Monsanto

FROM (NAME & LOCATION) E. S. Tucker - R&D Laboratories - South Second Street

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SUBJECT AROCLOR - WILDLIFE MONTHLY SUMMARY - OCTOBER-NOVEMBER, 1969

REFERENCE

cc J. G. Bryant - GO
M. W. Farrar - Res. 1
W. R. Richard - GO
E. P. Wheeler - GO

TO R. E. Keller - Res. 1

Milk and water samples from dairy farms belonging to the Maryland Coop Milk Producers have been analyzed for the presence of chlorinated hydrocarbons. Ppb levels of polychlorinated biphenyls (PCBs) and DDE, a DDT metabolite, were found in all milk samples received. No significant level of any chlorinated hydrocarbon could be detected in any of the corresponding water samples. The presence of PCBs in all milk extracts was established using electron capture gas chromatography (EC/GC) on polar and non-polar columns both before and after chemical treatment and by GC/Mass procedures.

Plant water samples received from Krummrich for PCB analysis have been completed and a memo issued. Analysis of the corresponding sediment samples is scheduled for completion in the next few days.

At the request of the medical department research support consultation was provided to a Mr. Huettenan at Johnson and Johnson Research in New Brunswick, New Jersey. The support involved procedures for the EC/GC determination of Therminol FR-1 in air samples.

The analysis of water samples, taken around our Pensacola plant, for Aroclor 1254 have been completed. All, with the exception of a control sample taken above the plant outfall contained Aroclor 1254. The amounts found ranged from 1-75 ppb. This is considerably less than the amount found in a sample taken prior to the removal of Pydraul from the plant.

A review and comparison of PCB analytical methodology developed here and independently in the Wisconsin Research Alumini Foundation laboratories was held in Madison, Wisconsin. Their procedures, with minor exceptions, were equivalent to ours. It was agreed to exchange a limited number of Lake Michigan samples and extracts for collaborative verification.

Analysis of estuary mud samples from around the Uskmouth area (Newport, U.K.) have been completed. Significant levels of Aroclor 1242 were found in all samples analyzed. The amount found ranged from 0.5 - 2.0 ppm. There were also indications of more highly chlorinated PCBs (Aroclor 1254-1260) but at much lower levels.

The EC/GC analysis of all water and sediment samples received from the Anniston Plant for PCBs has been completed. The levels found ranged from 2 ppb to 2%.

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A consulting visit was made with Dr. Denzel Ferguson, an experienced fish biologist at Mississippi State University. The discussion centered around our joint attepts with Bio-Test Laboratories to generate some reasonable fish toxicity data on the Aroclors. Apparently, the static tests we have tried are reasonable, in his opinion, and should be repeated minus the cross-contamination which occurred in the first go round. It was also indicated that it would be a good idea to follow these tests up with dynamic fish toxicity tests.

Several weeks ago, an experiment was started to establish whether or not Aroclor could be extracted from surfaces coated with Aroclor containing paints. The experiment consisted of exposing tap water to metal plates coated with a paint containing 13.7% Aroclor 1254 in sealed glass containers at 50°C. After two weeks exposure the tap water in the first jar contained approximately 30 ppb Aroclor 1254. Subsequent analyses of tap water taken after three and four week exposures confirmed that the Aroclor in the paint was being extracted into the water.

The feasibility of using a support coated open tubular (S.C.O.T.) column with an electron capture (EC) detector is being investigated. This system should combine the high resolution of the S.C.O.T. columns with the sensitivity of the EC detection. If successful, it will be used to monitor the planned biodegradation study of Aroclors 1221, 1242, 1248 and 1254.

The area per cent of each homolog and the isomer distribution of Aroclor 1242 was determined by gas chromatography-mass spectrometry. At least forty-six chlorinated biphenyls were detected. Homologs containing 5-10 chlorines per molecule accounted for [redacted]% of the Aroclor.
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Future Plans

A review of the available Bio-Test feeding test results is planned in order to determine which portions of these studies should be supported with residue analysis.

River water biodegradation experiments with Aroclors 1221, 1242, 1248 and 1254 will be started 11-25-69. These experiments are a cooperative effort with Dr. R. A. Swisher of the Inorganic Division.

The gas chromatograph-mass spectrometry determination of isomer distributions will be extended to Aroclors 1221, 1248 and 1254.

The analysis of all water and sediment from Anniston and Krummrich samples have finally been completed. The desirability of further

plant support analysis will be discussed with Paul Hodges.

Analysis for PCBs of detergents and detergent components has been started and results should be available shortly.

Two alternate chemical oxidation techniques ($KMnO_4$/HoAc and $K_2CR_2O_7$/HoAc) for isolating and identifying PCBs at the ppb-ppt range from other environmental contaminants are being investigated.

An EC/GC comparison of Aroclor with competitive PCBs from Ugine Kuhlmann and Progil will be carried out to determine if there are any significant differences in their EC fingerprints.

Plans are being made to obtain another electron capture detector and associated gear. The addition of this equipment should allow us to operate more efficiently.

E. S. Tucker

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