Report of the Chemical Analysis of Samples Collected from UCIL Plant Site, Bhopal

Report No: DRDE/VTX/UCIL/08

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Details of the GC-MS analysis and mass spectra of identified chemicals

Sample Collection

A team of scientists visited UCIL plant site on 21st May 2008. Following six types of samples were collected for the chemical analysis and toxicological evaluation.

	Name of the sample	Approximate amount (gm)	Code Assigned
1.	Evacuated Waste	500	EW
2.	Napthol Tar	500	NT
3.	Reactor Residue	500	RR
4.	Lime Sludge	500	LS
5.	Semi Processed Pesticide	500	SPP
6.	Sevin Tar	500	ST

Homogenization of Samples

Samples were homogenized by grinding and sieved through 200 microns sized sieve. Sieved samples were taken for the chemical analysis and toxicological evaluation

Extraction procedure for samples

A. Extraction with methanol

1. Sample (2 g.) taken in a 7 mL PTFE capped air tight vial.
2. Extracted with 2 mL methanol for 15 minutes.
3. Methanol layer separated and the extraction repeated with 2 x 0.5 mL methanol.
4. All methanol extracts combined
5. 100 µL of this extract was diluted in 1 mL methanol and 1 µL of this injected into GC-MS.

B. Extraction with hexane

Hexane extraction was performed similar to the methanol extraction and the results were similar in both the cases. However, methanol extraction gave superior recoveries of all the identified compounds. No additional compounds were found in hexane extraction.

C. Extraction for degradation products

1. 50 µL of undiluted methanol extract from the above extraction was evaporated completely.
2. Added 50 µL acetonitrile and 100 µL BSTFA.
3. Heated in a sealed vial at 75 °C for 1 hour.
4. 1 µL of this injected in GC-MS

Results of the Chemical Analysis

S. No.	Samples (Sample Code)	Inorganic Matter (%)	Organic Matter and moisture (%)	Chemicals identified in the organic matter (Relative concentration %)
1.	Evacuated Waste (EW)	36.99	63.01	1. 1,4 Napthalenedione (4.19%) 2. 1-Napthol (30.37%) 3. alpha-lindane (3.36%) 4. Sevin (27.98%) 5. Napthalene, 1,1'-oxybis- (6.29%)
2.	Napthol Tar (NT)	69.93	30.07	1. 1,4 Napthalenedione (2.36%) 2. 2-napthalenol-5,6,7,8-tetrahydro (27.98%) 3. 1-Napthol (29.03%) 4. alpha-lindane (0.13%) 5. Sevin (1.85%) 6. Napthalene, 1,1'-oxybis- (14.21%) 7. Diethyl phosphate (TMS) (0.88%) 8. Urea (bis-TMS) (0.62%)
3.	Reactor Residue (RR)	25.51	74.49	1. 1-Napthol (4.25%) 2. alpha-lindane (4.23%) 3. Sevin (6.90%) 4. Napthalene, 1,1'-oxybis- (68.18%) 5. Diethyl phosphate (TMS) (1.39%)