PROGRESS REPORT
ORGANIC CHEMICALS DIVISION
TECHNOLOGY DEPARTMENT

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PROJECT TITLE

ENVIRONMENTAL ANALYTICAL PROGRAM - TOXICOLOGY SUPPORT STUDIES

PROJECT OBJECTIVE

Determination of the type and level of polychlorinated biphenyls (PCB's) retained in the tissues of laboratory animals fed Aroclor 1242, Aroclor 1254, and Aroclor 1260 for correlation with toxicological effects.

SUMMARY

Analysis of 160 tissue samples (liver, fat, kidney and muscle) excised from albino rats sacrificed at 3, 12, and 24 month intervals during a two year study (IBT - #7298) of the chronic oral toxicity of Aroclor 1242, Aroclor 1254, and Aroclor 1260 have been completed.

The residues retained on the tissues of the animals fed these products were isolated by solvent extraction and the level and type of PCB's determined by electron capture gas chromatography.

PCB residues from these Aroclor products were observed in all the tissues (liver, fat, kidney and muscle, at all levels fed (1, 10 and 100 ppm) and at each sacrifice interval (3, 12, and 24 months). The residue levels found in the tissues of the amimals fed 1, 10 and 100 ppm of Aroclor 1254 and 10 and 100 ppm of Aroclor 1260 continued to build up over the entire two year duration of the study. Storage levels in the tissues of those animals fed 1, 10, and 100 ppm of Aroclor 1242 and 1 ppm of Aroclor 1260 did not continuously increase, but instead began to plateau at some point after three months of exposure.

The average PCB lipid storage level found in the tissues for each product after two years of oral exposure are shown in the following table.

	PCB Storage Level (mg/kg)		
Level Fed	1 ppm	10 ppm	100 ppm
Aroclor 1242	11	58	233
Aroclor 1254	58	348	1989
Aroclor 1260	54	411	5508

Alteration of the homolog distribution of all products was also observed. The alteration was greatest for Aroclor 1242 and least for Aroclor 1254 and Aroclor 1260. The dominant PCB homologs found in the residues were in all cases those which have been observed as environmental residues.

Although the observation of gross toxicity effect caused by the ingestion of the PCB products were few, the data indicated that they occurred (enlarged livers) when the PCB lipid storage levels were in the range of 500-1000 ppm.

FUTURE PLANS

Analysis of selected tissue samples for the level and type of PCB residues ~~returned~~ retained from the following feeding studies carried out by Industrial Bio-Test Laboratories.

Study	Priority
IBT #C7299 "Two Year Chronic Oral Toxicity Study of Aroclor in Beagle Dogs" (180 Samples)	1
IBT #P7297 "Three Generation Reproduction Study in Albino Rats with Aroclor" (90 Samples).	2
IBT #J7300 "Toxicity, Reproduction, and Residue Study of Aroclor in White Leghorn Chickens" (210 samples)	3

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DETAILS

See the following referenced reports:

"Two Year Chronic Oral Toxicity Study of Aroclor in Albino Rats", Industrial Bio-Test Laboratories, Report IBT #7298.

"Determination of Polychlorinated Biphenyl Residues in Rats From A Two Year Chronic Oral Toxicity Study", Analytical Chemistry Special Study 71-7.

"Statistical Analysis of Bio-Test Oral Toxicity Study - Albino Rats", Statistics Special Study 71-14.