period of 9 days and it was compared with other storage systems including refrigerator and ambient conditions. Parameters like physiological loss of weight, heterotrophic microbial count, carbohydrate and protein content and organoleptic qualities were analyzed for the stored products like carrot, tomato and ladies finger. The results indicated that the vegetables stored in pyramidal storage system minimized the physiological loss of weight, reduced microbial numbers and prevented spoilage, retained nutritive value much greater than, when compared to refrigerator storage and ambient storage. In the pyramidal system, organoleptic value has also unchanged.

92. Removal of Cd (II) from Waste Water by Synthesised Goethite

Amita Jaiswal and M. C. Chattopadhyaya*

Environmental Chemistry Research Laboratory,
Department of Chemistry, University of Allahabad,
Allahabad-211002
Email : amita_ecsl@rediffmail.com,
mcc46@rediffmail.com

Keywords : *Goethite, Heavy metal, Adsorption, XRD, FTIR, Langmuir isotherm model*

Goethite (á-FeOOH) is the most abundant and most stable of all forms of iron-oxides in soil and its surface chemistry affects the distribution of soluble species in soil. Synthetic goethite have been extensively study and applied for the removal of heavy metal contaminants from industrial solutions, radionuclides from nuclear reactor plants and for municipal water treatment. Adsorption is an effective purification and separation technique used in industry especially in water and wastewater treatments. In the present work we have synthesized a low cost goethite and characterized by XRD and FTIR.Using this goethite, the adsorption of Cd (II) was studied in synthetic waste water in a batch system by varying pH in the range 3 to 5,varying the initial concentration (1-5ppm) and varying the adsorbent dose(1.0 -5.0g). The percentage adsorption of the Cd (II) was found to be 97.56%. The equilibrium isotherm data was analysed using Langmuir isotherm model. The values of b and Qo for Cd(II) is 2.14 and 0.079 respectively and correlation coefficient is 0.9943.

93. Energy Conservation from Organic Wastes

D. Aravindaraja

Artchouna Soupraya Naickar, Govt. Middle. School – Mudaliarpet,
Cuddalore Main Road, Mudaliarpet,
Puducherry-605004.

Keywords : *Environmental Pollution, Organic wastes, Compost Tumbler, Energy Conservation (collection of Bio–Gas)*

This paper describes a method to reduce and manage organic waste using a rotating compost tumbler and also to arrest the harmful gases that are a great reason for climate change and make people aware of the importance of proper waste management. Our main strategy is that we could decompose fruits and vegetable wastes and extract and conserve energy out of the compost formed. For this purpose, we made a Compost Tumbler (a rotating compost bin) which are systems designed to be turned or aerated, with the facility of closing it air tight.

The project is typically conducted over two phases. During the I phase, the decomposition process was carried out and during the II phase, energy was conserved using the decomposed organic matter and the biogas was collected. In conclusion, our hypothesis was partially correct, the final results collected with the data being statistically analysed and recorded.

94. Bacteriological Water Quality of The Nambol River, Manipur

Rebika Soibam Chanu and *Asha Gupta

Department of Life Sciences,
Ecology Research Laboratory, Manipur University,
Canchipur-795003
*E-mail : anjalika_22000@yahoo.co.in

Keywords : *Total Coliform, Faecal Coliform, Indicator organisms, Water quality, Pollution, Nambol river, Manipur*

This survey comprised a part of the pollution analysis of the Nambol riverine ecosystem, Manipur with a goal to assess the bacteriological water quality. Samples were collected from 5 different sites from the Nambol river during Monsoon and Post monsoon period during hydrological year 2010. Total Coliform, Faecal Coliform, and Faecal Streptococci were used as bacterial indicators. Standard methods (APHA, 1989) were used for the analysis of total and Faecal Coliforms and Faecal Streptococcus. Site 5 showed the maximum bacterial contamination in both the monsoon and post monsoon seasons. The water which is otherwise used by the inhabitants in the surrounding areas of the Nambol river for domestic purposes like drinking, bathing, cooking, washing etc did not meet the microbiological water quality criteria for any form of use and the Nambol river is heavily polluted.

95. Phytoremediation : A Novel Strategy for The Removal of Heavy Metal from The Environment using Plant

Mule A. R.[1*], Patil V. V.[1], Jagdale V. V.[2], Patil B. D.[3] and Pawar D. V.[4]

[1]Department of Biotechnology COCSIT, LATUR (MH)
[2]Dr BAMU Sub Center Osmanabad (MH)
[3]New Arts Commerce Science College Ahmednagar (MH)
4 R.Y.K. College Nasik (MH)

Keywords : *Phytoremediation, Heavy metals, Soil contaminant*

Phytoremediation is a site remediation strategy which employs plant to remove non volatile & immisible soil contaminant (Heavy metal). More than 400 plant species have been identified to have potential for soil & water remediation. Among them Brassica & Thlaspi species have been mostly studied. Phytoremediation being more costeffective & fewer side effects than physical & chemical approaches. Three subset of Phytoremediation are applicable to heavy metal remediation (1)Rhizofiltration (2)Phytoextraction (3)Phytostabilization.The use of chelator enhance the heavy metal accumulation activity of plant. This paper is attempted to provide a brief review on recent progress in research & practical application of Phytoremediation.

96. Vermiculture : A Sustainable Solution for Waste and Land Management by Earthworms

Aasha Kumari[1], Soma Chatterjee[1], Dr. Tripti Gangwar[2] and Dr. Bihari Singh[3]

[1]Research Scholar, Department of Environmental Science
[2]Sr. Lecturer, P.G. Department of Chemistry,
A. N. College, Patna
[3]Professor, P.G. Department of Environmental Science,
A.N. College, Patna

Keywords : *Vermiculture, Vermicompost, Sustainable Agriculture, Earthworm Biomass*

Vermiculture is a growing industry not only for managing waste and land, very economically but also for promoting 'sustainable agriculture' by enhancing crop productivity both in quantity and quality at significantly low economic cost than the costly agrochemicals. In any vermiculture practice, earthworms biomass comes as a valuable by-products and they are good source of nutritive 'worm meal'. They are rich in proteins(65%) with70-80%high quality essential amino acids 'lysine' and 'methionine' and are being used as feed material to promote 'fishery',' dairy' and 'poultry' industry. They are also finding new use as a source of collagen' in the manufacture of pharmaceuticals and in the making of 'antibiotics' from the ceolmic fluid as it has ant pathogenic property. The objective of this article is the present an overview of vermiculture technology.

97. Electronic Pollution Control System

T. Raghavendran, Santhosh Jayanthi and P. Indraniel Gupta
Prince4india@gmail.com

The emerging world has been covered with a new blanket along with the atmosphere, in the recent times and that blanket is named "POLLUTION". And measures have been taken in recent times, to the core, to control and enroll certain measures to remove the blanket and it is successfully on way.

Here this is a part of it. This Electronic Pollution control system has been designed for the above purpose. This has a gas detector in the exhaust tube of every vehicle in case of automobile and in the chimney top, in case of different petro-chemical industries, which top the table of leading polluting industries. This sensor will monitor the toxic gases coming through the exhaust and give an electronic output, which will be monitored by small software.

Now when the output from the sensor for a particular season, or a particular period of time goes beyond the safer value, an ANALOG signal will be sent to the nearest transport or police department, with the help of an artificial SIM, equipped in the car. This signal has data regarding the owner's license, bank account number etc details, which helps them to take action on that vehicle.

98. Recycling Waste into Valuable Organic Fertilizer

Miss. S. A. Hake*, M. R. Deokar, H. B. Manjare, S. B. Bhosle and S. S. Khirsagar

Department of Biotechnology,
College of Computer Science and Information Technology,
Latur (MH)

Keywords : *Vermicompost, Earthworms, Biodegradation*

Vermicompost also called worm humus. Vermicompost is literally the best nutrient – rich, organic fertilizer and soil conditioner. Vermitechnology is the use of organic amendment. Vermitechnology comprises Vermiculture (Rearing of earthworms), Vermicomposting (Biodegradation of waste biomass in earthwormic way), Vermiconvertion (Mass maintenance of sustainability of waste lands through earthworms) Eudrilus euginiae is the species of earthworm used in the vermocomposting process. In this present work we prepare three beds with different contents. The worms added in the beds by using Random method. Then we found that the mixer of Soil, Agriwaste, Cow dung, Desiculture suitable for production of higher quality vermicompost with micro flora of vermicompost Azotobactor, Agro bacterium, Rhizobium, microbes.

99. Application of Water Quality Index to Assess Water Quality- A Case of Neyyar River Basin South West of India

Sheeja R. V.*, Sabu Joseph, Sheela A. M. and Jaya D. S.

Keywords : *Water quality Index, Weighted Arithmetic Index method*

Water quality monitoring studies in Neyyar River Basin were carried out with water quality index (WQI) Weighted Arithmetic Index model by using water characteristic data for Neyyar river, South west of India during the period, May 2006 to January 2007. The WQI is used to classify water quality as excellent, good poor and very poor. The index ranges from 0 to 100, where 100 represent very poor water quality. Water samples were collected in the premonsoon, monsoon and post monsoon seasons from selected stations of the river stretch. Eight parameters were

analysed, namely pH, Total Dissolved Solids, Total Alkalinity, Total Hardness, Chlorides, Sulphates, Dissolved Oxygen and Biological Oxygen Demand. The results of spatial and temporal distribution of WQI of Neyyar River Basin revealed that the water quality fall under good to poor category. Direct and indirect influx of solid and liquid wastes from urban area, withdrawal of water for irrigation, agriculture practice prevailing in the basin etc. mainly led to deterioration of water quality in some sampling stations of Neyyar River Basin.

100. Effect of Sand Mining on the Structure of Meiofaunal Community with Special reference to Marine Nematode Assemblages : an Experimental Approach

Ravail Singh and Baban IngolE

Biological Oceanography Division,
National Institute of Oceanography,
Dona Paula, Goa-403004
*Email : rubail2010@gmail.com

Keywords : *Sand Mining; Impact; benthic assemblages; simulated experiment; Paradeep; Bay of Bengal; India*

The exploratory mining phase was started about quite years ago on the assumption that the resources of terrestrial mines able to meet demand within a few decades. Supplies of certain metals might also become limited on political grounds, since production of certain metals is concentrated in relatively few countries. Increasing demand for metals and its depletion on land has turned global attention towards the Sea. Present study is investigating the effect of sand mining on benthic communities. This will be the first attempt to study meiofauna with special reference to nematodes up to species level from Paradip harbour east India. Disturbance (natural and /or manmade) is one of the major factors affecting the species diversity. Field studies investigating the effects of different classes of disturbances on benthic meio- and macrofauna have been conducted and results of before, immediately after and 24 hours of monitoring experiment are presented. We report the results of simulated sand mining experiments with dominant macro- and meiofaunal species in order to examine the effects of disturbance on species composition, diversity and community structure. The hypotheses that physical

disturbance brings significant change in benthic community structure, especially the species density and diversity. The experiment was conducted in the offshore between Mahanadi estuary in the north and Paradip port mouth in the south (20^0 15 08 -20^0 16 46 N lat.; 86^0 41 41 - 86^0 42 46 E long.) and it falls almost in the centre of the coastal periphery of the Mahanadi delta. The hypotheses tested is physical disturbance brings significant change in benthic community structure, especially the species density and diversity. Nematodes community attributes (species abundance, species number, species diversity) showed influence of disturbance. *Daptonema* sp was the most abundant among 16 nematode genera recorded at D-0hrs. The distribution of nematode was influenced by the supply of food material from water column and thus, any fluctuation in food input may impact the nematode distribution within the sediment column. We can say that the mining or any type of physical disturbance could change the feeding structure of community in a particular ecosystem. The results presented here contribute to a better understanding of benthic processes and improved the precision with which the response of the biota to environmental change can be determined. The experimental approach proved to be a powerful tool for the evaluation of environmental impacts. It is clear from this short-term experimental study that sand mining has large impact on the marine benthic communities. Thus, there is a need for conservation and the effective management.

101. Effect of Alternaria Leaf Blight on Seed Germination and Seedling Vigour of Sunflower in Rohilkhand Region

Vikas V. Patel, Reetu Gangwar and U. S. Mishra

Phytopathology Lab. Department of Botany,
Bareilly College, Bareilly, M.J.P. Rohilkhand University,
Bareilly-243006
E-mai : vpversatile@gmail.com

Keywords : *Alternaria leaf blight, sunflower, seed germination, seedling vigour, management*

Alternaria leaf blight of sunflower is a very common and destructive disease in Rohilkhand region. Despite the rapid spread of the crop in India, the productivity is going down in recent years due to the susceptibility of this crop to the fungal

diseases. The symptoms of *Alternaria* leaf blight appeared in the month of March in the form of characteristic small circular, brown coloured patches on the surface of leaves and these brownish patches grow in size and coalesced to cover the entire surface of leaves producing blight symptoms. Marked blight symptoms are seen in the head (capitulum) of heavily infected plants in which seeds are also infected with *Alternaria helianthi*. Naturally infected seeds with *A. helianthi* and artificially inoculated one showed 38.6% and 23.0% reduction in germination respectively. Shoot and root length of seedlings was also significantly reduced in both cases. There was a marked increase in number of seedlings showing blight incidence with increase in spore load of *A. helianthi* on seeds. Biocontrol of *Alternaria* blight by selected natural herbal plant extracts *in-vitro* has been observed and recommended for use to the farmers.

102. Ginger (*Zingiber officinale)* Rhizome Extract : A Source of Silver Nanoparticles and their Application

R. P. Singh*, S. Magesh[(a)] and C. Rakkiyappan

Amity Institute of Nanotechnology,
Amity University Uttar Pradesh,
Noida : 201301, (UP)

Ginger root extract has been used for chemical reduction of Ag^+ ion producing Ag nanoparticles. It is observed that chemical reduction is slow as compared to pudina or other leaf extracts reported by other authors. The observations of non-uniform particle size in the early stages of reaction, and subsequent appearance of uniform size distribution at the later stages have been accounted for the slow reduction process of ginger root extract. 3D Atomic Force Microscope (AFM) images of Ag nanoparticles reveal hill like structures around them. Attempt has been made to explain the mechanism of formation of such particles. It is believed that polyol (oxalic/ascorbic acid) and water-soluble heterocyclic components of the root extract play a key role in chemical reduction and stabilization of Ag nanoparticles respectively. Transmission Electron Microscope (TEM) images have been used as a complementary technique to see the shape and absolute size of Ag nanoparticles. In addition, the toxic effect of Ag nanoparticles to E.coli strain has been demonstrated.

103. Biosorption of Zn(Ii) from its Synthetic Solution by Aspergillus Niger

Asha Gupta[a]*, Pawan Rose[a] and Jaipal[b]

[a]Department of Environmental Science and Engineering,
Guru Jambheshwar University of Science and Technology,
Hisar-125001 (Haryana)
[b]DAV College of Engg. & Tech., Kanina,
Mohindergarh, Haryana,
*E-mail : drashagupta@indiatimes.com

Keywords : *Biosorption, Langmuir Isotherm, Freundlich Isotherm, Correlation Coefficient*

Free biomass of *Aspergillus niger* for the removal of Zn(II) from an aqueous solution was tested in this study. Batch studies were performed to optimize parameters like pH, biosorbent dose, contact time and initial metal ion concentration. Biosorption process was found to be highly pH dependent. The optimum pH for biosorption of Zn (II) was found to be 5.5. Biosorption was found to increase with increase in biosorbent dose and decrease with increase in metal ion concentration. The Langmuir and Freundlich isotherms were applied for describing sorption equilibrium. Freundlich isotherm was found to describe well the process with correlation coefficient (R^2) greater than 0.97.

104. Product Advertisements and Its Effects on Environment

#Mansi Shukla, Shilpi Bose, *Somit Roy Chowdhury and ^Vikas Gupta

#Lecturer, Department of Commerce,
Avadh Girls' Degree College, Lucknow
*Lecturer, Department of Botany,
Lucknow Christian College, Lucknow
^Research Scholar, University of Lucknow,
Lucknow

Keywords : *Eco friendly, environment.*

"Let every individual and institution now think and act as a responsible trustee of Earth, seeking choices in ecology, economics and ethics that will

provide a sustainable future, eliminate pollution, poverty and violence, awaken the wonder of life and foster peaceful progress in the human adventure."

The labelling of ecofriendly products has been introduced in a number of developed countries to assist in the protection of the environment. Recently, developing countries like India, have introduced the scheme.

As consumer demand for environmentally conscious products increases, so do claims touting the positive environmental impact of products, also known as "green" claims. Companies wishing to capitalize on the demand for eco-products must understand the law regarding such claims, as well as the ramifications, both legal and otherwise, of making illegal or false claims. With calls to conserve our resources, protect our environment and "Save Our Earth" reaching an all-time high, there is no question that green claims will continue to populate the marketplace with ever-increasing regularity.

105. Sedimentary record of heavy metal pollution of Lake Burragorang using ^{210}Pb dating

Archana Saily Painuly[1], Surendra Shrestha[2] and Paul Hackney[3]

[1]Babu Banarasi Das National Institute of Technology & Management, Lucknow, India

[2]University of Western Sydney, Sydney, Australia

3SA Water, Adelaide, Australia

Keywords : *Dating techniques, metal, nutrients sedimentation rate, paleoenvironment*

Sediment core samples from Lake Burragorang, Sydney, Australia were subjected to ^{210}Pb radiometric dating to determine the rate of sedimentation. CIC model has been applied in this study for age determination. The ages calculated were correlated with organic matter, carbonate content, nutrients and metals concentration, and past rainfall record and bushfire data in order to characterise the historical record of their deposition.

106. Assessment of chromium tolerance potential in three locally available aquatic macrophytes

Surjendu Kumar Dey

Department of Environmental Science,
Fakir Mohan University, Vyasa Vihar,
Balasore-756020
E-mail : surjendufmu@rediffmail.com

Keywords : *Ceratophyllum, Hydrilla, lipid peroxidation, peroxidase, Superoxide dismutase, total chlorophyll, Utricularia*

Three locally available aquatic macrophytes viz., *Hydrilla verticillata* (L.f.) Royle, *Ceratophyllum demersum* L. and *Utricularia aurea* Lour. were exposed separately to 100 ppm solution of $K_2Cr_2O_7$ for seven days and some physiological parameters were assessed in order to determine their Cr tolerance potential. The physiological parameters assessed were total chlorophyll and soluble protein contents; activities of antioxidative enzymes like superoxide dismutase (SOD) and peroxidase; and the level of lipid peroxidation. Since the concentration of Cr used was quite high, toxic effects in terms of alterations in physiological parameters were observed in all three species. However, differences in term of changes in physiological parameters were observed in three species tested. In *Hydrilla verticillata*, the decrease in total chlorophyll content, soluble protein content, activities of SOD and peroxidase and increase in lipid peroxidation levels were 26%, 14%, 15%, 18% and 41% respectively in comparison to the control plant. In comparison to other two plants, least decrease in the parameters was found in *Hydrilla verticillata*. The alterations in physiological parameters were found maximum in case of *Utricularia aurea* and the twigs were found disintegrated and in *Ceratophyllum demersum*, intermediate toxicity symptoms were noticed. Thus, the results of this study indirectly give evidence that among three species, *Hydrilla verticillata* has maximum potential to tolerate Cr and therefore, it may be recommended for Cr phytoremediation in polluted water bodies.

107. Effect of Ph and Biosurfactant on Bioremediation of Petroleum Contaminated Soil

Dr. B. Santhaveerana Goud

Professor, Department of Civil Engineering,
Bangalore University, Jnana Bharathi,
Bangalore-560056

Keywords : *Bioremediation, Biosurfactant, Soil, Hydrocarbons*

The biodegradability of petroleum hydrocarbons in oily sludge was studied in solid phase treatment by preparing simulated contaminated soil. Simulated contaminated soil was prepared by mixing fresh soil with oily sludge and innocuous soil collected from VRL Logistics Ltd, near R.V.College, Mysore Road, Bangalore. The simulated contaminated soil was filled in FIVE bioreactors and tested in the laboratory for various parameters at regular intervals of once in a week, for a period of 3 months to determine the biodegradation rate of TPH under laboratory conditions by maintaining optimum CNP ratio of 100:10:1.

Biodegradation of TPH was studied with four bioreactors for various soil pH conditions i.e. (i) 6.5, (ii) 7.0, (iii)7.5 and (iv)8.0. Fifth bioreactor was maintained at pH 7.5 with addition of Biosurfactant. From the results it was observed that the pH and biosurfactant have influence on bioremediation. The higher rate of biodegradation was observed when the pH was 7.5. The addition of biosurfactant further enhanced the biodegradation rate. At pH of 7.5, total TPH reduction was 71.62% with degradation rate of 0.0140/day. When biosurfactant was used, total TPH reduction was 82.17% with degradation rate of 0.0191/day.

108. Pesticidal Residue in Water and Soil of Godavari Delta

Mahaboob Pacha Mohammed[1] and N. Srinivas

Department of Environmental Studies,
GITAM Institute of Science, GITAM University,
Visakhapatnam.
[1]Department of Chemistry, Petrochemicals and P. G. Courses,
P.R. Government College (Autonomous),
Kakinada

Keywords : *Pesticide Residue, Godavari Delta*

Water samples were analysed for pesticide residue in Godavari Delta of East Godavari District of Andhra Pradesh. The important physico-chemical parameters were determined and a significant spatial variation was observed. The residue levels of persistent chlorinated pesticides such as HCH isomers, Chlorpyrifos and Endosulfan compounds were quantified in water samples. HCH showed higher levels during premonsoon (July to September) and monsoon (October to December) months, reflecting the HCH usage during that season for paddy crops. But in the case of Endosulfan no clear trend in residue level was observed. The Chlorpyrifos was detected as the dominant pesticide in all the sampling sites.

109. Comparative Investigation of Growth, Antioxidants and uptake of two Cultivars (Sona and SRHM 445) of *Zea mays* L. towards Cr (VI) in Sand Culture

Shekhar Mallick

Ecotoxicology and Bioremediation Group,
National Botanical Research Institute,
Rana Pratap Marg,
Lucknow-226001

Keywords : *Tolerant, sensitive, Zea mays, antioxidants, lipid peroxidation, chromium uptake*

The study reports a comparative evaluation of growth and biochemical response in two cultivars of Zea mays L. namely cv. sona and cv. SRHM 445 against Cr(VI) (2.5, 5 and 10 µg g-1 dw) under sand culture for 7 and 14d. The two varieties exhibited differential response in its growth and antioxidant parameters. Besides high uptake of Cr in cv. sona, percentage reduction in shoot, root length and fresh weight of cv. sona was less than cv. SRHM445. After 14d, the decrease in the shoot length, root length and fresh weight of

the cv. SRHM 445 was observed as 26.67, 26.37 and 51.66%, respectively and 6.32, 7.69 and 46.83% respectively in cv. sona as compared to their respective C. Similarly antioxidant parameters were less affected in cv. sona, is indicative of the fact that it is a relatively tolerant cultivar than cv. SRHM 445. As compared to respective C, there was significant increase in APX and GPX activities of cv. sona, and maximum increase of 114.53 and 30.65% was recorded after 14d in 10 µg g-1 dw, respectively as against 152.48 and 38.30% in cv. SRHM 445. Thus, cv. sona may be suitable to grow on contaminated sites. However, the level of Cr in the edible part needs to be checked before its consumption.

110. Removal of Cr (Vi) from its Aqueous using A Fungus -*Aspergillus Niger*

Jaipal* and Asha Gupta**

*DAV College of Engg. & Tech., Kanina,
Mohindergarh, Haryana
**Deptt. of Environmental Sci. and Engg.,
Guru Jambheshwar University of Sci. and Tech.,
Hissar, Haryana

Keywords : *Biosoption, fungus, Aspergillus niger, Chromium (VI), isotherms, Freundlich*

The aim of this study was to investigate the Chromium (VI) biosorption potential of Fungus Aspergillus niger at varying pH, biosorbent dose, contact time and temperature through batch mode experiments. The biosoption followed first order rate expression and Langergren equation. Biosorption data was fitted to Freundlich and Langmuir isotherms. The highest (94.4%) metal biosorption is achieved at pH -2, biosorbent dose -0.6 gram per 50 ml, contact tome 60 minutes, agitation speed 150 rpm and 30 ppm metal ion concentration. It is proposed that aspergillus niger can be potential biosrobent for chromium (VI) removal from waste water.

111. Ground Water Quality of Paldi Village of North Gujarat Region : A Case Study

Dr. J. R. Prajapati, Dr. B. V. Raol, F. J. Thakor* and Shri P. H. G. Muni

Arts & Science College, Kalol (N.G.) 382 721.
*J & J College of Science, Nadiad, Dist. Kheda.
E-mail : jrpbiology@yahoo.com,
bvraol@yahoo.co.in,
fulsangjithakor@yahoo.co.in

Keywords : *Ground water quality, Physico-chemical characteristics, bore-well samples*

The ground water quality of Paldi Village (Tal. Visnagar, Dist. Mehsana, North Gujarat) was assessed by examining various physico-chemical & bacteriological characteristics. The bore-well samples were collected from four different seasons. On the basis of TDS values all samples were rated as unacceptable for their taste and on the basis of total hardness these were rated as hard. The sulphate, total iron and fluoride, MPM\N of coliforms values exceeded the permissible limit. The defluoridation and disinfection of borewell water of this area are recommended to ensure the health of population residing in rural area of North Gujarat region.

112. Heavy Metal Assessment in Leachates of Municipal Solid Waste Dumping Site – Jaipur

Anirudh Sahni* and Abhishek Gautam**

Department of Environmental Science,
Birla Institute of Technology, Mesra (Ranchi),
Jaipur Campus
E-mail : anirudhsahni@yahoo.com,
dranirudhsahni@gmail.com

Keywords : *leachates, heavy metals, natural water resources, health hazards*

The MSW mismanagement is a serious problem of the world. Proper disposal methods are important in management of municipal solid waste. Open dumping may have adverse affects on environment and human health. Leachates are the byproducts of decomposition of municipal solid waste. It consists of various toxic and poisonous substances and heavy metals. These heavy metals may percolate through soil in surface and sub surface water and may cause negative impact. In the present study analysis of heavy metals in the leachates of MSW site of Jaipur shows their presence in toxic levels. Iron was found in highest quantity (224.0 ppm) and cadmium in least amount (0.14 ppm). The order of merit of heavy metals was found to be Fe > Zn > Pb > Cr > Cu > Ni > Cd. Complete isolation of municipal solid waste dumping site from population and natural water resources is recommended to minimize the adverse effects.

113. A Comparative Analysis of Trace Elements in Domestic Waste Water and Industrial Waste Water by ICP-MS

Pathan A. D.*, Gaikwad S. D., Patil S. M. and Bhavsar V. A.

Dept. of Biotechnology, COCSIT College,
Latur (Maharashtra)

Keywords : *Trace elements, Heavy metal, ICP-MS, Waste water*

Water is the most vital source of all kinds of life on the earth water quality is adversely affected both qualitatively & quantitatively by all kinds of human activities. Determination of trace element is considered as a useful and important test in survey of environmental pollution. So this issue is taken for the study. Inductively Coupled Plasma Mass Spectrometry (ICP-MS) is used to determine trace elements and metals. A number of elements are normally present in relatively low concentration, usually less than a few mg/l, in conventional irrigation water and are called trace elements. They are not normally included in routine analysis of regular irrigation water. Particularly if contamination with industrial wastewater discharge is suspected. These include Al, Be, Co, F, Li, Mn, Mo, Se (Selenium), Sn (Tin), Ti (titanium), W (Tungsten), V (Vanadium). ICP-MS (Laser Ablation Inductivity Coupled Plasma Mass Spectroscopy) were used for the detection of

trace metals in a solid matrix consisting of KBr and two oxides. In the present investigation it is found that concentration of Be, Na,V,in domestic waste water is higher than industrial waste water. In the present study the aim was only detection of trace elements and metals. On the basis of this data the further study will be on, to reduce the load of trace element and metal by using advanced techniques e.g. Biosorption.

114. Biodegardation of Atrazine by Soil Isolates

Avinash S. Kale[1] and Mrs. J. N. Bandal[2]

[1]Department of Microbiology,
S.V.K.T. College Deolali camp Nasik,
[2]Department of Microbiology,
S.V.K.T. College Deolali camp Nasik

Atrazine, a herbicide, belongs to S-triazine group, widely used in corn, sugarcane fields. It is frequently detected as a ground water and soil contaminant. An atrazine degrading bacterial cultures were isolated from an agricultural soil, previously impacted by herbicide spill. Fifteen atrazine degrading isolates were isolated, out of which two best degraders were studied for biodegradation studies depending on their high substrate tolerance. The isolated organisms were identified by using 16S rRNA technique Pseudomonas *putida*(ATZ-2) and *Leucobacter komagatae* (ATZ-7).

Atrazine estimation was done by U.V. Specrophotometer at 220 nm. The organisms were capable of using atrazine as a sole source of carbon and nitrogen under aerobic condition. The substrate tolerance of both organisms was found to be 400 ppm. Glucose and ethanol served as good additional carbon sources whereas, ammonium chloride and peptone as good nitrogen sources for carrying out of atrazine degradation. There was no significant influence of different metal ions on biodegradation of atrazine. pH 7 and 27^0c temperature was found favorable for growth of both organisms. As the cell population density increases, the biodegradation activity was found to be increased. Bioreactor and Shake flask studies showed that complete biodegradation of atrazine taken place in 120 hours. Decreasing levels of COD indicated that atrazine is degraded in to non toxic product(s).

115. Sand Mining Impact Assessment of Ecology of Kallada River in Kerala, India

S.Sheeba and Nimisha P.*

Sree Narayana College, Punalur,
Kollam-691 305, Kerala.
***Sree Narayana College,**
Kollam-691 001. Kerala.

Keywords : *sand mining impact, Kallda river, ecology*

The quality of environment and ecosystem in rivers of the world are declining at an alarming rate. The rapid growth of population, industrialization, urbanization disturbing the natural quality of environment and that of the ecosystem has degraded. The entire old culture has changed due to destroying the environment rather than conserving. The life of the organisms is being threatened. Monitoring the ecosystem degradation level has not yet started in a serious way. Exploding population and shrinking of resources are the causes of environmental degradation. The natural resources are ruthlessly exploited in the name of development for economic benefit without giving adequate consideration to gradually deteriorating the environment. Human activities have greatly altered the ecosystem, and geographical factors very strongly influence the environment and environment is a product of various geographical factors.

116. Environmental Effects on Voltage Comparator Circuit - A Simulation Study Performed using MULTISIM

R. B. Barve and A. V. Mancharkar

Department of Electronic Science, New Arts,
Commerce and Science College,
Ahmednagar-414001
E-mail : mancharkarav@rediffmail.com;
barve_rb1970@rediffmail.com

Keywords : *Multisim, Simulation, Temperature Analysis*

Electronic products reliability is very important to both user and manufacturer. Designing products to survive harsh environments is expensive in time and money. An optimum design is one of that meets its requirements at minimum cost. Different factors such as humidity, radiations, EMI, vibrations, shock, water leakage, fungal growth, chemical attack, damage due to abuse & many others would also play as distracter. In the industrial processes temperature is a main factor. Many of these factors put constraints on the mechanical & electronic design**.**

This paper presents simulations of typically chosen representative circuit of analogue electronics using MULTISIM 10.1. The circuit performance is tested by simulating under specified temperature range. The results are plotted as a function of temperature to show performance degradation of circuit operation. This study would then help the pool for bridging the gap between the customers need & the manufacturer which would cut down the product waste cost, time & efforts manufacturing new product.

117. Physico-Chemical Analysis of Effluents of Dairy and Textile Industries

Lav Varma and Dr. Jyoti Sharma

Department of Chemistry, Raj Rishi Govt. College,
Alwar-301001, Rajasthan

Keywords : *Physico-chemical analysis; Dairy effluents; Textile effluents; Chemical oxygen demand*

Samples, from each industry, were collected and analyzed for various physico-chemical parameters such as pH, total dissolved solids (TDS), biochemical oxygen demand (BOD) and chemical oxygen demand (COD),suspended solids(SS), oil and grease, calcium, magnesium, iron, manganese, copper, chromium, sodium, potassium, total hardness. Results indicated that textile effluent is more acidic and possesses lower values of BOD and COD than dairy effluent. TDS and SS levels are higher in textile than dairy.Irrigation with high TDS water will result in decrease in optimal crop productionSodium levels were found quite high. Soil becomes poorly drained and tends to crust when treated with high level sodium water.Dairy effluent excels in Sodium, Calcium, Potassium and Manganesevalues, while textile effluent has

greater magnesium, total hardness and iron than dairy effluent. Copper and chromium were untraceable. Some methods like Electro-dialysis, ion exchange method, biochemical purification etc. can be employed for the treatment of such wastewater.

118. Polyphenol Content and *in vivo* Antioxidative Effect of *Ipomoea Aquatica* Extracts against Carbofuran Toxicity

***Sanjukta Datta and Santinath Ghosh**

Department of Chemical Technology,
University College of Science and Technology,
University of Calcutta, 92, A.P.C. Road.
Kolkata-700 009
E-mail : samyukta9231@gmail.com

Keywords : *Carbofuran, Flavonoids, Oxidative stress, Lipid peroxidation*

Carbofuran (2, 3-dihydro-2, 2-dimethyl-7-benzofuranol methyl carbamate) is a widely used carbamate which has been reported to be a potent inhibitor of neuronal functions in the body. Its ill effects by way of producing oxidative stress in the body tissues are well established. Studies have revealed the antioxidative properties of green vegetables and fruits to a large extent and have attributed this characteristic to the presence of the large quantities of polyphenolic compounds present in them of which, flavonoids form a major portion. The aim of this study was to evaluate the deleterious effects of this pesticide on blood plasma and erythrocyte membranes due to oxidative damage in Wistar albino male rats, given an oral dose of 0.1mg/ kg body weight and the extent to which the leafy vegetable extracts of *Ipomoea aquatica* (20 mg of polyphenolic compound expressed as gallic acid equivalents / kg body weight) protects the body against the oxidative insult caused to the blood. The evaluation was based on the lipid peroxidation levels in the plasma and also the erythrocyte membrane peroxidation levels. The results show that there was an increase in lipid peroxidation levels in the pesticide treated group than the group treated with the plant extract along with the pesticide. This provides a better surface to understand that how these natural products can protect the body cells against the deleterious effects of the oxidative stress caused by the pesticide. The present study thus gives an insight into the ill-effects of this carbamate and the protective role of plant polyphenols in minimizing those effects.

119. *Trigonella Foenum-Graecum* Mucilage : An Adsorbent for Removal of Sulphate Ions

Dr. Alka Tangri
Dept. of Chemistry, Brahmanand P.G. College,
Kanpur
E-mail : alka. tangri@rediffmail.com

Sulfate occurs naturally in groundwater. Sulfate ions present in water in high concentrations may cause temporary and acute effects on humans and animals, including diarrhea. Recently, numerous approaches have been studied for the development of cheaper and more effective adsorbents containing natural polymers. Among these, the use of adsorbents containing polysaccharides has been investigated as a replacement for current conventional methods of removing pollutants from solution.

The mucilage extracted from the seeds of Trigonella *foenum-graecum*, a food grade natural polysaccharide, is used as an adsorbent for removal of sulphate ions in aqueous medium. The maximum removal obtained was 87.80% after 60 minutes. The optimum mucilage dose was 50mg/L. The maximum removal was obtained at acidic pH. A series of contact time experiments were conducted to assess the system variables such as concentrations of mucilage and ions and pH. This ecofriendly food grade polysaccharide was proved to be a very good adsorbent for the removal of sulphate ions.

120. Uptake of Chromium and their Effects on Biochemical Constituents in *Salvinia Molesta* (Mitch.) Exposed to Tannery Waste Water

S. N. Pandey*, Kavita Singh, Padma and Sindhuja Shukla
Department of Botany, University of Lucknow,
Lucknow,
*E mail : snpandey511@gmail.com

Keywords : *Salvinia molesta* (Mitch), *tannery waste water, chromium, catalase activity.*

Due to the wide spread discharge of tannery waste, Cr is considered as hazardous aquatic pollutants in the environment. The exposure effects of Cr (VI),

evaluated in tannery waste water in *Salvinia molesta* with respect to biochemical alterations and visible symptoms of toxicity were studied. Tannery waste water were collected from Jajmau area in Kanpur district (U.P. state, India) and analyzed for some important pollution parameters. The waste water was slightly acidic in pH (6.7) with high BOD, COD and chromium content (1.32 ppm). Tannery waste water was low in dissolved oxygen content. *Salvinia molesta* were exposed with various concentrations of waste water (25, 50, 75 and 100%), tap water was served as control (0). The high uptake of chromium in *Salvinia molesta* was determined (612 µg g^{-1} dry weight) at 144 h exposure of undiluted tannery waste water (100%). Chromium accumulation was increased with increase in waste water concentrations. *Salvinia molesta* showed visible symptoms of toxicity such as necrosis in the leaves followed by chlorosis, spread from upper marginal portion. Visible effect of toxicity was more severe at undiluted tannery waste water than its ditlutions. The decrease in carotenoids content (- 54.3%) and activity of catalase (-60.9%) in *S. molesta* were observed at undiluted tannery waste water (100%), whereas these were stimulatory at low concentration (25%) of tannery waste water. Accumulation of chromium in *Salvinia molesta* was found concentration dependent. Therefore study concluded that, elevated level of Cr in tannery waste water showed high accumulation in *S. molesta* and exhibit visible symptoms of toxicity. Thus, tannery waste water needs more treatment prior to its discharge.

121. Microbial Removal of Hexavalent Chromium from Railway Locomotive Effluents in Liluah, West Bengal

Parijat Sil, Sneha Dutta, Rishita Baishya, Deblina Basu, Shriya Saha and A. K. Mitra*

Department of Microbiology,
St. Xavier's College
Kolkata-700 016
Email : *drakmitra01@hotmail.com

Keywords : *Liluah, Howrah, West Bengal, Hexa-valent Chromium, Bacillus firmus*

In India, the locomotive industries have a rich heritage of more than 150 years. But because of their old status, they have not always kept the effluent level low. The one at Liluah, Howrah, West Bengal, turns out effluents rich in heavy metals

like chromium, cadmium, lead and mercury. They have different levels of toxic influence on the aquatic microbes. Untreated water contains a typical micro-flora of bacteria tolerant to those heavy metals and was considered for this investigation. Five different colonies were chosen from this consortium and were named 1,2,3,4 and 5. Chromium content was highest in this effluent ((0.01 mg/I)). SO metal tolerance assay for Chromium was carried out and colony 1 showed 99% efficiency in the uptake of hexavalent chromium at 10ppm concentration of the metal in the growth media.it is worth mentioning here that colony 5 was growing appreciably at 50ppm concentration of the hexavalent metal. The bacteria to be Bacillus firmus, strain CM21 (GenBank Accession Number : **EU660344.1**), Which is a gram positive, long rod, aerobic, motile, and was found to be catalase positive, indole negative, voges Proskauer Positive. The consortium of these organisms can therefore act as effective means of removing hexavalent chromium from railway locomotive effluent.

122. Study of Kinetic Alfven Wave by Kinetic Approach in Inhomegeneous Plasma

P. Agarwal, Nidhi Shukla, P. Varma and M. S. Tiwari

Department of Physics.
Dr. HS Gour Uiversity,
Sagar-470003, Madhya Pradesh.
E-mail : nidhiphy.shukla@gmail.com

The Kinetic Alfven waves are investigated using Maxwell – Boltzmann-Vlasov equation. The model is developed by basic kinetic theory in inhomogeneous plasma. The physical model is based on the collisionless Vlasov-Maxwell equations in which unperturbed distribution function is evolved. Throughout the present analysis it is assumed that the plasma is immersed in inhomogeneous magnetic field. The effect of inhomoeneous magnetic field is included in the analysis for both the regions k1p1 <1 where k1 is the perpendicular wave number and p1 is the ion gyroradius. In this model, kinetic dispersion relation for inhomogeneous plasma is determined. This model of KAW is applicable to evaluate the dispersion relation, growth rate, growth length and damping rate of kinetic Alfven wave. The applicability of this model is assumed for auroral acceleration region and plasma sheet boundary layer.

123. Study of EMIC Waves with Linear Dispersion Relation in Current Free Plasma by Particle Aspect Approach

Soniya Patel, Nidhi Shukla, P. Varma and M. S. Tiwari

Department of Physics,
Dr. Hs Gour University,
Sagar-470003, Madhya Pradesh.
E-mail : nidhiphy.shukla@gmail.com

Electromagnetic ion cyclotron instability, incorporated the details of charge particles trajectory has been discussed. In this paper the energy of EMIC waves, growth rate and marginal instability by linear dispersion relation is determined. The growth rate has been obtained by and energy conservation method for a general loss-cone distribution function. It is assumed that the whole plasma is considered to consist of resonant and non-resonant particles. The resonant particle participates in energy exchange with the wave whereas the on-resonant particle participates in the oscillatory motion of the wave. The effect of non-resonant particle on the resultant growth rate has been discussed and beam effect on EMIC wave in current free plasma has also been derived. The heating of ions perpendicular and parallel to the magnetic field has been derived. The heating of ions perpendicular and parallel to the magnetic field has been discussed along with EMIC emission on auroral field line.

124. The Effect upon *Tilapia mossambica* on Exposure to short term and long term Concentration of Acehate

Dixy. B. A., Cannali Christy Deena. J. and Prakash. D. J.

Postgraduate & Research Department of Zoology,
Voorhees College,
Vellore-632001. Tamil Nadu.

Keywords : *Toxicity – Acephate – LC 50*

Water pollution is a global problem. Products and wastes from synthetic chemical industries are extremely complex in their composition and have an adverse effect on the water quality. *Tilapia mossambica* fishes from Vellore

Moat water (a polluted water body) were collected and exposed to lethal concentration of Acephate (orthene). LC50 value was calculated to be 1600mg/litre in 96hrs. The behavioural, physiological and histopathological parameters were studied during the lethal (96hrs) exposure. The observations show a moderate damage. The study concludes that the toxicity of this insecticide is comparatively less to the other insecticides and the damage to the non-target population is tolerable.

125. Studies on the Socio-economic Effects of Arsenic Pollution and Existingstatus of Mitigation measures in the Katlamari – I G.P. of Raninagar – II Block of Murshidabad District, West Bengal, India.

Saptaparna Chowdhuri, Abhijit Das and Subarna Bhattacharya

Department of Environmental Studies,
Rabindra Bharati University,
56, B.T. Road, Kolkata-50
Kandi Raj College, Kandi,
Murshidabad (West Bengal)

The presence of arsenic in the groundwater has become a high profile problem in many districts of West Bengal. Murshidabad district is one of the 9 severely arsenic affected districts of West Bengal. In which excepting Nabagram and Bharatpur-II blocks, 24 blocks are arsenic affected. Kotlamari-I Gram Panchayat under the Raninagar-II block of Murshidabad district was chosen to analyze the socio-economic effect of arsenic pollution among the villagers and the existing status of arsenic mitigation measures implemented there. Primary data was collected through door to door field survey from the 10 villages (20 households from each village) of Katlamari – I Gram Panchayat. It is observed that 30.38% of people affected by arsenic skin lesions out of which 18% died. Many arsenic mitigations measures like 4 arsenic treatment units, 5 deep tube-wells, 1 swajal dhara project, 1 pipes water supply scheme have been implemented there. But at present except the piped water supply scheme, all other measures are defunct. Proper awareness must be imparted to the villagers and project based on surface water resource; rainwater harvesting should be adopted there to fight out the arsenic pollution.

126. Nano-crystalline Mgo as Adsorbent to Reduce COD from Pharmaceutical Industry Effluent

Mohd. Mehmood Hussain, Rajest, V. V., Surabhi Shrivastave., Naidu, R., Nagapa, B., Tejas T. S. and G. Panduranga Murthy

Centre for Shridevi Research Foundation –
CSRF & Dept. of Biotechnology,
Shridevi Institute of Engineering & Techonology,
Sira Road, Tumkur-572106

Keywords : *Meso-porous, Solution combustion synthesis, Physico-chemical*

Mesoporous Nano-crystalline MgO was prepared by the process i.e, Solution combustion synthesis (SCS) and using Magnesium nitrate as oxidizer & Glycine as a fuel. TEM & SEM studies were conducted to evaluate pore diameter (4-11nm) of MgO powder for the further analysism. The collected 'Pharmaceutical effluent' (from TPRL – Tumkur) was subjected for 'batch stirring processed for the treatment. Some of the important Physico-chemical parameters like sulphate, chloride, pH and COD were conducted before and after treatment of effluent. The results reveal; 150mg of MgO at constant pH-8 & stirring time- 40 minutes in 200 ml of pharmaceutical effluent sample could reduce 91.41% Chemical Oxygen Demand(COD). This can be a significant & noval approach for the removal of COD in the pharmaceutical effluent.

127. Avenue Trees - A Boon To Mankind

Huma Fazal*, S. S. Khan and Zahoor Ahmed Lone

Dept of Botany, Saifia,
P.G.College of Science and Education,
Bhopal M.P. 462001

Among the loveliest living things, trees once covered nearly all the land on earth. But it is a far different story today, and perhaps it was the apparent endlessness of the world's forests and trees that led to their present predicament. Humanity has always looked upon trees as an economic resource to be exploited, rather that the very foundation on which all the life on earth depends. Like the huge

and beautiful trees of te forests, the avenue trees, which are planted on the roadsides, also play a very important role in our life. They control the pollution level as well as add to the beauty and aesthetics of the cities. Apart from these they play several other roles also.

Some of the common avenue trees are Azadirachta indica ADR.Juss (neem), Bauhinia variegate L.Sp.Pl., Bombax malabaricum L.Sp.Pl., Caesakoubua saooab L.,Cassia renigera, Enterolobium sanam Prain, Holoptelia integrifolia Roxb, Jacaranda mimosaefolia D.Don, Peltoforum ferrugineum Benth, etc. The present paper deals with these and many more trees with the same utility.

128. The Flying Coffines (Devastating Grabbing Gravity)

M. H. Ranebennur

Astronomer Cum Co-Ordinator,
The Astro Divine Science Research Centre,
GADAG-582101, Karnataka State
E-mail : mhranebennur@hotmail.com

The death cavity, great grave gap developed under the earth due to oil spill technology since 150 years created catastrophic effects. Earth's magnetic power, gravitational power added with devastating grabbing gravity power. Internal global warming, de-hyderated earth, de-oxygenation zone in oceans kills whales, dolphins, devastating cloud brust, tornadoes, cyclones, hurricanes, earth slides, Avalanche of mountains, torrential rains, heavy down pours of rains, floods, mud floods, killer earth quakes, valconic eruptions, they are all biter fruits and free gifts of oil spill technology which is the mother of all ills & evils affects shrouded around the earth.

Earth's grabbing gravity reaches the sky to recover back it's own blood & Breath (Fossile Fules) burning in flights engines. Picks fire & plung into sea or on mountains killing all air travelers of the Flying coffins.

This devastating grabbing gravity of earth inner core reaches the Meteorieds, Astroids, converts into stony rains, it will grab the poisionus gases of passing comets kills millions of people, when this lathe energy reaches moon split into pieces. Already moon has started shrinking by more than 100 meters in it's size and developed many cracks on its surface.

We think that we know more about earth inner core. Actually we know little about the life giving capabilities and super hyper caliber of earth inner core. Now we cannot escape from it's catastrophic effect internal global warming, resulting into PLANET CHANGE on 21st December 2012. Erasing 80% of living beings from the surface of the earth, but this is not the Dooms Day. Dooms Day is very very far away. This is purely the man made catastropy.

129. Plants in Relation to Fisheries Practices – A Survey on Biodiversity Utilizatio in North Bihar, India

V. Jha, A. B. Verma and Anuradha Mishra***

Department of Botany, L.N. Mithila University,
Darbhanga-846004.
E-mail : vidyanathjha@gmail.com
Department of Botany, M.R.M College,
Darbhanga-846004.
Department of Botany, Marwari College. Darbhanga

Keywords : *Indigenous. Fisheries, North Bihar, Plants, Bair formulation, Fish flots.*

Mankind is in the habit of living in tandem with nature and has been utilizing its resources from pre-historic times. Being endowed with intelligence the humans have also developed the capacity of modifying and nurturing these reserves as per their requirements. The varied natural resources have been utilized for fulfilling the livelihood requirements of food, medicine, cloth, housing material ect.

North Bihar is endowed with a sprawling water resource spectrum and a large section of its populace sustains itself on the diverse fish population that exists in its aquatic environment. The reason is know for indigenous production of air breathing fishes which thrive on the rich organic detritus and are richer source of easily digestible protein, essential amino and fatty acids and other nutrients.

People in this area have been utilizing the various indigenous plant resoures for fisheries purposes. Aquaphytes like Eichhornia crassipes and Alternanthera sp. Are utilized as fish shelter belts, locally known as 'jhangs'. Hollow stems of Phragmites karka are utilized as angles. The local bamboo species are used for making the various types of fishery appliances.

A number of plant products are used as components of bait formulation of which Hedychium spicatum (ekangi) and Curcuma zedoaria (Kachur) constitute the major ingredients. Leaf extracts of Cannabis sativa, essence of flowers of Jasminum sp. Are used for procuring live earth work bait as well as fish poison. Plants of E.crassipers, Aeschynomen sp, and banana pseudoostems are used as fish floats. Woods of Inga dulcis, Syzygium cuminii and Dalbergia sissoo are used to making boats which are used for ishing purposes.

Of late, makhana (Euryale ferox) system, in order to raise the overall fish productivity in this region, has emerged as a potential choice for integral aquaculture projects.

130. Studies on Solid Waste Management Practice in Madhyamgram Municipality, West Bengal, India

Sinjini Dutta Gupta and Subarna Bhattacharyya*

Department of Environmental Studies,
Rabindra Bharati University,
56A, B.T. Road Kolkata-700050.
E-mail : sinjiniduttagupta1@gmail.com

Keywords : *Domestic waste management, rap pickers, bio fertilizer*

The present study was aimed to investigate existing domestic waste management practice in Madhyamgram Municipality, West Bengal, Ward No 24 of this area was selected for assessing existing solid waste management practice. Categorization characterization and handling of the waste was recorded by using a self designed questionnaire. Observation had shown that the mixed waste comprised mostly vegetable debris (58.65%) followed by mental waste (20.80%), plastic (42.90%), paper(55.18%) and food waste (25%). People of higher income family used to accumulate more domestic wastes in their own home flowed by middle class, lower middle class and below poverty level people. Significant statistical correlation was observed with family income and their solid waste handling. Bio-degradable and on-biodegradable wastes were used disposed in an open sold wastes dumping ground which was very near to railway station. Rag pickers used to segregate the mixed wastes and sold the plastics, papers and metal wastes for their livelihood support. They were the only waste managers of the study area. As the bio-degradable part of the waste is higher it could be a potential source for bio-fertilizer.

131. Evaluation of The Quality of Underground Water of Ara and Surrounding, Bihar

MD Shahnawaz and Saiyad Rafat Imam

Deptt. of Chem., Al-Hafeez College,
Veer kunwar Singh University, Ara
Deptt. of Chem., H.D.Jain college,
Veer kunwar Singh University, Ara

Keywords : *Ground water, Physico – chemical study, Borewell, Hand pump, Ara*

Ground water forms a major source of drinking due to non-supply for rural and urban people of India. It is preferred over surface water due to non-availability of other water sources and the consideration that surface soilstrata acts as a natural filter providing safe and pure water. Work on the quality and extent of utilization of underground water in drinking and domestic purposes has been reviewed. A systematic physico-chemical quality study of the ground water in different localities in Ara and its surrounding ahs been taken to evaluate its suitability for domestic purposes. A total of 45 water samples were collected from different hand pumps and analysed for the various physico – chemical parameters like pH, electrical conductivity (EC), turbidity, total dissolved solids (TDS), total hardness (TH), calcium (Ca), magnesium (Mg), chloride (CI), fluoride (F), iron (Fe), sulphate (SO4), nitrate (NO3) and arsenic (As). The results were compared with Drinking water standards.

132. Bucket Water Experiment for Treatment of Arsenic Contaminated Ground Water

Md. Shahbz Rahim, Miss, Sneha Rashmi and Dr. Bihari Singh

Department of Env. Science,
A.N. College, Patna

Keywords : *Bucket water experiement, Arsenic Contaminated ground water, Sodium, Hypochlorite*

Recently ground water Sources in areas along the main stream of Ganga river in Bihar has been found to have Arsenic Content much above the permissible limit

of 50ppb. Excess Arsenic in drinking water is a serious health problem to human. In water Arsenic occurs as As(III) and As(V). As(III) is more poisonous as compared to As(V). Whicle in surface water AS, if present exists mainy as AS(III).

The two forms of Arsenic are reversibly interconverteble through the following redox reaction.

The results of our experiment of perfume in Maner Block, district Parna, Bihar for a period of 3 moths show that if Arsenic contaminated ground water is left exposed to atmosphere in a lidless bucket for 48 hrs, Arsenic Content in the water falls down form 110 ppb to 50ppb (maximum permissible limit) or even below it.

Therefore, it is advised that people living in the areas with ground water contaminated with Arsenic may use of drinking purpose (in absence of any alternative option) after storing it is open buckets. So, that it is in atmospheric contact for 48 hrs.

If the water is treated with a tablet of sodium hypochlorite per 10 litre of water, the chances of microbial contamination is greatly reduced.

133. Cholera Toxin-Its Biochemistry and Genetic Regulation

Rashmi Sinha

M. M. Mahila College,
Ara (Bihar)

Affecting the small intestine through secretion of a protein enterotoxin called the choleratoxin whose action on the mucosal epithelium is responsible for the characteristic diarrhea. The enterotoxin has been characterized and contains 5 blinding (B) subunits of 11,500 daltons (encode by cixB), an active (AI) subunits of 23,500 daltons, and a bridging piece (A2) of 5,500 daltons (both encoded by ctx A) that links A1 to the 5B subunits assembling the toxin in the appropriate 1A:5B proportion. Once it has entered the cell. The A1 subunit enzymatically catalyses the covalent modification of the regulatory protein Gas protein by transferring or attaching an ADPribosyl (ADPR) moiety from NAD to an arginine residue at the GTPase active site of the adenylate cyclase (AC) system forming Gas-ADPT. This ADP-ribosylatio prevents Gas from hydrolyzing GTP, thus causing the protein to

become permanently activated. This process is complex. The activation is normally brief because another regulatory protein (Gi) hydrolyzed GTP, since GTP hydrolysis is the event that inactivates the adenylate cyclase, the enzyme remains continually activated.

The activated adenylate cyclase, the enzyme remains continually activated intracellular cAMP in cells of the intestinal mucosa converting the damage cells into pumps, which extract watr and electrolytes like Na+K+,cr, and HCO-3 from the blood and tissue causing their hyper-secretion into the lumen of the small intestine, Hp,Na+ and other electrolytes actually follow due the osmotic and electricl gradients caused by the loss of cr. The loss of fluids leads to dehydration, anuria, acidosis, cardiac complications, circulatory failure and shock. The secretion of a large volume of isotonic fluid constitutes watery diarrhea that contains enormous numbers of vibrios. This effect is dependent on a specific receptor, monosialosyl ganglioside (GMI ganglioside) present on the surface of intestinal mucosal cells. The determinants for the colonization of the mslall intestine in pathogenic cholerae include invasion, adhesions and neuraminidase during the colonization stage, which has the interesting propelly o fdegrading gangliosides to the monosialosyl form, which is the specific receptor for the toxin V. cholerae is resistant to bilsalts and can penetrate the mucus layer of the small intestinem possible aided by secretion of neuraminidase and proteases (mucinases). Once the cholera bacteria reach the intestinal wall, they do not need the flagella propellers to move themselves any more, so they stop producing the protein flagellin, thus again conserving the energy and nutrients. Specific adherence of V. Cholerae to the intestinal.

134. Intensity of Anar Butterfly Virachola Isocrates (Fabr.) with Period and Crop means in Guava

Sunita Singh, S. Sinha and A. Prasad

Department of Zoology,
D.S.D.(P.G) College, Unnao

Keywords : *Infestation, Guava Fruit*

Guava is a popular fruit crop but several insect pests easily damage the crop. Guava is mainly a crop of U.P. where it is used in large amount by all classes of

society. The experiment have been carried out at D.G. College, Kanpur during 2003-2004. Anar butterfly (virachola isocrates Favr.) is found throughout the year except May and June. Data recorded on the population of oriental fruit fly larvae in period, period x crops, months, crops and months x crops were summarized. Among the 40 periods of populario of Virachola isocrates was found the highest (35.600 per unit) in 3rd week of September and it was followed by 32.219 in the 3rd week of August, 28.285 in the 2nd week of September and 27.180 in the 4th week of December. The minimum population was observed in the 4th week of November i.e. of population 10.794 per unit, respectively. In fact this showed a great range if variation. It was very apparent that population fluctuation varied from September to November.

135. Recycling of Seqae & Industrial Waste for Fish Culture

Archana Sengupta and Rinini Dastidar

Department of Biochemistry,
Vivekananda Institute of Medical Science
Ramakrishna Mission Seva Pratisthan,
99, Sarat Bose, Road
Kolkata-700026.

Keywords : *Recycling, Sewage & Industrial Waste, Waste Recycling, Aquaculture & Physicochemical Properties.*

Intense efforts are being made at treating the domestic sewage to make the effluent suitable for discharge into natural water in the recent past. In this research physicochemical properties of waste water fed fishery at Taratala, Kolkata were assessed to evaluate its suitability for pisciculture. The water sample was analyzed monthy. The present study showed that the desired levels of physicochemical properties of this aquaculture farm were achieved when the water discharge into ponds through traditional purification. Considering all the data, it can be conferred that traditional recycling of sewage through a biological process may be able to contribute into the socio – economic and developmental dimension of sustainability.

136. Status of Soil Enzymes in Different Parts of a Metropolitan City : A Case Study in Kolkata

Chandrima Ghosh, Shreyasi Dutta, Monideepa Sengupta and Srabanti Basu

Department of Biotechnology,
Heritage Institute of Technology,
Chowbaga Road, Anandapur
Kolkata-700107.

Keywords : *Kolkata, soil, amylase, cellulose, phosphatase, protease*

Soil enzymes play key biochemical roles in the overall process of organic matter decomposition in the soil system. They are important in catalyzing several important reactions necessary for the life – processes of soil microorganisms, stabilization of soil structure, decomposition of organic wastes and nutrient cycling. An understanding of the role of soil enzymes in the ecosystem will potentially provide a unique opportunity for an integrated biological assessment of soils due to their crucial role in several soil biological activities. In the present study, and attempt has been made to study the status of some important enzymes in soil samples of a metropolitan city. Activity of amylase, cellulose, protease and alkaline phosphatase were determined in soil sample collected from East Calcutta Wetlands, and agriculture – and pisiculture – based area, situated at eh eastern fringes of Kolkata. Enzyme activate was found to be higher in the samples collected form the parks of north-eastern and sounth-central region indicating a better biological activity of the soil of those two parks.

137. Hydro-Geology of Bhojpur-A Part of Middle Gangetic Plain

Md Shahnawaz and Saiyad Rafat Imam

Deptt. of Chem., Al-Hafeez College,
Veer kunwar Singh University, Ara
Deptt. of Chem., H.D.Jain College,
Veer kunwar Singh University, Ara

Keywords : *Groundwater; Contamination; Quality; Arsenic; Bhojpur District*

This communication describes the ground water quality of different block of Bhojpur district in middle gangatic plan. A total 66 numbers of ground water samples were collected from different locations of these blocks and analysed from the various physico chemical parameters like pH, electrical conductivity (EC), turbidity, total dissolved solids(TDS), total hardness (TH), calcium (Ca), magnesium (Mg), chloride(CI), fluroride(F), iron(Fe), sulphate(SO4), nitrate(NO3) and arsenic(As). Water samples were collected from hand pumps and public water supply. Among the parameters described, elevatedlevels of EC, turbidity. TDS< TH, Ca and Fe were detected according to WHO permissible limits for drinking water. AS concentration in 36.36 to 59.09% ground water samples were found higher than the WHO permissible limit.

138. Role of Iron Oxidizing Bacteria in Making Iron Plaques on the roots of Plant Typha and Making it Tolerant Towards Heavy Metal

Upal Das Ghosh, Chinmay Saha and Dr. Maheshweta Mitra Ghosh

Department of Microbiology,
St Xavier's College, Kolkata

Keywords : *Iron plaques, Radial Oxygen Loss, Phytoremediation*

Constructed wetlands are an inexpensive means of treating wastewater enriched wit heavy metals. The ability of wetlands to cleanup heavy metal toxicity largely depends upon the activity of the plants growing on those wetlands. It's a well known fact that roots and the surroundings rhizosphere of these wetland plants containing a large microbial population with high metabolic activity plays important role in imparting heavy metal tolerance or helping to regulate metal availability to the plant. A predominant wetland plant in this context is the Typha species. One important factor related to this metal hypertolerance is atttricuted to the formation of Fe oxyhydroxide precipitates on the root surfaces of these plants commonly know as Iron plagues there are information's that bacteria may play a role in formation of Iron Plagues. Our present study involves the isolation an characterization of iron oxidizing microbes form the roots of plant Typha and establish their capability to form plaques on the roots of plants grown under lab conitions.

139. The Evaluation of Some Water Quality Properties of Waste Water Fed Fishery for Pisciculture

Archang Sengupta, Mriganka Bhusan Bhandopadhya and Sankar Kumar Ghosh

Department of Biochemistry,
Vivekananda Institute of Medical Science,
Ramakrishna Missio Seve Pratishthan,
99, Sarat Bose Road, Kolkata-700026

Keywords : *Pisciculture, Waste Water, Heavy Metals & Sustainable Development.*

Heavy metals contamination of aquatic ecosystem has been recognized as a serious pollution problem. All heavy metals are potentially harmful to most organisms at some level of exposure and absorption. A study was initiated to assess the heavy metals like Fe, Cu, Pb, Zn and Cd contamination in sewage and industrial effluent fed aquaculture farm named as Mudialy Fishermen Cooperative Society, Taratala, Kolkata, The date of physicochemical properties collected from the proposed farm offered a constant environment for growing fish, This study arrives at a conclusion that properly planed and managed reuse scheme backed with effective regulatory policy measures can lead to a sustainable development.

140. Environmental Impacts of Open Cast in Sccl-Ap

S. Chalapathi Raju

Educational Resource Person Education Department,
Kothagudem-507101.
Khammam Dist. Andhra Pradesh.

Keywords : *EIA, Open cast Mining, Ambient Air quality, Geo-friendly, waste water, Over burden, Biological – Engineering*

Any developmental activity results in environmental degradation as it disturbs the natural existing system. With growing population and planned economic growth for better standards of living, there will be grater demand for exploitation of mineral resources besides other natural resources, increasing environmental pressure with

passage of time. The mining industry plan a vital role in the overall economy and industrial development of any country. Most of the Energy requirements in India (about 70%) are based n coal.

The Technology transferred in pursuit of Social-Economic development has led to increase in Opencast Coal Mining with highly mechanized systems as the productivity is very high compared to underground mining.

In SCCL-AP, the increasing O.C. Mining results in environmental degradation is various section. Ait is polluted with "suspended particulate mater" (SPM) and gaseous emissions like Sox and NOx. The water resources are polluted due to acid mine drainage, heavy silting, greases, oil and other heavy metals. The O.C. result in Noise pollution. The flora, fauna and wild life gets affected due to deforestation and changes in land use patterns.

141. Role of Medicinal Plants on Tai Tribes of North – East India with Special Reference to Tai Phake and Its Conservation

Mamoni Phukan Borgohain

Department of Botany,
Moran College, Sivasagar, Assam

Keywords : *Medicinal plant, Herbal treatment, Tai, Tai Phake, Traditional, Practitioner*

A Plant with therapeutic properties in any part of its body may be termed as medicinal plant. Our beautiful world is endowed with wealth of medicinal plants. The uses of medicinal plants for treatment of various diseases have been found since the dawn of civilization.it is most popular among the tribes of India.

The Tai is one of the largest tribal groups of North-East India. The Tai Phake is the second largest group among them. The system of herbal treatment is traditional and is inherited from generation to generation. They have some manuscripts for herbal treatment which are written, in Tai language. The people of this tribe collect their medicinal plants from the nearby forest. Due to some natural calamities like flood, soil erosion, land sliding etc. they have lost many valuable medicinal plants every year. Therefore some of the practitioners grow some important plants in their own kitchen gardens for continuing their tradition of herbal treatment of various diseases.

142. Physico-Chemical Analysis of Ground Water at some Selected Sites in Muzaffarpur Town

M.Kumar*, S. Sharama[1] and K. E.

*Dept. of Chemistry, B.R.A.BIHAR University,
Muzaffarpur-842001.
[1]Dept. of Zollogy, Dr.J.Mishra College,
Muzaffarpur-842001.
[2]Dept. of Chemistry, Marthoma College, Chungathara,
Nilambur-679334 (Kerala)
E-mail : mkumar@yahoo.co.in

Keywords : *Ground water, Physico-chemical, Analysis*

The result of 12 month from June 2009 to May 2010 continuous study of Physico-chemical analysis of ground water with respect to pH, conductivity, Ca^{2+}, Mg^{2+}, K^{+}, No_3^{-}, Cl^{-},HCo^{-}_3, So_4^{-}, F^{-}, Fe, Zn and Mn at five selected sites in Muzaffarpur town are incorporated here.

143. Estimation of Radioactive Air Pollutants in some Industrial Units

Ajay Gard[a], R. P. Chauhan[b], K. Kant[c] and Sushil kumar[d]

[a]Department of Physics, Arya PG College,
Panipat (Haryana).
[b]Department of Physics,
National Institute of Technology,
Kurukshetra (Haryana).
[c]Principal, aggarwal P.G. College,
Ballabgarh (Faridabad)
[d]Department of Physics, CDLU sirsa (Haryana)
E-mail : gargnimish94@gmail.com,
chauhanrpc@gmail.com

The industrial unit like thermal power plants, fertilizer plants, paper mill etc.. are using coal as fuel. The combustion of coal in various industrial units results in

the release of some poluutants including natural radioactivity to the environment. The radioactive radon gas and it's progeny in the atmosphere, soil, ground water, oil and gas diposits contributes the largest fraction of the natural radiation dose to population, tracking it's concentration is thus fundamental for radiation protection. Keeping this in mind measurements of radon, thoron and their progeny in the environment and soil samples collected from the vicinity of some industrial units at Panipat (Haryana) have been made. The annual effective doses received by the walkers have also been estimated. The radon concentration in the environment of thermal power plant is higher (165+/-42 Bq m^{-3}) as compare to fertilizer plant (1o5+/-21 Bq m^{-3}) which may be due to the use of large quantity of coal as fuel in thermal plants.

144. Dissipation of Tetracycline in Soils under Different Redox Conditions

O. P. Bansal

Chemistrry Departments, D.S.College,
Aligarh-202001 (U.P.),
E-mail : drop31@rediffmail.com

The dissipation kineties of a widely-used veterinary antibiotic tetracycline(TC) was investigated in the laboratory in six different soils under aerobic and anaerobic conditions. The results showed that the dissipation of TC in soils followed first order reaction kinetics and dissipation rates decreased with increasing concentration of TC. The dissipation of TC was faster under aerobic conditions than under anaerobic conditions. The $T_{1/2}$ values for TC dissipation under aerobic conditions ranged from 41.2 256 days for non sterile treatments, and 95.6 to 130 days for sterile treatments, while under anaerobic conditions the half lives of TC ranged in between 57 and 71 days for non sterile soils and in between 100 and 144 days for sterile soils, suggesting that microbes can degrade TC in agricultural soils strong sorption of TC by soil components, dependent on soil nature, soil pH and soil organic matter, also affects the dissipation of TC.

145. Study of Fauna of Nahar Wildlife Sanctuary

Dr. Kalpana Sharma and Satish Kumar Yadav

Dept. of Zoology, GOVT. Colege,
AJMER (RAJ).

Keywords : *Fauna, Reptiles, Birds, Mammals, Wildlife*

Wildlife is the native fauna of particular region which grows without care of human beings. Nahar wildlife sanctuary is situated in Haryana in district rewari, near the nahar village, on kosali mahendergarh road. The study of natural habitat of animals is must to conserve and should have knowledge of their ecological relations. The loss of wild life is a present global crisis so that they may not become extinct. The animals from reptilian, avian and mammalian fauna were observed with the help of binoculars and then photograph with the help of a camera.

Our observation shows that in the avian fauna, 34.2 % passseriforms, 33.3% sturnidai, 16.6% carvidae, 16.1% picnodae, 16.6% muscicapidae, 8.3% placidae, 8.3% dicruridae, and 14.25% from the order coraciiforms, 50% alcedinidae, 10% maropidae, 20% coraciidae, 10% upupidae, 10% bucerotidae, and 11.4% from the order columbiformers, 11.4% from order gruiformers, 10% from order gruiformeres. All remaining orders falconiformers, psittaciformers, cucaliformeres and stringiformeres have availability percentage 28 and their families are falconidae, psittacidae, cuculidae and strigidae respectively present in study area.

From mammalian fauna 27.7% carnivore, 22.2% artiodactyla, 16.6% rodentia, 11.11% arthropodae, 11.1% insectivore, 5.5% lagomorpha, 5.5% chiroptera. The order carnivore has 2 suborders named fisspedia and pinnipedia in the sacnctuary. The order artiodactyla has only 1 suborder, ruminantia in the sanctuary. Three families are present under the order rodentia, namely muridae, seiridae and hytricidae. Under arthropodae, a single family named as cercopathecidae is presnt in sanctuary.

Logomorpha order which included mainly hares has only one family named as liporidae.

Insectivore order has two families; soricidae and erinaceidae, in the sanctuary. The order chiroptera has one suborder; microchiroptera in the sanctuary.

146. Polltion Control in Open Cast Mines

Dr. Keshab Mukhopadhyay
Department of Pharmacology,
College of Medicine and J.N.M. Hospital,
Kalyani, Nadia-741235

Keywords : *Air Pollution, Rain Water harvesting, Plantation, open cast mine*

Abandoned open cast mines are producing air pollution in the coal mines area and are producing health hazards in those areas.

i) If those abandoned mines be filled with soil, night soil (acting as manure) and plants of wood, food, fuel and medicinal value be planted there then those air pollution can be controlled a large

ii) Down going of the surface water is really a problem today. Some of those open cast abandoned coal mines may be used as reservoir of rain water harvesting and will solve.

(a) Water crisis problem in coal belts.

(b) Fish may be cultivated there.

147. Quality of Locally Manufacture Turmeric Powder Samples Availanle in Markets of Kolkata and Neighborin Areas

Suravita Banerjee (Ghosh), Barnilni Mitra,
Shilpasree Saha and Kamala Adak
Department of Home Science,
University of Calcutta,
20B Judges Court Road

Keywords : *turmeric powder, moisture, total ash, acid insoluble ash, metanil yellow*

The work comprises of detection of certain parameters like moisture, total ash and acid insoluble ash of turmeric powders available in local markets of Kolkata and its neighboring areas. Along with this ;the presence of metanil yellow (a very much hazardous extraneous colour) in the collected samples was also examined through chemical test and analysis of microscopical structure. Only a very small percentage (10 %, out of 60 samples) was found to be adulterant free based on the above parameters. Alternatively, from this study, 90% of turmeric powders were found to be adulterated which is really alarming. This gives a brief idea about what kind of malpractices are going on in spice market of Kolkata and its neighbouring areas.

148. Comparative Study of Decolourization of Texdtile Dyes Between Bacterial and Fungal Cultures

K. Jayashree[1], Dr. D. Sarvamangal[1], Dr. P. Appa Rao[2] and P. Vijaya Lakshmi[3]

[1]Githam University,
[2]Imma Labs,
[3]Visakha Govt. Degree College.

Keywords : *Bacterial cultures, Fungal cultures, Dye solution, U. V. Spectrophotometer, Other routine lab requirements, etc.*

Water pollution- The major problem faced by the present generation has many solutions which are both advantageous as well as disadvantageous. 17-20 percent of industrial water pollution comes from textile dying. This paper deals with the biodegradation of textile dyes that contaminate the water bodies. This paper offers a comparative study of biodegradation between Bacterial and Fungal cultures.

149. Characterization of Dicarboxylic Acids in Atmospheric Particles

Dhananjay Kumar Deshmukh and Manas Kanti Deb

School of Stsudies in Chemistry,
pt. Ravishankar Shukla University, Raipur,
Chhattisgarh-492010,
Email : debmanas@yahoo.com

Keywords : *$Pm_{2.5;}$ Dicarboxylic Acids; Urban Area; Oxalic Acid*

Dicarboxylic acids are important components in atmospheric aerosols and can act a cloud condensation nuclei to potentially affect the climate. Thirty sets of weekly $PM_{2.5}$ samples were obtained during the period of July 2009 to November 2009 at Raipur, India using Andersen sampler. The concentrations of $PM_{2.5}$ were determined by gravimetric analysis and dicarboxylic acids by ion chromatography. The average concentrations of $PM'_{2.5}$ were 96.0+/- 48.9 ug m^{-3}. Measurement showed that the highest concentrations of dicarboxylic acids were oxalic acid (732.0 ng m^{-3}) at capital city Raipur followed by phthalic acid (18.9ng m^{-3}) and maleic acid (16.4 ng m^{-3}).

150. Biological Monitoring at Selecyede Petrol Pumps of Kanpur with Respect to Petrochemicals like Benzene

Dr. Nasheed Sultana and Pragati Mishra

Department of Zoology
A.N.D.College,
Kanpur

Keywords : *Petrochemicals, Benzene, Petrol Pump Workers, Kanpur City.*

A BIOLOGICAL Monitoring was conducted at selected Petrol Pumps of Kanpur city to determine the adverse effect of petrochemical like Benzene in the

breathing zone of service attendant. We aimed to ascertain the exposure of petrochemicals to petrol filler attendants refilling the petrol during the working period. The study population includes 25 stations (Petrol Pumps) from different areas of Kanpur. Benzene being one of the major components of any petrochemical substances which is totally undesirable in view of their health effects. The major health risk associate with low concentrations of exposure to benzene has been shown to be leukemia, particular acute non-lymphocytic leukemia & aplastic anemia.

151. Cyanobacteria as Bioindicator for Indexing Pollution Load of Sewage Water

Rajesh Dhankhar and Lalita Rana

Dept. of Environmental Science,
Maharshi Dayanad Univerity,
Tohtak-124001, Haryana
Email : dhankar.rd@gmail.com

Keywords : *Lyngbya sp., Phormidium sp., growth performance, bioindicator.*

In order to analyze the pollution load of sewage water of Rohtak city, Haryana, the isolated *Lyngbya sp.* and *Phormidium sp.* From sewage irrigated soil, were exposed to different concentrations of sewage water and their growth performance was analyzed. It was found that these species were not only able to survive but showed good growth at different concentrations of sewage water. The present study suggests that sewage water does not contain high concentration of toxic contaminants harmful to the soil biota. So, sewage water can be used safely as a source of irrigation after proper dilution.

152. Detecting the Ozone Level in Various Areas of Puducherry

D. Aravindaraja

Artchouna Soupraya Naickar,
Govt. Middle. School – Mudaliarpet,
Cuddalore Main Road, Mudaliarpet,
Puducherry-605004.

Keywords : *Ozone layer, Depletion, Schoenbein, Ozone level, Results.*

Methane (CH_4) contributes to the growing global background concentration of troposphere ozone (O_3), an oxidant air pollutant associated with premature mortality. Methane and ozone are also important greenhouse gases. The principal aim of this study is to create awareness about the Ozone layer and its Depletion, global warming and climate change (by conducting several programmes) among the students and their parents. This study mainly targets at the Detection of Ozone Concentration Level at the troposphere surface of the atmosphere. In this study, we examined the ozone level concentration in 15 important places of Puducherry state . The test was conducted using the Schoenbein paper (exposed under the atmosphere) over a period of 3 weeks. Later the ozone treated Schoenbein papers were analysed to obtain the results. The results showed the areas with low, more ozone and high ozone concentrations. An ozone level concentration map of the surveyed areas of the Puducherry State was finally drawn up from the obtained results.

153. Estimation of Net Primary Productivity of Natural Forest Based on Inventory Data

K. N. Mishra and C. P. Shukla

Ecology Research Centre,
Department of Botany, T.D.P.G. College,
Jaunpur-222 002 (U.P.)
Email : cp.shukla@yahoo.com.

The behavior of energy in ecosystems including transmission and utilization constituents energy circuits. These circuits many be grazing type in which energy is directly consumed by living plants or their parts, and organic detritus circuit involving the accumulation as well as decomposition of dead materials. In nature, every year about 100 billion tons of organic matter is produced on the earth and about the same amount is oxidized back to CO_2 and H_2O during same time interval and thus a sort of rough balance exists between production and consumption. This balance is not exacted and organic production is more than its utilization, presumably due to changes in long geological history. Forest

inventory data (FIS) include forest resources information at large spatial scale and long temporal scale. They are significant sources carbon budget at landscape and regional scales. In this present study 100 database of biomass, volume, NPP and stand age for natural forest (Dewghat) from the literature were synthesized to develop regression equations between biomass, volume, NPP and biomass as well as stand age. Using these regression equation and the FID surveyed by the Forestry Ministry India from 2006-2010, NPP values of Natural forests (*Diospyrous* forests) were estimated. The mean NPP of forests was 4-35 Mg ha^{-1}. NPP varied widely among provinces, ranging from 1-5 to 13-73 $Mgha^{-1}$. Total NPP of *Diospyrous* forests was 10-87$Tgyr^{-1}$ (1Tg = 10^{12}g). NPP values of forests were not distributed event across different places in world. This study may be useful not only for estimating forest carbon of other forest types but also for evaluating terrestrial carbon balance at regional and global levels.

154. Recent Trends in Conservation of Wetland Resource Utilization in Indogangetic Plain

C. P. Shukla and K. N. Mishra

Department of Botany,
T.D.P.G. College,
Jaunpur (U.P.)

Wetland constitute the vital link in the hydrological cycle. They provide a multitude of services like purification and regulation of flours, fisheries, habitat provision to plants, animals and microorganisms providing opportunities for recreation and tourism and so fourth. Their extrinsic hydrological functions act as buffer against such extremes as drought and flooding. In monsoon wetland absorbs and restore water and therefore, reduce the risk of flood. In winter and summer they gradually release water and thus ensure its availability to surrounding and down streams areas, inland wetlands, are important water resource, replenishing ground water and sub soil aquifiers. Wetland harboring a great variety of aquatic macrophytes. Information on psychosocial association for aquatic macrophytes in any water body is of immense importance to understand the wetland ecosystem.

The present study reveals that 49 species of angiosperms belonging to 28 families in habiting the different lakes, ponds, pool and marshy region. *Ipomea* and *Cyperus* are the dominant genera in marshy region. The associatin of Eichornia-Nymphea-Hydrilla and Ipomea-Lemna-Hydrilla were very common. Plants of *Azolla pinnata* and *Potamogeton nodosur* were found in every where. The paper present an account of the wetland resources with seasonal distribution and association of plants on different wetlands of indogangetic plains.

155. Kinetic Modeling for Biodegradation of Catechol in Batch Reactor

Banhi Biswas[1], Neh Nupur[2] and Sudipta Dey[3*]

[1,2]UG Students, Department of Biotechnology,
Heritage institute of Technology, Kolkata
[3]Lecturer, Department of Biotechnology,
Heritage institute of Technology, Kolkata.
E-mail : sudipta.dey@heritageit.edu

Keywords : *Catechol biodegradation, kinetics, inhibition model*

Biodegradation of catechol has been studied under aerobic condition in a batch reactor by microorganism isolated from effluent treatment plant of a coke oven industry. Catechol concentration in the present study was ranged from 100 mg/L to 800 mg/L. Both biodegradation kinetics and microorganism growth kinetics have been studied and kinetic parameters have been estimated. Upto 400 mg/L of initial catechol concentration, 100% degradation was possible to achieve, but a very little percentage of substrate (catechol) removal has been resulted for 500mg/L-800 mg/L of catechol. The growth kinetics showed substrate inhibition after 300 mg/L of catechol. The kinetic data obtained in this study has been fitted to different substrate inhibition models (Haldane, Han-Levenspiel, Edward and Luong model). Among all the kinetic models Luong model fitted the data best (Root mean Square Error =0.004679, R^2=0.98) with maximum specific growth rate of 0.2477 hr^{-1} and half saturation constant of 214.9 mg/L.

156. Genotoxicity of Air Borne Particulate Matter – A Cross Sectional Study among Urban Population

Anusha C Pawar, Jithender Kumar Naik S. and Anitha Kumari. S

Department of Zoology,
University College for Women,
Koti, Hyderabad.

Air borne suspended particulate matter is a serious problem concern with adverse health effects. These concerns have been substantiated by several laboratory investigations and confirmed that the particulate matter is proven to be carcinogenic and also mutagenic in several experimental animals. The ambient air genotoxicants originate from combustion of fuel, waste incineration and industrial processing. The city like Hyderabad is highly sensitized and polluted zone with respect to urban air concern. Nearly about 85,000 motor vehicles fly on the roads every day contributing different high molecular weight organic compounds through combustion of diesel.

Considering the genotoxic nature of high molecular weight organic compounds a cross sectional study was conducted among 65 human subjects exposed to contaminated urban air. PBL was cultured and monitored for CA's and SCE by adopting standard methodology. The analyzed data revealed statistical significant increased frequencies of CA's and SCE. This clearly indicates the genotoxic potency of air borne particulate matter with high molecular weight organic compounds to which the urban populations are frequently exposed.

157. Oxidative Stress and Antioxidant Enzyme Response in Swiss Albino Mice Exposed to Textile Dye Effluent

S. Anitha Kumari, Anusha C. Pawar and Jithender Kumar Naik S.

Department of Zoology,
University College for Women,
Koti, Hyderabad.

Oxidative stress is caused due to an increase in reactive oxygen species (ROS), an impairment of antioxidant defense systems or an insufficient capacity

to repair the oxidative damage. Antioxidant system include antioxidant enzymes (SOD, Catalase, GST) and free radical scavengers like glutathione, Vit-C and Vit-E that remove the ROS there by protecting the organisms from oxidative stress.

Textile dye processing is one which produces broad spectral, complex chemicals of adverse health implications. Generally the effluent contains organic and inorganic compounds with highly toxic dyes and trace elements. These compounds exert the toxic effect on the biotic life by generating the free radicals. In order to assess the toxic nature of the textile dye effluent on the oxidative enzymes, the present study was carried out in kidney tissue of Swiss Albino mice exposed to sub-lethal concentration of the $1/4^{th}$ diluted effluent for an acute period of 22 days. The kidney tissue was isolated, perfused in saline and extracted for the enzymatic assays. The LPO activity was assayed by determining the MDA levels followed by the enzymatic assays such as SOD, Catalase and GST. The investigated results revealed a statistically significant ($P<0.05$) decreased MDA levels and an elevated levels of SOD, Catalase and GST activity as against their respective control group, indicating the defense against oxidative stress, caused due to the production of ROS.

158. Occurrence of Arbuscular Mycorrhizal Fungi in Rhizosphere Soils of some Oil-yielding Plants

A.K. Pandey, Rekha Shukla and Ajay Kumar Gond*

Mycological Research Laboratory,
Department of Biological Sciences,
Rani Durgavati University,
Jabalpur-482001
*Corresponding author
E-mail : gondbioscience@gmail.com

Keywords : *AMF, rhizosphere soils, oil-yielding plants*

Arbuscular mycorrhizal fungi (AMF) are most ubiquitous. They form mutualistic relationship with almost all major roles in ecosystem. Mycorrhizal plants are better able to obtain their nourishment in soil and resist and biotic stresses. Arbuscular mycorrhizal fungi are associated with rhizosphere soils of various oil-yielding plants. Nineteen species of Arbuscular mycorrhizal fungi were isolated and identified from the rhizosphere soils of five oil-yielding plants which belonging to five different genera. *Glomus* was represented by ten species. *Gigaspora* and *Acaulospora* by three species and *Enthrophospora* with two species and *Archaeospora* by only one species. *Glomus* genera were the more predominant species that was associated with oil-yielding plants.

159. Isolation And Purification Of Polyphenol Oxidase From Various Plant Sourses And Its Use In Decolourization Of Indstrial Dyes

P. S. Solanki, P. V. Khakke, S. P. Bobade, S. M. Karhade, A. B. Jadhav and S. N. Harke

MGM's Institute of Bioscience and Technology, Aurangabad.

Keywords : *Reactive dyes, Polyphenol oxidase (PPO), Bioremediation, Waste water treatment.*

Reactive dyes are important chemical pollutants from various industries. Polyphenol oxidase (PPO) enzyme shows the activity of decolourization of various industrial dyes such as Malachite green dye. Polyphenol oxidase (PPO) enzyme is isolated from locally available plant sources such as Cabbage, locally available Brinjal, wild Brinjal, Banana peel, Banana pulp, Potato, Apple, Coriander, Mango etc. The enzyme activity is evaluated by using Catechol as substrate. The enzyme is partially purified by Ammonium sulphate precipitation (70%). The decolourization of these phenolic compounds by PPO enzyme is evaluated and confirmed by using U.V. Spectroscopy. The ability of PPO enzyme to decolorize various industrial dyes confirmed that enzyme polyphenol oxidase (PPO) as remarkable potential for its application in Bioremediation and Waste water treatment especially in detoxification of phenolic waste.

160. Studies on Treatment of Dairy Waste Water under Mesophillic Conditions

Dwaraka K, Seema Chaitanya Ch, Srinivasa Rao B. and Meena V.*
Centre for Biotechnology,
Department of Chemical Engineering,
AUCE (A), Andhra University, Visakhapatnam,
*Contact Id : meena_sekhar09@yahoo.co.in.

Keywords : *Anaerobic digester, Hydraulic retention time (HRT), Kinetic studies, Arrhenius theory*

Water management in the dairy industry is well documented, but effluent production and disposal remain a problematic issue for the dairy industry. To enable the dairy industry to contribute to water conservation, an efficient and cost-effective treatment technology has to be developed. To this effect anaerobic digestion offers a unique treatment option to dairy industry. In our present study, an attempt has been made to treat dairy wastewater entirely via anaerobic treatment with HRT of 6 days, using Immobilized Fixed Bed Anaerobic Digester (IFBAD), the effect of various temperatures were studied through laboratory experiments between 20-40^{o}c. Treatment of dairy wastewater with in 28-36^{o}c has shown more positive results in bench scale studies Using Immobilized Fixed Bed Anaerobic Digester system. Kinetic studies were done for temperatures 28-36^{o}c, in which the maximal degradation efficiencies were observed. Through kinetic studies using Arrhenius theory, the activation energy for degradation of waste water is calculated and the value was 12.327kJ/mol K.

161. Effect of Chromium and Lead Toxicity on Germination and Early Seedling Growth in Vegetables Crobs

Mamta Gautam[a], A. K. Singh[b] and R.M.Johri[c]
[a]Research Scholar, M.M.H. College
Ghaziabad
[b]ICAR, KAB II, IARI Campus,
New Delhi-110012
[c]Department of Botany, M.M.H. College
Ghaziabad

Keywords : *Germination, Seedling growth, Root elongation, Heavy metals*

Seed germination is perhaps the most sensitive stage in the entire plant life cycle. A good number of vegetable crops are cultivated crops in the peri-urban areas where wastewaters are frequently used for irrigation. A study was therefore, conducted to investigate the impact of chromium and lead contents in wastewaters on seed germination, seedling length, seedling vigor index, seedling dry biomass, root and shoot length of tomato (*Lycopersicum escluetum*) and brinjal (*Solenum melongera*) under laboratory conditions. Fifty seeds each were replicated three times for each treatment. Treatments consisted of five different concentrations of Cr (0, 0.1, 0.5, 2.5, 7.5 ppm) and Pb (0, 2.5, 5, 7.5, 10 ppm). Distilled water was used as a control treatment. Lead concentrations >2.5 ppm significantly effected seed germination, seedling length, seedling vigor index, seedling dry biomass, root and shoot length of both tomato and brinjal as compared to control. Similarly chromium concentrations >7.5 ppm affected all the parameters studied in both the crops. No germination took place at lead concentration of =5 ppm and chromium concentration of = 7.5 ppm in both crops.

162. Reduction in Mosquito Larvae Density by Spraying of A Traditional Neem Preparation - A Study Report

Dr. P. K. Suhas Narayanan[1], Dr. Sheela B. Karalam[2], Dr. V. C. Deep[3], Dr. P. K. V. Anand[4], Mr. Sasi[5] and Dr. V. Subhose[6]

[1]Governament ayurveda dispensary talikulam-Kerala.
[2]R&D Oushadhi.
[3]NRIP-Cheruthuruthi
[4]Vaidyaratnam Ayurveda college, Thissur.
[5]N.R.I.- Vijayawada.
[6]P.K. District Malaria Officer, Palakkad

Keywords : *Vector borne disease controle-spraying& fogging-Veppenna Pukayila Kashayam-Mosquito Larvae Density-Eco friendly method-People's participation*

Rainy seasonal & Vector born disease outbreaks are global attention seeking epidemics, since the available preventive & curative aspects against it are less successful. Widespread Spraying & Fogging of various chemicals for prevention will become a threat to health & environment. As an alternative, a traditional cost effective preparation of Kerala called VEPPENNA PUKAYILA KASHAYAM used in health & agriculture was field trialed & analysed scientifically.Besides the mild repellant action it showed a significant reduction in mosquitolarvae density. With improved versions of this , the concept of Ecofriendly methods for countering epidemics can be highlighted.

163. Air Quality Management during Common Wealth Games – 2010 : Delhi

Shaveta Kohli, Alok Kumar, F. Rehman,
Srivastava, R. C. and Saha, D.

Air Laboratory Division
Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar,
Delhi-110 032
kohli.shaveta@gmail.com

Keywords : *Air Quality Management, Common Wealth Games, Delhi*

The 19th Commonwealth Games (CWG) is being organized in Delhi, the capital city of India, during October 3 and 14, 2010. This is an event of paramount importance for India and accordingly steps have been initiated at various levels to make the event a great success. With its modern infrastructure in place, Delhi wishes to provide a healthy and enjoyable experience for all. The management of ambient air quality is one of the major concerns for the regulatory agencies. In Delhi, mixed combinations of manual and on-line analyzers (conventional and open path) have been placed at various locations, which would be utilized for monitoring of air quality and it's forecasting during the entire period of the games. The study is an attempt to describe the air quality status during this prestigious event being

organized at Delhi. It is also proposed to make a presentation along with preventive and regulatory measures initiated for this particular event besides establishment of monitoring stations and instantaneous data transmission vis-à-vis implementation of preventive actions at various stages of games.

164. Polycyclic Aromatic Hydrocarbons in Respirable Ambient Particulate Matter (PM10) in Urban Atmosphere of Delhi.

S. K, Tyagi, Dolly Kulshreshtha, P. Krishnamurtthy, A. K. Sen, Amit K. Sharma and D. Saha

Central Pollution Control Board,
Parivesh Bhavan, East Arjun Nagar,
Delhi-110032

Keywords : *Polycyclic Aromatic Hydrocarbons, Benzo(a)pyrene, PM_{10}, Respirable Dust*

Polycyclic Aromatic Hydrocarbons (PAHs) are toxics to human health and animals. These are primarily emitted to air from vehicular exhaust, coal combustions & thermal power plant in urban area. This is a class of organic molecules that consist of 2 or more benzene rings and are commonly produced by pyrolitic combustion of fossil fuel. Some of PAHs like Benzo(a)pyrene (BaP) have shown evidence of human carcinogenic activity. Therefore, CPCB has given National Ambient Air Quality Standards (NAAQS) for Benzo(a)pyrene. CPCB is monitoring 15 particulate PAHs in Ambient Air at 7 monitoring sites in Delhi. The field samples have been collected using Respirable Dust Sampler (RDS) with cut size of PM_{10} and below. Ambient air has been sampled through glass fiber filter paper (EPM2000) at a flow rate of ~1.0 m^3/min. The filters were extracted with residue grade Toluene using ultrasonic apparatus. The resulting sample extract was concentrated to a significantly small volume (i.e. 2ml) prior to analysis using Rotary evaporator. Final concentrated was analyzed using GC-FID with Ultra-2 column (). Multilevel calibration has been performed using Dr. Ernhstrofer's standards of different concentrations (5ng, 10ng, 15ng,20ng). The results of Total PAHs and Benzo (a) pyrene have been discussed in the paper. The monthly mean total PAH in PM_{10} laded ambient particulate matter was found between 24.68 and 33.85 ng/ m^3 and Benzo(a)pyrene was found between 5.08 to 7.07 ng/ m^3 at different

locations during the study period (January – December 2009). The levels of Benzo(a)pyrene are 5 to 7 times higher than the notified NAAQS for B(a)P which reflects urgent need of monitoring of PAHs including B(a)P in other metro cities of India.

165. PAH and VOC Profile during an Accidental Fire at Oil Storage Depo in Jaipur

A. K. Sen, P. Krishnamurthy, Dolly Kulshreshtha and S. K. Tyagi

Central Pollution Control Board,
Parivesh Bhavan, East Arjun Nagar,
Delhi-110032

Keywords : *Polynuclear Aromatic Hydrocarbons, Volatile Organic Compounds, $PM_{10,}$ Oil Depo*

A devastating fir accident has been occurred in an oil storage depo at Sitapur Industrial area, Jaipur on October 29, 2009 and the fire continued till November 11, 2009. The city Jaipur is situated at 26°55' North, 75°49' East & 26.92° North, 75.82°E.The average elevation from sea level is 432 meters. The burning of fuel in the storage tank released dark smoke including organic gases like Polynuclear Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) and inorganic gases like Sulpher-di- oxide, Nitrogen-di- oxide, Carbon monoxide etc. are transported into the surrounding areas. As fuel oils consist of mostly organic compounds such as PAH, VOCs which are highly toxic in nature and affected the humans, animals and vegetation system. Among them benzene and benzo(a)pyrene are known carcinogens. Keeping view of the above, CPCB has conducted an in-depth monitoring of inorganic and organic pollutants of the fire accident areas during Nov 4-5, 2009 to assess the environmental impact of the fire. In this paper, we have mainly emphasized organic pollutants like PAH and VOCs. Ambient monitoring was carried out at 5 locations at a distance of about 1 to 3 km away from the fire in the upwind and downwind directions. PM_{10} Particulate PAH in ambient air was sampled by Respirable Dust Sampler (RDS) equipment using EPM 2000 glass fiber filter paper which was extracted with toluene by ultra sonication followed by pre- concentration to 2 ml by rotary evaporator. The final sample was

analyzed in GC-FID using ultra 2 capillary column. Ambient VOCs were adsorbed in Tenax and Chromosorb sorbent tubes in series by low flow pump and directly thermally desorbed and analyzed in GC-MS-ATD. The minimum and maximum concentration of benzene, toluene, ethylene benzene, m,p-xylene, o-xylene, naphthalene were found as 1.3-38.6 $\mu g/m^3$, 25.9 – 75.9 $\mu g/m^3$, ND – 27.5 $\mu g/m^3$, ND- 41.1 $\mu g/m^3$, ND-6.3 $\mu g/m^3$, ND-9.2 $\mu g/m^3$ respectively. The benzo(a)pyrene in particulate ranges from 2.16 ng/m^3 to 11.55 ng/m^3 and total PAH ranges from 21.51 ng/m^3 to 81.39 ng/m^3. Benzene and benzo(a)pyrene concentrations were observed quite high when compared with National Ambient Air Quality Standards (N AAQS) for benzene i.e. 5 $\mu g/m^3$ and benzo(a)pyrene i.e.,1 ng/m^3.

166. Spent Mycelia for Removal- and Recovery of Cr (VI) from Synthetic Solution as well as Industrial Effluent

Dilip Markandey, V. K. Sachan, N. Semwal and B. R. Naidu

Central Pollution Control Board, Parivesh Bhavan,
ZO- W, Opposite VMC, Ward No.10,
Subhanpura, Vadodara

Keywords : *biosorption, heavy metals, waste mycelia, environmental variables, sorption efficiency, recovery of metals, industrial effluent*

Next to municipalities, industrial operations like electroplating, battery manufacturing, pigment and paint production, tannery etc. contribute significant amount of heavy metals to the aquatic system. These contaminants find their way into the receiving aquatic system through various natural and man made sources and lead to several undesirable effects on natural resources.

There is a great potential in using microorganisms and associated derivatives for resolving the problem of contamination of metals due to discharge of various metal bearing effluents. This approach is certainly economical, which many a times, cannot be achieved through chemical and / or physical reaction with the completeness and efficiency. The microorganisms based decontamination techniques exhibit advantages like easy to realize, profitable, as well as economical. Besides, the microbial methods convert these contaminants into an immobilized insoluble state that can readily be recovered.

Keeping the said point into mind, compressed dehydrated spent mycelia from an antibiotic manufacturing unit was collected and used for preparation of biosorbent to study removal of Cr(VI) from synthetic solution as well as diluted electroplating effluent. The adsorption, desorption and recycling studies indicate the prepared activated carbon effectively used for removal- and recovery of Cr (VI) from synthetic solution as well as diluted effluent. Adsorption data fitted well with the Freundlich adsorption Isotherms. Using NTA and EDTA for desorption, the recovery of the target metal was achieved upto 90% with 4 repeats without deterioration of the sorption/desorption efficiency of the test biosorbent. This paper describes the findings of the said investigations in detail.

167. Impact of Hydro Electric Projects on Water Quality of River Bhagirathi (Ganga) in the High Altitude Region

N. Semwal*, J. S. Jangwan, Dilip Markandey, V. K. Sachan and B. R. Naidu**

Central Pollution Control Board, Parivesh Bhavan, ZO- W,
Opposite VMC, Ward No.10, Subhanpura, Vadodara
** Dept. of Chemistry, HNB Garhwal University Campus,
Badshahi thaul, Tehri Garhwal,
Uttarakhand.

Keywords : *water quality, hydroelectric projects, municipal waste, physico-chemical parameters, benthic components, biological monitoring*

Millions of Hindus from all parts of India and also from overseas flock to Gangotri, Uttarkashi, Devprayag and other spots along Bhagirathi to observe this majestic river and perform various religious activities. The major human activities which have been observed influencing the water quality of river Bhagirathi are; hydro-electric projects (HEPs), municipal waste (sewage & solid waste), religious activities like mass bathing, open defecation, indigenous fishing methods, landslides and soil erosion triggered by road construction.

Over last two decades a number of HEPs have been proposed, built or under construction on a 225 km stretch along the course of the Bhagirathi between Gangotri (3048 MSL) and Devprayag (475 MSL). The artificial alteration in

natural flow of the river water due to reservoirs led to transformation in substratum composition of the river bed and brought about a lot of changes in the water quality characteristics viz., benthic fauna, water temperature, DO, suspended solids, turbidity, pH, metals and nutrient transportation. The alteration in metal and nutrient transportation would adversely affect the agricultural soil fertility of the Great Gangetic Plain and thus the food security of the country. Increase of water temperature and depth and decrease in DO values at HEP reservoirs affects the fauna and thus adversely impact the ecology of the river. The flow variation from Tehri reservoir has shown drastic impact on benthic macro- invertebrates as these animals were completely disappeared from reservoir downstream upto Devprayag.

The saying 'Prevention is better than cure' holds true for mitigation of environmental and social impacts of HEPs. It is worthwhile to abandon projects when the environmental and social costs to be paid are high. This paper briefly describes the physico-chemical and monitoring of benthic fauna of river stretch from Gangotri to Devprayag in the quantitative terms.

168. The Impact of Yagna on Adjacent Air Environment – A Case Study*

A. Pathak and D. Saha

Address for correspondence : Central Pollution Control Board*
'Parivesh Bhawan', East Arjun Nagar, Delhi

Key words : *PM_{10}, $PM_{2.5}$, $PM_{1.0}$, Yagna, Havan*

The religious belief on performing yagna to clean the atmosphere is gathering impetus as reported in some studies. Scientific explanation on betterment of air quality after yagna has become a debatable topic in recent past. This particular study was aimed to see the impact of mass yagna (108 Kund Maha Yagna celebrated in Delhi) on air quality in adjacent air environment. Increase in PM_{10} (93 %), $PM_{2.5}$ (94 %) and $PM_{1.0}$ (104%) concentrations during Yagna indicate addition of ultrafine particles in adjacent areas due to uncontrolled combustion. The number of particles having upto 1µm aerodynamic diameter added in to the air environment may be a major concern of tremendous health hazard even for a short span of exposure.

*The views expressed in this paper are exclusively owned by the authors and the organization in no way related to it

169. Effect of Mixing Height on Air Quality at a Busy Traffic Intersection in Delhi

Mohanan M. N., Ratnesh Kumar and D. Saha

Air Laboratory Division,
Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi-110 032

Key words : *Delhi, mixing height, sodar system.*

The air quality data collected at ITO by continuous ambient air quality monitoring station and mixing height data collected by soar system at Parivesh Bhawan, CPCB Head Office are used in this study. Data collected from October 2006 to June 2010 are used to see the variation of air quality and mixing height in different seasons. In post monsoon and winter seasons air quality is more affected by pollution and in monsoon and summer it is better. Correlation of monthly averages of mixing height and air quality parameters measured at ITO are observed. NO2 and SO2 have weak -ve correlation with mixing height. CO and PM2.5 have -ve correlation while O3 have + ve correlation with mixing height. Variation of air quality through different seasons in this study period is more often as mixing height suggests.

170. Air Quality Trend at Traffic Intersection in Delhi - Impact on Implementation of Major Policies

Satheesh M., R. C. Srivastava and D. Saha

Air Laboratory Division, Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi 110032

Keywords : *Air pollution, Delhi, low sulphur diesel, particulate matter Compressed Natural Gas.*

The present is attempt to examine the trend in the level of air pollution and impact of air quality after implementation of number of policy measures for

reducing the air pollution in Delhi. The annual data of the last 10 years (2000-2009) has been analyzed. One of the important measures is conversion of all commercial passenger vehicles viz. buses, taxis and three wheeler auto rickshaws and light commercial goods vehicles to Compressed Natural Gas (CNG). The other policy measure that appears to have a positive impact on air quality trend is the reduction of sulphur content in diesel, introduction of unleaded petrol and reduction of benzene content in petrol. The results show that the policy measures have helped in reduction of sulphur dioxide (SO_2), carbon monoxide (CO) and benzene. Due to the growth in use of diesel fuelled cars and vehicle population, the levels of Particulate Matter (SPM, PM_{10}) and nitrogen dioxide (NO_2) shows an increased trend.

171. Indoor and Outdoor Study of Air-Microflora at Delhi

D. K. Markandey, B. K. Chaudhari and S. D. Makhijani

Central Pollution Control Board, Parivesh Bhavan,
East Arjun Nagar,
Delhi-110 032

Aero-mciroflora is a tem used to define the living microbial contents specially bacteria, fungi, viruses, algae, protozoa of a bio-aerosol. It is a general term which is also used to define collectively the air borne particles or microorganisms, gases, vapouts or fragments of biological origin (e.g. pollengrains, mycotoxins). Bio-aerosols are everywhere in the environment and they are always present and generally pose no problems when various types of them are kept within the reasonable limits. However, some bio-aerosols when breathed it can cause diseases including pneumonia, asthma .rhinitis (e.g.cold hey-fever) and respiratory infection. These health problems caused due to bio-aerosols or aero-microfloral reasons make the study of bio-aerosols very important to humans for adopting useful preventive and curative measures. Aeromcriflora study was conducted with indoor and outdoor samples at CPCB premises and some other places at Delhi during the years 2005, 2008 and 2009. Nutrient Agar was used for the collection of bacterial colonies, Potato Dextrose Agar was used for the collection of fungal colonies,, Plant Count Agar was used for the collection of general microflora, and Mac

Condkey Agar was used for enrichment of pathogenic bacterial flora. Samples were collected over a fortnight and numbers were counted with different media. A few microbes could also be identified. The methodology includes quantification, isolation, pure culturing followed by identification. The report will soon be published by CPCB.

172. Study of the Exhaust Gases from different Fuel based Vehicles for Carbonyls and Methane Emissions

R. C. Saxena*, Anjana Kumari V. and Meetu Puri

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

In recent years, the automobiles are the major contributor to the overall pollution in the country. Carbonyl emissions from the vehicle exhaust causes pollution as well as various types of health hazards and material damages etc. Central Pollution Control Board (CPCB) carried out detailed study to evaluate and characterize carbonyls and methane emissions from different category of vehicle exhaust using various fuels. The paper contains the study details from selection of the vehicles, methodology, findings and the recommendations for control of carbonyls and methane emissions.

173. Status of the Vehicular Pollution Control Programme in India

R. S. Mahwar*, J. S. Kamyotra and S. P. Gautam

Central Pollution Control Board, Parivesh Bhawan,
East Arjun Nagar, Delhi

The growing cities, sharp increasing traffic, trajectory growth, rapid economic development and industrialization, and higher levels of energy consumption has resulted an increase of pollution load in the urban environment. It is also accepted that automobiles have emerged as a critical source of urban air pollution specially in the developing world. Realizing the gravity of the problem, steps are

being taken to introduce better technologies, better fuel quality, shift to environment friendly fuels, and mass transit system for the control of environmental pollution in urban areas.

The Central and State Governments in India have been developing strategies for mitigation measures to improve the urban air quality and make the cities cleaner and greener. Over the past decade or so, the Government of India has notified statutes aimed at regulating and monitoring vehicular emissions across the country.

The paper presents a review of the vehicular emission problems in Indian cities, the various developments that have taken place in the past including the studies conducted for assessment of the air quality in cities, the legislation and standards adopted for the control of vehicle emissions, the role of the various concerned agencies, the steps taken for improvement in the quality of the automotive fuel, the overall impact of these measures and the future strategy to be adopted for vehicular emission reduction and related issues.

174. Environmental Issues Involved in Recycling of used Vehicles

Anjana Kumari V*, R. C. Saxena and R. S. Mahwar

Central Pollution Control Board,
Parivesh Bhawan, East Arjun Nagar,
Delhi

There are about 7.22 (2004) million in use vehicles in the country and the country's annual production is about 11.18 (2008) million. There is no mandatory end of life for vehicles (ELV) in India. The existing legislation only requires the removal of 15 years old commercial vehicles in certain cities. The vehicles have parts made of different materials which vary from vehicle to vehicle depending on there make and even from model to model. These materials include right from ferrous and toxic metals to synthetic organic materials such as plastics. The recycling/disposal of the vehicles is therefore required to be done in an environmentally sound manner ensuring maximum recovery/reuse/recycle and generation of minimum residues to be disposed in a safe manner. The paper presents the review of environmental issues involved in recycling of used vehicles.

175. Municipal Solid Waste Management in Delhi : The Challenges

Pramila Gupta, Dr. S. Agrawal, Dr. D. D. Basu and Shri J. S. Kamyotra

Keywords : *collection, disposal, NDMC, MCD*

One of the Problems of capital city of India, Delhi is to collect and disposal of municipal solid waste. The total generation of the Municipal solid waste is approx 7000 tones/day and this is projected to rise to 17,000–25,000 tones/day by the year 2021. The three major agencies responsible for the management of solid waste in Delhi are Municipal Corporation of Delhi (MCD), New Delhi Municipal Corporation (NDMC), Delhi Cantonment Board (DCB) .The Delhi is divided into 15 zones out of which MCD is taking care of 12 zones, 2 zones is by NDMC and one by DCB. The waste collected by the concern agencies is being dumped in three working landfill sites namely, Bhalswa, Ghazipur and Okhla Landfill site.

The Central pollution Control Board has been entrusted to monitor the entire operation of Municipal Solid Waste Management. This paper discusses in detail about the present practices, their limitations and the challenges faced by the concern agencies for the disposal of the municipal solid waste. The paper also addresses the SWOT (Strength, weakness opportunity and threat) analysis, limitations of the land for disposal and possible engineering innovation for the mitigation of the challenges.

176. Air Quality in Metropolitan Cities of India

Abida Khatoon, Sanjeev Agarwal, D. D. Basu and J. S. Kamyotra

Central Pollution Control Board
Delhi

Keywords : *PM_{10}, air quality monitoring, metropolitan cities, NAMP*

Central Pollution Control Board has laid down an ambient air quality network in India known as National Ambient Air Quality Monitoring Programme (NAMP)

to assess the air quality of Metropolitan cities as well as important cities. Ambient air quality monitoring is required to determine the existing quality of air, evaluation of the effectiveness of control programme and to identify areas in need of restoration and their prioritization. 146 air quality monitoring stations spread across the 35 metro cities including seventeen cities identified by Honorable Supreme Court as polluted cities. The parameters of the air quality monitored under NAMP are sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), and Particulate Matter size less than 10 micrometer (PM_{10}) at all stations. The monitoring of pollutants is carried out for 24 hours (4-hourly sampling for gaseous pollutants and 8-hourly sampling for particulate matter) with a frequency of twice a week, to have 104 observations in a year as per National Ambient Air Quality Standards revised in November 2009 under Air (Prevention & Control of Pollution) Act 1981. Close examination of the data observed in the decade, revealed a decreasing trend of SO_2. Same is the fate with NO_2 with occasional pulses. PM_{10} revealed an increasing trend and which did not meet the standard in several occasions. This paper shall address the statistical summary of the said parameters, degree of violation of standard and trends.

177. Assessment of Ground Water Quality in NCT of Delhi

Alpana Narula *, R. M. Bhardwaj and D. D. Basu**

Junior Scientific Assistant, scientists

Central Pollution Control Board

The quality of water and its distribution over different regions of the India is uneven and causes problems of scarcity and suitability. It is therefore imperative that this scarce commodity be used as rationally and efficiently as possible. With the rapid increase in population and the increasing demands of irrigation, human and industrial consumption, the available water resources in many parts of India are being depleted and water quality has deteriorated. Ground water quality deterioration in urban areas in India is predominantly due to discharge of untreated or partially treated domestic sewage, industrial effluents and haphazardly disposed municipal and industrial solid waste.

Ground water quality deterioration in urban areas in India is predominantly due to discharge of untreated or partially treated domestic sewage, industrial effluents and haphazardly disposed municipal and industrial solid waste.

pH of Ground water of metropolitan city of Delhi is mostly confined in the range of 6.5-7.8, thus the value is in the permissible limits prescribed by BIS (1991) and WHO (1996) for various uses of water including drinking and other domestic supplies. The value of TDS in 70% of the samples observed to be above the desirable limit but within the maximum permissible limit of 2000 mg/L during both pre- and post-monsoon season and only two samples exceeds the maximum permissible limit of 2000 mg. The conductivity values in the ground water samples of the metropolitan city vary widely from 507 to 12180 µS/cm during pre-monsoon season and 448 to 2804 µS/cm during post-monsoon season with almost all the samples having conductivity value above 1000 µS/cm during pre-monsoon season.Nitrate content in drinking water is considered important for its adverse health effects. The concentration of nitrate in 80% of the samples fall within the desirable limit of 45 mg/L. fluoride concentration observed to be exceeding the permissible limit of 1.5 mg/l in 20% of the samples.

178. Water Quality of Rivers in Cauvery Watershed

Shweta Gaur, R. M. Bhardwaj and D. D. Basu

Central Pollution Control Board,
Delhi

Keywords : *BOD, DO, FC, TC, Conductivity*

The river originates at Talakaveri in Karnataka, flows through Karnataka and Tamil Nadu and outfalling in the Bay of Bengal through two principal mouths. The water quality monitoring of the River Cauvery along with its tributary streams Arkavati, Amravati, Bhavani, Kabbani, Laxmantirtha, Shimsa, Hemavati and Yagachi is carried out at 36 locations and water samples are analysed for pH, Conductivity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Total Coliform (TC) and Faecal Coliform (FC) to assess the spatial and temporal variation. The analytical methods for water and waste water

analysis are done as per American Public Health Association. The river is not meeting to indicator parameters of water quality for various beneficial uses at Pallippalayam, Erode, Tiruchirappalli D/s and Trichy due to wastewater discharges from urban agglomeration and industrial sources. There is a need to restore the water quality of river Cauvery in polluted segment through interception, diversion and treatment of municipal sewage.

179. Longitudinal Water Quality Profile of River Godavari

Shweta Gaur, R. M. Bhardwaj and D. D. Basu

Central Pollution Control Board,
Delhi

Keywords : *BOD, DO, FC, TC, Conductivity*

River Godavari originates in western ghat near Trimbak in Nashik District of Maharashtra and is the longest river basin in peninsular India. The Godavari basin lies in the Deccan plateau, and covers large areas in the States of Andhra Pradesh, Madhya Pradesh, Chhattisgarh and Maharashtra, besides smaller areas in Karnataka and Orissa. The water quality monitoring of the river Godavari is carried out at 35 locations and water samples are analysed for pH, Conductivity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Total Coliform (TC) and Faecal Coliform (FC) to assess the extent of water quality variation. The water samples are analysed as per the analytical method of water and waste water analysis by American Public Health Association. The river is polluted in Maharashtra segment from Nashik to Nanded due to wastewater discharges from urban agglomeration and industrial sector whereas it is relatively clean in Andhra Pradesh with respect to indicator pollution parameters. This paper shall address the spatial and temporal trend of water quality parameter and degree of exceeding the limit with respect to water quality criteria for designated best uses for a decade. In addition to above, the paper shall deliberate statistical summary with respect to each parameter.

180. Water Quality of Sabarmati River System

Sandhya Shrivastava, R. M. Bhardwaj and D. D. Basu

Central Pollution Control Board,

Delhi

Keywords : *BOD, DO, FC, TC, Conductivity*

River Sabarmati rises in the Aravalli hills and outfall in Arabian sea after flowing for 371 km through the states of Rajasthan and Gujarat. The principal tributaries of the river are Sei, Wankal, Harnay, Hathmati, Vatrak and Meshwa. The lower part of the basin in Gujarat has become a haven for industries and many of them being engineering and chemical units generating significant volume of industrial effluents besides municipal sewage from Ahmedabad and other urban centres.The river is significantly polluted from Ahmedabad to vautha although it is the lifeline of the region. Intensive agricultural practices coupled with intensive withdrawal of water for cropping had left the river with lean flows after it entered the Ahmedabad city limits. The water quality monitoring is carried out at 9 locations on the mainstream and one each on tributaries viz. Meshwa, Shedi and Khari. Water samples are analysed for pH, Conductivity, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Total Coliform (TC) and Faecal Coliform (FC) to assess the extent of water quality variation. The water samples are analysed as per the analytical methods of water and waste water analysis by APHA (American Public Health Association). The water quality data analysed over a period of eight years indicates that the concentration of BOD varies from 0.1- 475 mg/l and DO is observed in the range of 0 -14.7 mg/l in the mainstream of Sabarmati. The number of faecal coliform bacteria are exceedingly higher than the desired level for various beneficial uses and observed in the range of 4 - 46 x 10^5 MPN/100ml. The river is in need of improvement of water quality by control of point and non point sources of pollution to restore the water quality.

181. Water Quality of Medium and Minor River in the Coastal Tract of India

Ankur Rajpal, Suniti Parashar, R. M. Bhardwaj and D. D. Basu
Central Pollution Control Board, Delhi

Keywords : *Medium and minor river, Water quality of river, Pollution, Monitoring and Assessment,*

The medium and minor rivers out falling to the coastal tract extending from Orissa (Bay of Bengal) to Gujarat (Arabian Sea) are monitored for the assessment of water quality. Water quality observations of sixty medium and minor rivers are analyzed and compared to desired water quality criteria for aquatic resources. Out of the twelve rivers in Maharashtra, ten are not confirming to the criteria where as one in Andhra Pradesh, one in Kerala and all eleven rivers in Gujarat and Daman are exceeding the desired water quality criteria. River water quality is assessed for physico-chemical and bacteriological parameters viz. Temperature, pH, Electrical Conductivity (EC), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Fecal coliform (FC) and Total coliform (TC). Rivers meeting to ambient water quality criteria are Periyar, Pamba, Neyyar, Amaravila, Ayur and Mahi Valayamin in Kerala; Nagavalli, Vamshdhara in Andhra Pradesh; Rushikuliya in Orissa; Zuari, Mandovi and Kalna in Goa, whereas the rivers in Gujarat and Maharashtra mainly Amlakhadi and Damanganga are grossly polluted. The rivers identified are in need of restoration of water quality by taking appropriated action for control of pollution.

182. Water Quality of streams in Brahmaputra Watershed

Suniti parashar*, R. M. Bhardwaj and D. D. Basu****
Senior Scientific Assistant, Scientists
Central Pollution Control Board

Key Words : *Trans-boundary, tributary, water quality analysis, spatial, temporal*

The Brahmaputra also called Tsangpo-Brahmaputra is a trans–boundary river and one of the major rivers of Asia. The Brahmaputra basin extends over an

area of nearly 5, 80, 000 Km and traverses through Tibet (china), India and Bangladesh. In India the basin lies in the states of Arunachal Pradesh, Assam, Nagaland, Meghalaya and west Bengal. It enters India across the sadiya frontiers tract, west of Sadia town into the Assam valley. Here it is joined by two more tributaries viz. the Dibang or sikang and the Lohit, from here onwards the river is known as the Brahmaputra. The river has eight significant tributaries in India. The water Quality monitoring of river Brahmaputra is carried out at 10 locations viz. Kherghat, Dibrugarh, Nimaighat, Dhenukapahar, Pandu, Jogijhoga, Khacharighat, Chandrapur, Sualkuchi and Dhubri. The water samples are analyzed for pH, Conductivity DO, BOD, Total Coliform and Fecal Coliform to assess the extent of water quality variation. The analytical methods of water and waste water analysis are done as per the American Public Health Association. The mean concentration of BOD is meeting water quality at all the monitoring locations whereas occasional pulses of higher concentration are observed at Nimaighat, Pandu , Jogijhoga and Chandrapur locations. This paper shall address the spatial and temporal trend of water quality parameter and its compliance to water Quality criteria for designated best uses and deliberate statistical summary with respect to each parameter.

183. Analytical Performance Evaluation of the Laboratories of Pollution Control Boards and Committees participated in Analytical Quality Control Exercises (AQC) for Water Quality parameters carried out by Central Pollution Control Board

A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board,
Zone Office (South),
Bangalore-560 010
[2]Central Pollution Control Board,
Delhi-110 032

Analytical Quality Control (AQC), a part of Quality Assurance (QA) Programme, plays a vital role in any Environmental Monitoring Programme. The analytical data obtained in a monitoring programme is used for decision making

purpose, upon which the entire scheme is executed by incorporating money, materials and man power. The Central Pollution Control Board (CPCB) is monitoring 1429 water quality monitoring stations comprising rivers, lakes, wells, and ground water spread over 27 states and 6 Union Territories through various State Pollution Control Boards(SPCBs) and Pollution Control Committees(PCCs). The water samples are being analysed in central or regional llaboratories of SPCB/ PCCs for various physico chemical and bacteriological parameters. In order to generate high quality analytical data as a part of Quality Assurance system, CPCB has started regular and organised Analytical Quality Control (AQC) exercise with the concerned laboratories from 1991 onwards as a continuous programme. Till March 2010, twenty five rounds of exercises were carried out for water quality parameters. At present there are 85 laboratories of SPCBs/PCCs participating under this programme.

Two synthetic water samples prepared in laboratory were distributed to all participating laboratories and analysis reports were obtained from laboratories. Robust Statistical analysis of data for arriving *"Reference value", (Median), standard deviation and Z – Scores values* were worked out. A total of 75 laboratories were considered for assessment and the **AQC performance index (API**) in terms percentage was found with score of 60 % and above for 30 laboratories. In general performance of these laboratories for titrimetric methods of analysis is comparatively better than colorimetric methods. The performance of laboratories for various analytical parameters in the order decreasing percentage was as follows :

Chloride(81) < BOD(75) < NH_3-N(73) < TKN(72) < Total Hardness(72) < Conductivity(71) < Calcium(70) < Magnesium (69) < Sulphate(69) < COD(68) < FDS(68) < Sodium(67) < Boron(66) < Potassium(66) < TSS(65) < TDS(65) < Chromium^{+6}(63) < PO4-P(62) < NO_3 – N (61) < Fluoride(60). The overall mean value was found as 68 %. Further it is observed that there is a continuous improvement in the performance of analysis as compared to earlier periods.

This exercise shall be a routine activity of Central Pollution Control Board for improving the analytical capability of the concerned laboratories. This paper deals with interpretation of the analytical results and suggestive measures for improvement of the analytical performance of the laboratories.

184. Estimation of Volatile Organic Compounds (VOCs) and Poly - cyclic Aromatic Hydrocarbons (PAHs) in few Industrial Estates in Southern India

T. K. Radheshyam Balaji*, A. Manoharan*, V. K. Verma*, J. S. Kamyotra and S. P. Gautam****

*Central Pollution Control Board, Zonal Office(South)
Bangalore-560010
**Central Pollution Control Board,
Delhi-110032

Volatile Organic Compounds (VOCs) are emitted by various industrial units such as paints, pharmaceuticals, pesticides, petrochemical refineries, solvent manufacturers, chemical industries etc. Poly cyclic Aromatic Hydrocarbons (PAHs) are produced as byproducts of fuel burning. Some of these compounds have been identified as carcinogenic and mutagenic. Health effects include: irritation of eye, nose, and throat, headache, nausea etc. Few of the VOCs and PAHs are Persistent Organic Pollutants (POPs) that enter the bio-geo chemical cycle and cause severe health effects to human. In Southern India, five industrial estates namely Patencheru/ pashimylaram, Jeedimetla in Andhra Pradesh, Manali and Cuddalore in Tamilnadu and Cochin in Kerala either consume the solvents in bulk or produce solvents The various chemical processes in these industrial units produce VOCs and PAHs either directly or indirectly. A comprehensive monitoring has been carried out in 5 industrial estates to estimate the emissions. 8 hourly monitoring for 24 hours in four directions of the industrial estates were carried out by using Automated Thermal Desorption Tubes attached to personal samplers at constant flow rate of 0.5 liter per minute.

VOCs in these industrial units are found in the range of, 400 – 900(Toulene), 40-400 (Chloroform), 100-200(Xylene) and 10-200·(Benzene) µg/m^3. PAHs are in the range of 0.005-0.5(Naphthalene), 0.003 -0.04(Pyrene), and 0.003-0.05(Benzo (a) Pyrene) µg/m^3. When compared with international Ambient Air quality standards for Toulene, Chloroform, Xylene and Benzene, the observed values were found exceeding the standards. Indian standards laid by Central Pollution Control Board (CPCB) for Benzene (5µg/m^3) is also not meeting the standard whereas the Benzo (A) Pyrene was found within the standard of 1 µg/$m^{3\cdot}$ The study included the probable escape routes from sources and means to control/reduce the emission levels.

185. Co-incineration of Distillery Spent Wash in Cement Kiln as an alternative Waste Management Option - A Case Study

K. Ranganathan[1], K. Vivek[1], H. V. Gayithri[1], A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautham[2]

[1]Central Pollution Control Board, Zonal Office (South),
Bangalore-560 010
[2]Central Pollution Control Board,
Delhi-110 032

Co-processing of high calorific and toxic wastes in cement kiln is emerging as one of the alternative waste disposal methods in the recent years. Distillery spent wash is a waste with high organic and inorganic solids and that requires high care disposal as it causes damage to the environment. An attempt was made for co-processing of concentrated spent wash in cement kiln as it contains significant amount of calorific value. Manufacture of cement is basically energy intensive process in that the chemical and physical process reactions take place at high temperature. Due to the high temperature inside cement kiln, combined with the oxidizing (oxygen-rich) atmosphere and long residence time, cement kilns have been used as a processing option for various types of waste streams. A distillery with an average spent wash generation of 5 KL per KL of alcohol is concentrated using multi-stage evaporator to obtain the spent wash with high calorific value (1800 kCal/kg) and solid contents (50 %). Elemental analysis report shows that the C, H, S and O are 41.1%, 1.6%, 2.1% and 31.0%, respectively. A trail run was carried out in a cement kiln with feed rate of raw meal (205 TPH), coal powder, (18.4 TPH) and the concentrated spent wash (1000 kg/ h). The monitoring results show that the emission parameters are with in the standards prescribed. The organics in the spent wash is completely combusted and the inorganic are maximum melted with the clinker product. The reduction in coal combustion due to spent wash incineration at the rate of 1000 kg/hr is 11 TPD. The clinker product quality is also found with in the specification stipulated by Bureau of Indian Standards.

186. Status of Ambient Noise Levels in State Capitals of Southern India

S. Karthikeyan[1], K. Karunagaran[1], M. Madhusudanan[1], A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board, Zonal Office (South),
Bangalore-560 010
[2]Central Pollution Control Board,
Delhi-110 032

Noise, a form of energy pollution, is a complex sound with little or no periodicity and psychologically it is a sound undesired by the recipient. The ever increasing industrialisation, urbanization and vehicular population add to the noise problem. Noise as a pollutant contributes to a deterioration of the environment as potential hazard to health, communication interferences and nuisance. In order to estimate the extent of violation of National Ambient Noise standards so as to enable the policy makers to formulate policies/programmes for mitigating noise levels and ascertaining the nature and extent of noise pollution problem, a study on ambient noise levels in state capitals of southern states viz. Bangalore, Chennai, Hyderabad, Thiruvananthapuram was carried out.

In Chennai, the noise level ranges from 51 to 89 dB(A) during day and night time for all the zones and the same for Bangalore, Hyderabad, and Thiruvananthapuram ranges from 41.6 to 93.3, 51.4 to 83.8 and 44.7 to 81.1 dB(A) respectively. The noise levels in the four cities are compared with National Ambient Noise Standards and found violating 99% in Chennai, 84% in Bangalore, 88% in Hyderabad and 80% in Thiruvananthapuram at all the zones put together. Almost all the four cities are facing high levels of noise pollution problem.

Attempt has been made to compute and interpret the data applying statistical tools. Suggestions for mitigation of noise in these areas are given for effective control of noise levels.

187. Status of Ozone levels in ambient air at Bangalore

K. Karunagaran[1], M. Madhusudanan[1], A. Manoharan[1], J. S. Kamyotra[2] and S. P. Gautam[2]

[1]Central Pollution Control Board, Zonal Office (South), Bangalore-560 010

[2]Central Pollution Control Board, Delhi-110 032

Air Pollution is a major concern in most of the metro cities as it is causing serious health problems and associated economic loss. Bangalore city is witnessing explosive growth of vehicular population and industrialisation thus causing deterioration of ambient air quality. Majority of tropospheric ozone formation occurs when nitrogen oxides (NOx), carbon monoxide (CO) and volatile organic compounds (VOCs), react in the atmosphere in the presence of sunlight, particularly ultraviolet light. These precursors are mostly emitted by automobiles, gasoline vapours, fossil fuel, power plants, refineries, and certain other industries.

The ozone data monitored through continuous ambient air quality monitoring station (CAAQMS) at Bangalore during 2009 is statistically processed and interpreted.The ozone concentration ranges from 9.0 to 106.6 $\mu g/m^{3.}$ The mean concentration was observed as 33.6 $\mu g/m^3$ with the standard deviation of 9.9 and co-efficient variation of 28.6%. As compared with air quality standard notified by the Central Pollution Control Board, almost all the times, the ozone levels are found within the limit except in few occasions. This paper deals with findings of ozone levels and its further mitigation measures.

188. Abstract of Paper on "Management of Bio-Medical Waste in an Armed Force hospitals in Punjab and Uttar Pradesh"

S. K. Arora, H. P. S. Rathore, R. Rajkumar and Gurnam Singh

Central Pollution Control Board, Zonal Office (North)
PICUP Bhawan, Gomti Nagar Lucknow-(UP)

The Ministry of Environment & Forests notified the Bio-medical Waste (Management & Handling Rules 1998 (BMW Mgt.) in July 1998. In accordance

with the rules every hospital generating BMW needs to set up requisite BMW treatment facilities on site or ensure requisite treatment of waste at common treatment facilities. No untreated BMW shall be kept stored beyond a period of 48 hours. An attempt has been made to critically review the current bio-medical waste management practices followed by an Armed Force Hospitals in Pathankot, Gurdaspur, Amritsar & Jallandhar (Punjab) and Lucknow & Bareilly (Uttar Pradesh). The quantity of the bio-medical waste generated is around 148 kg/day (excluding liquid waste) from above armed hospitals in Punjab and 106 Kg/ day(excluding liquid waste) from above armed hospitals in Uttar Pradesh. The physical composition of the hospital waste was determined during the investigation. Category wise production of the bio-medical waste has also been worked out. Hospital follows strict segregation packing, labeling and disposal as per the Bio-Medical Waste Management & Handling Rules, 1998. Treatment techniques include steam sterilization (autoclaving|) incineration and land filling. The generated liquid effluent is treated with 1% sodium hypochlorite before disposal into the drain.

Intensive Care Unit Operation theatre, labour room, blood bank, pathology, hematology and OPDs are some of the department in the hospitals responsible for maximum generation of waste. Human anatomical waste in usually generated during operation in Operation Theater but a number of specimens is sent to the pathology department for diagnosis. Hence it is a liability of the laboratory to dispose the tissues as bio-medical waste. Category 2 (animal waste), category 5 (discharged medicines and cytotoxic drugs) and category 9 (incineration ash) are not generated in a pathology laboratory. Category 8 includes liquid was generated while washing of laboratory waste and processing of samples on the analyzers. Category 10 is the chemical waste generated while testing and analysis. The waste generated from disposable items (other than waste sharps) contribute the highest portion of the waste while discarded medicines and cytotoxic drugs contribute the least. The stack emission monitoring results indicate almost all the specified parameters are fall within the specified range indicate effective performance of the oil fired incineration.

The paper highlights the collection transportation and disposal procedures adopted by the hospital for effective and efficient treatment of bio-medical waste. It also describes the waste cycling procedures for recyclable hospital waste material and the imitative taken by the hospital to create health and mass awareness among the staff and health workers and waste handlers.

189. "Ambient Air Quality in Residential Area of Lucknow in Uttar Pradesh"

D. K. Soni, R. K. Mishra A. Kumar, Nidhi Nigam, Gurnam Singh, and J. S. Kamyotra

Central Pollution Control Board, Zonal office, Lucknow-U.P.

Keywords : *Ambient air, Particulate Matter, Nitrogen dioxide, Sulphur dioxide*

Ambient air quality is an important aspect of environmental studies due to its direct impact on the health of living organisms. Considering its potential with respect to receptor, the present a study was carried out in residential area of Lucknow- city-U.P. . Lucknow is the capital of Uttar Pradesh and is business hub of the Northern India, is situated at the either bank of the river Gomati (Latitude-26^o 30" & 27^o 10' North and longitude 80^o 30" & 81^o 13' East). The elevation of the city from sea level is 128 meter above from mean sea level (MSL). Lucknow covers an area of about 2528 square kilometer. The study projected diurnal, seasonal, and yearly variation of ambient air quality in residential area of Lucknow city. The present study highlighted the concentration of criteria pollutants i.e. Particulate Matter (PM_{10}) , Sulphur dioxide (SO_2) & Nitrogen Dioxide (NO_2), analyzed during 2008-2010. Monitoring was carried out as per the standard method for five days in week. The PM_{10} concentrations were exceeding the permissible limit of 100 μg/m^3 whereas the concentration NO_2 were found almost well below the prescribed limit except during low mixing height period. The ambient air quality of the area concern is closely associated with meteorological parameters like Temperature, Humidity, wind velocity, wind direction, and rain apart from the anthropogenic sources. During low mixing height period the concentration of air pollutants particularly PM_{10} was found many folds higher than the prescribed limit and the reverse trend noticed during high wind speed and improved ventilation period. Concentration of gaseous pollutant i.e. NO_2 level were always below the permissible limit, except in the winter. Correlation coefficient between of PM_{10} and NO_2 was positive during study period which gives an idea about the sources.

190. "Water Quality of Major River at Interstate Boundaries Flowing Through Northern Part of Country "

D. K. Soni, R. K. Mishra, Sunil Kumar, C. K. Dixit, A. Kumar, V. P. Yadav and Gurnam Singh

Central Pollution Control Board, Zonal office,
Lucknow-U.P.

Keywords : *Interstate boundaries, River monitoring, Physio-chemical.*

Water being the state subject, it is required to have constant vigil on the quality of river water flowing from one state to another to avoid disputes among them. Considering fact, CPCB-Zonal office has developed the network of monitoring at interstate boundaries for river Betwa & Sone in M.P. and U.P., river Ganga in U.P. and Bihar, river Satluj and Beas in H.P. & Punjab and Ram Ganaga in Uttaranchal & U.P. Selected pollution indicative parameter were monitored during 2009-2010 with quarterly frequency as per the protocol notified by Ministry of Environment and Forest, Delhi.

This paper reflect the status of water quality with respect to the physiochemical parameters like Electrical Conductivity (E.C), Chloride (Cl.), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) and Microbiological Parameters i..e. Total Coliform (TC) & Fecal Coliform (FC) monitored at interstate boundaries.

In lean period when the flow in the most of the river reduced remarkably, the pollutants concentration were observed increased in almost all rivers which get regenerated by the onset of monsoon. High level of TC & FC were observed in most of the river at all monitoring locations, which may be due to discharge of sewage. At little location mixing of industrial waste was also observed.

191. Treatment of Water using Sludge-Reagent-Product Technology

P. K. Behera, S. K. Biswas and D. P. Mukhapadhaya

Central Pollution Control Board,
East Arjun Nagar, Sahadra,
Delhi-110032
E Mail : behera.cpcb@nic.in and
pradyumna_73@yahoo.co.uk

In the prevailing global economic recession and environmental degradation, when cost cutting and sustainable development has become an emergent need, absolute or relative reduction in the quantity of materials can not be unattended for, since large amount of resources is spent on water treatment to supply drinking water. In all urban and rural areas, raw water from surface and/or under ground are treated by using coagulant at the rate of 40-150 mg L^{-1} depending on the quality of raw water. The cost of the coagulant substantially contributes to the cost of production of drinking/domestic water. On the other hand, the disposal of large amount of sludge generated from the Water Treatment Plant, is a major problem. Reduction of quantity will minimize the sludge disposal problems. Considering the above fact , Central Pollution Control Board along with Dr. S.K.Biswas came with an innovative idea of regenerating and recycling the alum along with positively charged colloidal particle in water treatment process.

Implementation of this treatment technology in all water works in India is likely to save approximately Rs.55,000,0000 per annum, and that would be the remarkable achievement in sustainable development in terms of alum consumption and sludge volume reduction (90 percent) .This treatment technology titled **"An Integrated Plant for Treatment of Raw Water Using Discarded Sludge to Produce Drinking Water"** has been granted patent ,vide Indian Patent No. 215808, on March 2008.

192. Dioxin and Furan Emission from Common Hazardous Waste Incinerators in Gujarat, India

A. R. Thakkar, P. D. Bharne and B. R. Naidu

Central Pollution Control Board, West Zone Office,
Vadodara, Gujarat

Keywords : *Dioxins, Furans, Hazardous Waste, CHWTSDF, Incinerator, Standard*

Dioxins and Furans are two families of related chemical compounds known as polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans. Dioxins are the group of 75 related chemical compounds known as polychlorinated dibenzo-p-dioxins and furans are the group of 135 related chemical compounds known as polychlorinated dibenzofurans. Out of these, 17 pose a major health risk to human health, including 2, 3, 7, 8- tetrachlorodibenzo-p-dioxin (TCDD) is the most toxic compound of the dioxin group.

Dioxins and Furans are present in trace amounts throughout the environment. Minute amounts may be found in the air, food, water, soil and dust. Dioxins and furans are unwanted by products created in manufacturing of chemicals such as some disinfectants, wood preservatives, dyes and dyes intermediate, herbicides etc. They are also emitted during combustion processes such as the incineration of municipal and industrial waste, wood and gasoline burning.

Gujarat state in India accommodates large numbers chemical industries manufacturing variety of chemicals. The state is having around 3, 00,000 industries and out of which 7751 industries generate hazardous waste. As per the National Inventory of Hazardous Waste Generation and Management in India, 2009, published by CPCB, Gujarat generates incinerable hazardous waste to the tune of 1,08,622 Metric Ton Per Annum. For proper treatment and disposal of hazardous waste i.e. landfill, stabilisation and incineration, Common Hazardous Waste Treatment Storage Disposal Facilities (CHWTSDF) are developed in the state, and become pioneer in development of such facilities. There are eight CHWTSDF with landfill facility. Out of eight CHWTSDF, four facilities are having Common Hazardous Waste Incineration Facility (CHWIF) comprising storage facility of incinerable waste and incinerator. Possibility of generation of dioxin and furan while incineration of hazardous waste and municipal waste is very high as reported in many literatures.

The source emission monitoring carried out for Dioxins, Furans and other pollutants at two CHWIF at Gujarat viz M/s Gujarat Enviro Protection & Infrastructure Limited (GEPIL) Surat and M/s Bharuch Enviro Infrastructure Limited (BEIL), Ankleshwar. The paper is prepared which includes information on common hazardous waste incineration facilities, type and characteristics of incinerable hazardous waste, technical details of incinerators including air pollution control system, analysis results of source emission monitoring for Dioxins, Furans and other pollutants.

It is observed from the result that the Total Dioxin and Furan detected during the source emission monitoring were 0.0487 ngTEQ/Nm^3 and 0.00396 ngTEQ/Nm^3 at M/s GEPIL, Surat and M/s BEIL, Ankleshwar respectively. The results are well within the Standard (0.1 ngTEQ/Nm^3).

193. Trend analysis of Gaseous and Particulate Emission Data of Vadodara City and Identification of Transport Pathways using HYSPLIT Trajectory Model

Vinay Kumar Upadhyay*, D. Brahmaiah* and B. R. Naidu*

*Central Pollution Control Board. Zonal Office-Vadodara,
Gujarat-390023
E-mail : vinay0408@gmail.com

Keywords : *RSPM, Trend analysis, Mann-Kendall test, ANOVA, Hysplit trajectory model*

An important objective of many environmental monitoring programs is to detect changes or trends in pollution levels over time. Over the period 2005–2009, trend in concentrations of three major atmospheric pollutants were investigated (RSPM, SO_2 and NO_2) using modified non parametric Mann-Kendall test. This trend analysis was supplemented with ANOVA analysis to see significant difference in trend obtained at different sites (industrial, residential and commercial) during years of investigation. The Hybrid Single-Particle Lagrangian Integrated Trajectory model (HYSPLIT) is used to create seasonal air parcel trajectories to understand long distance movement of atmospheric pollutants in Vadodara City. This air mass trajectory results with surface meteorological data was used to interpret high and low concentration episodes in positive trend years.

194. Evaluation of the Status of Heavy Metal Pollution in an Important Ramsar Wetland System of India

U. P. Nasir[a], P. S. Harikumar[b], D. Brahmaiah[a] and B. R. Naidu[a]

[a]Central Pollution Control Board, Zonal Office-Vadodara,
Gujarat-390023
E-mail : nasirchemistry@yahoo.com,
[b]Central Water Analysis Laboratory,
Centre for Water Resources Development and Management,
Kozhikode-673571, Kerala

Keywords : *Heavy metal, sediment quality guidelines, degree of contamination, pollution load index, index of geo-accumulation.*

Indiscriminate industrialization and urbanization led to the increase of Pollution level. Agrochemicals, geochemical structure and industrial wastes create a potential source of heavy metal pollution in the aquatic environment. Wetlands are especially at risk of contamination by different contaminants from anthropogenic sources including heavy metals. A study has been conducted to understand the heavy metal contamination of the Vembanad wetland system, an important Ramsar site on India and its impact to the fresh water region of the Vembanad lake. Surface sediment samples were collected from six stations of the wetland including three from industrial zone and three from fresh water zone. The concentrations of copper, zinc, manganese, cadmium, lead, nickel and mercury were determined in the sediments. Highest heavy metal concentration was determined at industrial zone and lowest was found at southern upstream of the wetland system. Most metal levels in the sediments at the estuarine region exceeded the different sediment quality guidelines. Quality of sediment were evaluated using the numerical value of degree of contamination, pollution load index, sum of toxic units, enrichment factor and geo-accumulation index which showed severe pollution in the industrial zone. The ecotoxicity was determined by using effect range low/effect range median and threshold effect level/probable effect level values of environmental protection agency guideline. The percentage of heavy metal calculated with respect to the industrial zone as the base line and the correlation analysis with organic matter indicated that, mobility of the specific metal has higher impact on its concentration at the fresh water region of the wetland.

195. Assessment of Fluoride Contamination in Mehasana Area of Gujarat State

D. Brahmaiah, Pratik D. Bharne and B. R. Naidu

Central Pollution Control Board,
West Zone Office, Vadodara

Key Words : *Fluoride, Industrial waste, Sewage, concentration*

Water availability is a critical factor in socioeconomic development, limiting progress in many areas such as south Asia and other arid and semi-arid zones. In most parts of the world, the finite supply of freshwater is put to heavy use. Industrial wastes, sewage and agricultural run-off can overload rivers and lakes with chemicals, wastes and nutrients, and contaminate water supplies. At present, the annual freshwater consumption is around 4000 km3 throughout the world with India's consumption being about 10% of it.

Some elements are essential in trace amount for human being while higher concentration of the same can cause toxic effects. Fluoride is one of them. It is a conclusive fact that concentration between 0.6 to1.2 mg/ l is essential to protect teeth decay, while higher concentration (beyond 1.5 mg/l) can cause teeth mottling and still higher concentration of fluoride may lead to different major health hazards. The importance of developing quality drinking water system facilities in any health care programme of the country can hardly be over emphasized.

It is, therefore, imperative that groundwater, free from higher fluoride concentration needs to be explored & where ever the concentration is high, mitigation strategies have to be adopted on urgent basis. Fluorosis was first detected in India among cattle's by farmers of Nalgonda district (A.P) during early 1930's, later the same disease was detected in human beings also. Presently, around 15 number of states declared endemic for fluorosis and Gujarat is one of them particularly Mehasana region.

In this paper an attempt has been made to assess the ground water quality in Mehasana region of Gujarat with respect to fluoride concentration in ground water.

196. Photocatalytic disinfection of fungal population in micro-working environments

Nithia Priya P. M.*, A. Navaneetha Gopalakrishnan, D. Brahmaiah*** and B. R. Naidu*****

*Scientist B, Central Pollution Control Board, ZO(W), Vadodara.
(nithiling@yahoomail.com),
** Director Centre for Environmental Studies,
Anna University, Chennai,
***Scientist "C" &"D" Central Pollution Control Board,
Zonal Office (W), Vadodara.

Keywords : *Photocatalysis, Titanium Dioxide, bio-pollutants, contaminated air, working environments*

Exposure to airborne microorganisms in working environments may result in infectious disease or an irritant response. The contaminated air disperses microorganisms (fungi) into working environments, thereby serving as a route of exposure to occupants. This study mainly focuses on Photocatalytic inactivation of fungi in micro-working environment such as sewage treatment plant and municipal dumping site. Quartz based Photocatalytic reactor (PCR) was fabricated. The catalyst used was TiO_2 (Degussa P25) of different film thickness from 0.57×10^{-6} μm to 5.78×10^{-6} μm with UV source of medium pressure germicidal UV lamps of 15 W and 30 W. PCR was connected to High Volume Air Sampler. Air was drawn and trapped in the trapping medium (Phosphate buffer). The reactor was run for 8 hrs and samples were collected for every 1hour interval for both the sample and control. In sewage treatment plant, maximum percentage reduction was 97% at 15 W in 3.47×10^{-6} μm and 97% at 30W in 2.89×10^{-6} μm thickness of TiO_2. In municipal dumping site, maximum percentage removal was 97% at both 15 W and 30 W in 3.47×10^{-6} μm thickness of TiO_2. The rate constant for critical exposure time $t_{(cet)}$, beyond critical exposure time for fungal removal were arrived. The rate of disinfection follows first order kinetics for all the experimental investigations both during the critical exposure time as well as beyond critical exposure time.

197. Pollution Potential in Jari Industries of Surat, Gujarat, India

Prasoon Gargava*; B. R. Naidu and P. K. Mirashe*****

*Working as Scientist "C", Western Zonal Office,
Central Pollution Control Board, Vadodara, Gujarat.
**Working as Zonal Officer and Scientist "D",
Western Zonal Office, Central Pollution Control Board,
Vadodara, Gujarat.
***Working as Regional Officer, Regional Office-Pune,
Maharashtra Pollution Control Board,
Pune, Maharashtra.

Kaywords : *Jari, Gilding, Electroplating, Cyanide, Heavy Metals, Pollution Load, SMC.*

India, wrapped in the mystique, enhanced with the romance of fabled craft, has one of the finest traditions of embroidery in the world. It has long been known for its embroidery with gold and silver threads called Jari. Jari industries have great influence on local economy, workforce and environment. Economy and workforce are of great concern for city & the persons involved in this sector but the Jari industries are still untouched from pollution control and environmental protection aspect due to their cottage & household type of set-up. The pollution potential caused due to Jari industries is serious and dreadful; therefore, an effort is made to uncover the pollution potential associated with Jari industries of Surat. As such no references are found on the subject, this perspective on pollution potential in Jari industries is probably first of its kind.

Due to the availability of good quantity of water for all the months and the favorable weather conditions, Jari industries are developed in Surat area, however, stray incidents have been identified to start manufacturing of Jari, elsewhere in the country but have less success. There are approximately as many as 2000 to 2500 small gilding benches each producing approx. 50 kg of Jari wire per day located in the walled city area of Surat such as Gopipura, Navapura, Sagrampura, Wadifalia, Mahidharpura, Station Road & Begampura. The Jari industries of Surat are potential source of water pollution, not actually in terms of quantity but in terms of pollution load of Cyanides and Heavy Metals. Jari industries are not equipped with

adequate pollution control measures and many times the community involved in this sector pays the price in terms of human life because of negligence and small accidents.

The main process steps of Jari making are washing of wire in acidic media, dipping in Cyanide solution, reeling and electroplating. The process involves use of acids, cyanide and heavy metal containing solutions. The total effluent generation from all 2500 gilding benches are comes around 375 – 437 m^3/day, say an average of 400 m^3/day (@ 150 – 175 lit/bench/day). The average concentration of silver, copper and cyanide in the effluent generated from acid wash (after silver precipitation), which is going to the SMC sewerage system are 28 mg/lit, 2983 mg/ lit and 230 mg/lit respectively. Hence pollution load, which is going to sewerage system of SMC, works out to be 11.4 kg/day, 1194 kg/day and 92 kg/day respectively (by taking average concentration and average hydraulic load of 400 m^3/day). In nutshell, it is concluded that the units are providing treatment to the effluent in a very crude manner due to which lot of valuable metals are finding their way to the drain or in the atmosphere and also posing adverse impact on environment.

The main pollution is in the water drains containing high amount of copper, cyanide & silver, which needs treatment either on individual or combined basis. Due to location, size and geographical conditions, it is not possible to establish the treatment facility at every individual unit and hence the wastewater discharge may be collected on appropriate intervals with adequate mechanisms and treated in a common treatment system best suited for the purpose. The recovery of precious metal like silver, and copper at commonplace needs to be established. Need of fume extraction system, ventilation and proper handling of Cyanide compounds are some other issues present with significant scope for improvement.

198. Curing of Hides in Tannery Sector

H. P. S. Rathore*, S. K. Arora and M. Q. Ansari
Central Pollution Control Board,
Lucknow

Curing is employed to prevent putrefaction of the protein substance (collagen) from bacterial growth during the time lag that might occur from procuring

the hide to when it is processed. Curing removes excess water from the hides and skins using a difference in osmotic pressure. The moisture content of hides and skins gets greatly reduced. In wet-salting, the hides are heavily salted, then pressed into packs for about 30 days. In brine-curing the hides are agitated in a salt water bath for about 16 hours. Generally, curing substantially reduces the chance of spoilage by bacteria. Curing can also be done by preserving the hides and skins at a very low temperature.

An increasing demand of leather has created the problem of high dissolved solids in the receiving water body which is generated during the process of hide/ skin curing by using the common salt. It is one of the challenging issues in the Tannery sector. To rectify the problem of dissolved solids, presently, Reverse Osmosis process is being used for removing these solids. This process is very costly and can not be used by the small unit members. There are other alternate options for curing of hide/skin like use of insecticide /organic preservation, curing of hides at low temperature by using the liquid nitrogen followed by U.V. exposure, lypholization which will enable the Tannery sector to dissolve the problem of high dissolved solids. The problem of high dissolved solids can also be overcome by segregation of salt baring stream at source or by using Solar/forced evaporation. In this paper a comparison of various curing technologies, associated pollution and economic feasibility has been made.

199. Implications of Water Quality Data for Trend Analysis – A Case Study on Drains

D. P. Mukhopadyay and B. Sasi Devi
(email : dpmcpcb@yahoo.com)

The monitoring system plays crucial role to provide important decision support. For this purpose water quality monitoring has been estimatablished to provide information on environmental processes of major and medium rivers, ponds, wells, drains etc. Huge volume of data are generated by Central Pollution Control Board for framing water quality management system. Now interpretation of these data by using various statistical techniques merit attention. As a part of various monitoring programmes, the drains in and around Delhi are being monitored by CPCB since long. The aim of this paper is to investigate the state of pollution and temporal variation of oxygen demanding substances in terms of BOD and COD.

The variation of water quality parameters is often reported without adjusting (normalizing) them with the flow and the amount of suspended matter and thereby actual dynamics of these parameres remain hidden. Therefore attempt has been made to compute flow-normalized monthly and annual riverine load of these oxygen demanding substances in statistical terms. For this purpose person's correlation technique was applied to assess the degree of association of these oxygen demanding substances with the amount of suspended matter. Strong influence of TSS on chages of values of BOD and COD was encountered in all the drains. Therefore measured concentrations of BOD and COD were separately considered as dependent variable and TSS as independent variable to apply regression technique. Tegression technique gave an idea about percentage apportion of BOD and COD between dissolved and particulate phases. It was further confirmed that temporal trends (monthly and annual) in measured condentrations were extensively influenced by the changes of flow and TSS. Another important aspect has been covered in this study i.e. conventional quality assurance which is complemented with through statistical follow-up of reported values. It was observed that sysnchronous increase and decrease of the measured concentrations data (unadjusted) caused problems in the analysis of temporal trend. The adjustment step provided realistic state of environment and environmental behavior of the oxygen demanding substances. These pertinent information will be obviously useful for appropriate watershed management and within water body management.

VI

LIST OF PAST SECTIONAL PRESIDENTS

PAST SECTIONAL PRESIDENTS

Environmental Sciences

S. P. Gautam	(2010)	Malay Chatterjee	(2006)
M. G. Tiwari	(2009)	Shelly Bhattacharya	(2005)
V. K. Verma	(2008)	J. S. Singh	(2004)
P. C. Pandey	(2007)	Kasturi Datta	(2003)