Monsanto

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SUBJECT MONTHLY SUMMARY - AROCLOR WILDLIFE
MAY, 1969 - ANALYTICAL STUDIES

REFERENCE

TO : R. E. Keller

Aroclor recovery experiments on control samples of chicken fat, muscle, and liver have been completed. Duplicate analysis of these tissues spiked with Aroclor 1242 were fat (1 ppm) 98-102%, muscle (0.25 ppm level) 102-103%, and liver (1 ppm level) 84-88%. The low recovery of Aroclor from chicken liver did not appear to be due to biodegradation and will therefore be repeated.

Analysis of the Biotest chickens has been started.

Samples of the Aroclor lots being used in our studies and three polychlorinated biphenyl isomers (2,4'-4,4'-, and 2,2'4,4'-) from SRC have been sent to Ruabon to be used in microbiological degradation studies. The SRC isomers structures were confirmed by mass and NMR analysis.

Analysis of water and sediment samples from WGK by EC/GC established the presence of polychlorinated biphenyls in all samples taken. A sludge sample from the Sauget Village treatment plant contained 0.86% Aroclor 1242. The waste water from the Village effluent had a very high background and the amount of Aroclor present could only be estimated at 10-100 ppb. Sediment from the Mississippi River, 300' downstream from our plant out fall contained 16.4 ppm Aroclor 1242 plus indications of more highly chlorinated material, i.e., Aroclor 1254-1260. Waste water from the Aroclor production department contained 1.2 ppb Aroclor 1242.

GC/Mass analysis of the Sauget Village sludge extracts confirmed the presence of mono-, di-, tri-, and tetra-polychlorinated biphenyls, characteristically Aroclor 1242.

The simultaneous EC/FID - FID/MASS experiments have been successfully completed and we now have a compatable absolute identification system for polychlorinated biphenyls. We are still having some decomposition problems with the mass spectral identification of pesticides.

The dehalogenation-hydrogenation of polychlorinated biphenyls by direct injection into a Beroza unit followed by GC/FID seems to be working quite well. If this system can be applied to real samples, it will provide a simple method for the identification

(M-10 REV 11-68

and quantitative analysis of PCBs, a problem which is common to all workers in this area. Sensitivity is on the order of 10^{-6}g absolute.

There have been persistent questions about the chemical treatments used to destroy interferences to PCB analysis. We have tried the nitration technique of Erro, Bevenue, and Beckman (Bull. Environ. Contam. & Toxicol. 2, 372, 1967), referenced by Risebrough in his Nature article, in our laboratories. I find that the electron capture identity of 1242 is completely destroyed by this treatment. Aroclor 1248 is only partially effected, while 1254, 1260, 1262 and 1268 are unchanged. The essence of these findings are, if this nitration procedure is employed on environmental samples the lighter chlorinated biphenyls (1242) will not be detected even if they are present.

Recent information from Sweden indicates that Widmark uses a lower temperature nitration procedure. I have repeated his procedure with Aroclor 1242 and found that it seems to retain its electron capture properties completely. Apparently, Aroclor 1242 is not a significant environmental contaminant in Europe. Hopefully, this means the lower chlorinated biphenyls are either biodegradable or that the type of use restricts its entry to the environment.

It is apparent, to me at least, that we must have more information on the actual techniques used by Risebrough and other U.S. workers.

We are currently in the process of determining the higher chlorinated content of Aroclor 1242.

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