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ANALYSIS OF FENITROTHION RESIDUES IN FISH SAMPLES RECEIVED FROM THE ENVIRONMENTAL IMPACT SECTION AT C.C.R.I.

by

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INTRODUCTION

Fenitrothion (0,0-dimethyl 0-4-nitro-m-tolyl phosphorothioate) has been applied by aircraft on a large scale in Canada since 1968 to control forest insect pests specifically spruce budworm Choristoneura fumiferana (Clem). The ecological impact of this chemical is monitored by the Environmental Impact Section (EIS) at this Institute (CCRI). The Pesticide Chemistry Section (PCS) at CCRI provides the necessary analytical service facilities.

During the later part of 1976 spray season, Mr. B.B. McLeod of EIS brought to the PCS four frozen fish samples for the analysis of fenitrothion residues. This report briefly describes the residue analysis made on these fish samples.

EXTERIMENTAL

Extraction

Each fish sample was allowed to thaw, pressed between folds of filter paper to remove the adsorbed water and weighed. The samples were homogenized separately twice with 100 ml of ethyl acetate in a Sorvall-Omni-Mixer for 4 min. at speed 6. The slurries were filtered under suction, rinsed with the solvent (20 ml), combined and the extract flashed down under low pressure to ca 10 ml. The solvent partition, column cleanup and gas-liquid chromatographic (GLC) analytical steps used in the final quantitation were similar as described elsewhere (Sundaram, 1974). The results are recorded in Table 2.

Solvents and Chemicals

All solvents used were either pesticide grade or freshly distilled in glass.

All the chemicals used in the analysis met with the American Chemical Society specifications. The anhydrous sodium sulphate used was of reagent grade from Fisher, heated at 150^{o} overnight and stored in air-tight glass-stoppered bottles.

Laboratory sources of contamination of chemicals, glassware, solvents etc. was found to be negligible during the period of study.

Table I

Recovery Study of Fenitrothion in Fish*

Fortification Level	Fenitrothion Conc. Recovered (Percent)	Remarks
1.0	94	
2.0	92	Av. recovery 93% with coefficient of variation 4

* Average of triplicate determinations.

Table 2

Analysis of Fish Samples for Fenitrothion from Bonaventure River

Sample No.	Environmental I.D. No.	CCRI No.	Sample Description			Fenitrothion Conc. (ppm)
			Type	weight (gm) Total	Sample Used in analysis	
1	Q-BR-1	26/76/424/545	Smelt	34.3	20.0	0.09
2	Q-BR-2	26/76/425/546	Smelt	77.9	20.0	0.06
3	Q-BR-3	26/76/426/547	Smelt	15.1	15.1	0.11
4	Q-BR-4	26/76/427/548	Smelt	31.6	20.0	0.36

MDL 0.05 ppm

RESULTS AND DISCUSSION

For recovery studies fish samples (rainbow trout - Salmo gairdnerii) were collected from a fenitrothion-free lake, fortified with the insecticide at 1.0 and 2.0 ppm levels and analysed by the method described. The average recovery was 93% with a coefficient of variation of 4. The minimum detection limit was found to be 0.05 ppm at the above concentration range for 10g of the fish used in the recovery studies. The results of the recovery study are recorded in Table 1. The method is sensitive with minimum interference and is very good for the analysis of fenitrothion residues present in fish at above 0.05 ppm concentration level.

The fish extracts received from EIS were analysed by injecting 4 ul samples in the flame photometric-GLC and the results are recorded in Table 2. All the chromatograms did show measurable peak height with retention time 3.1 min. corresponding to the presence of fenitrothion as observed in the spiked sample confirming that all the fish samples analysed did contain detectable levels of fenitrothion.

CONCLUSION

Under the experimental conditions described above, the four fish samples received from the EIS did contain measurable levels of fenitrothion residues as recorded in Table 2.

ACKNOWLEDGEMENTS

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LITERATURE CITED

Sundaram, K.M.S. (1974). Distribution and Persistence of Fenitrothion Residues in Foliage, Soil and Water in Larose Forest. Env. Canada For. Serv. Chem. Cont. Res. Inst. Inf. Rept. CC-X-64, pp. 43.