MONSANTO INDUSTRIAL CHEMICALS CO. #86

FROM (NAME & LOCATION) W. M. Mees - T2F

DATE October 10, 1972

SUBJECT TRIP REPORT

REFERENCE

TO : E. S. Tucker
T2F

cc R. E. Keller - T1B
R. H. Munch - T1B
W. B. Papageorge - B2NA
W. R. Richard - T3A
J. F. Stapleton - B2SA
R. A. Stohr - A3SB
E. P. Wheeler - A2SA

Meeting: Symposium on PCBs - 164th ACS National Meeting, New York

Date: August 29 and 30, 1972

For Monsanto: W. M. Mees

Purpose of Trip: To keep abreast of the research being carried out on the environmental aspects of PCBs. To identify future problems with PCBs for Monsanto.

Summary:

The twenty-six papers presented were divided into three categories: ubiquity (6), analysis and degradation (7), and toxicity (13).

I. Ubiquity

Researchers continue to document the presence of PCBs in the environment and the transport of these materials to the higher members of the various food chains. The papers dealt primarily with aquatic systems, and in several cases significant decreases in the PCB levels were noted. Decreased PCB levels were observed; by Dr. Y. A. Greichus in the Lake Poinsett, South Dakota ecosystem (~50%, '70 vs '71), by Dr. O. W. Berg in sediments from lakes and rivers in Ontario, and by Dr. D. R. Nimmo in samples from Escambia Bay, Florida (10 fold, '70 vs '71).

Dr. Hans J. Crump - Weisner reported on the U.S. Geological Survey's monitoring of surface waters for PCB contamination (10 states). The levels found ranged between 0.1 and 4 ppb. Confirmation was accomplished by gas chromatography-mass spectrometry.

Dr. A. R. Yobs of the EPA who has been monitoring human adipose samples, reported the results of a larger sampling.

PCB in Human Adipose Tissues

Negative	1001	45.7%
Trace - <1 ppm	370	16.9%
1-2 ppm	651	29.8%
>2 ppm	167	7.6%
	2189	100.0%

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No comment was made regarding the significance of the PCB levels found in humans.

II. Analytical and Degradation

The papers dealing with analytical techniques, often quite exotic, netted very little useful information.

Dr. D. L. Stallings, using GC/MS, has verified a significant decrease in the penta isomer content of Aroclor 1016 vs Aroclor 1242. He is planning to publish his data in JAOAC soon.

Dr. O. Hutzinger discussed his photochemical degradation experiments with pure isomers. Using both lab and natural conditions he has observed isomerization, condensation, polymers, polar materials, higher PCB formation and terphenyls. Experiments were carried out with thin films in the presence of water. Alteration of the 2,2',5,5' tetrachloro homolog was complete in 80 hours. No alteration was observed with the 2,2',4,4',5,5' hexachloro homolog.

III. Toxicity

One day was devoted to papers on toxicity studies with the Aroclors. The feeding studies discussed involved Aroclor 1016, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 5460 with invertebrates - fish, birds, and mammals. The data presented was at times confusing and occasionally contradictory. Considerable effort was directed toward detailing the various changes occurring in animal systems upon exposure to the Aroclors. Much less effort was spent on detailing the reversal of the toxic effects observed. Metabolism of the Aroclors in birds and mammals appears to proceed as expected via hydroxylation without the loss of chlorine. No hydroxylated metabolites were observed in excretions of rats and pigeons exposed to the 2,2',4,4',5,5' hexachloro biphenyl. No hydroxylated metabolites were detected in any of the studies with trout. Somewhat surprising were the unusually high levels of PCB found in the brain tissues of birds and mink. The significance of this observation was not discussed.

Dr. D. Nimmo reported Aroclor 1016 was as toxic as Aroclor 1242 to shrimp, oysters and fish in chronic dynamic bioassays.

Dr. R. Ringer reported on the growth and reproduction problems of mink apparently caused by PCB contamination of Lake Michigan coho salmon. All of the animals orally exposed to the Aroclor died during the test. A total of 45 mink were divided into 3 groups (12 females and 3 males per dietary treatment group). The treatments were a basal diet containing ocean fish, substitution of coho salmon for the ocean fish, and the basal diet supplemented with 10 ppm each of Aroclors 1242, 1248, and 1254. Additional feeding studies are being carried out with Aroclor 1254.

A discussion on directions for future PCB research was led by Dr. J. C. Street. Perhaps the most significant comment was to the effect that researchers should look for impurities, specifically dibenzofurans, in the Aroclors to explain the erratic toxicity data.

Dr. A. C. Kolbye discussed FDA regulation of PCBs as well as the prospects regarding future PCB tolerance limits. His presentation amounted to a justification of the FDA's proposed guidelines on the basis of available animal and human toxicity data.

Dr. Kolbye made favorable comments about Monsanto's restrictions on sales and uses. He indicated that, in his opinion, Monsanto has acted responsibly and the restrictions should minimize the levels of PCB in the environment.

Dr. Kolbye alluded to the fact that consumption of sport fish could be potentially hazardous to humans, primarily because at this point, it is an unregulated area.

In summary, the academic community appears anxious to initiate more research on the PCBs and to use the PCB problem as a source of research funds. The regulatory agencies, notably the FDA, seem to view the PCB situation as a problem which currently is under control.

W. M. Mees

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