

Monsanto
CHEMICALS LTD.

FROM (LOCATION): H.A. WOODEN - RUABON.

CC: W.H. Richard - St. Louis.
R.A. Maxter - Ruabon.
R.S. Tucker - St. Louis.

DATE: 25th January, 1972.

SUBJECT: Your letter of 18 January, 1972.

REFERENCE: HAV/b.o.g.

TO: R.H. MUNCH - ST. LOUIS.

Dear Ralph,

I appreciate your concern at not receiving the additional data for Table 3, Appendix 2 of our joint PCB report.

Unfortunately, the results of the work in hand did not furnish the information I had anticipated and we have been unable to reduce the data to a simple tabular form. We find, for example, when 10% of Aroclor 1254 is added to Aroclor 1242 to increase the percentage of higher homologues present, that degradation of the whole Aroclor composition is inhibited. In other words, a sufficient concentration of more highly chlorinated Aroclor appears to behave as a bacteriostat towards the C_2 and C_3 cultures. In the presence of a low concentration of these more highly chlorinated homologues, such as in Aroclors 1016 and 1242, however, the cultures C_2 and C_3 appear to degrade all the isomers present in significant quantities, including some penta and hexachloro-components, with half-life periods of less than 50 days. We have just completed some of the tests leading to this conclusion and have more in progress to confirm the level at which bacteriostatic action occurs in a PCB mixture.

It appears, therefore, that we cannot specify, even approximately, the degradation rates of PCB homologues without taking into account the effects of other PCB components. This makes it impossible to compile a simple table of degradation rates for insertion into a mathematical model of the type we discussed with Jack Hinchey.

This work may also explain the discrepancies in results to which you refer in your letter. In a mixture, the adaptation process may permit degradation of certain isomers which in isolation might be resistant, (e.g. 4-4'dichlorobiphenyl in the presence of C_2), but if significant quantities of highly chlorinated biphenyl are present, the degradation of many other isomers may be inhibited or slowed down.

I do not think these findings invalidate the concepts behind Aroclor 1242; indeed they seem to me to strengthen its position, but presentation of the results, in a way which allows a rational interpretation, poses some difficulties. I am rewriting the section of Appendix 2 concerned with the results on commercial mixtures and the discussion to take account of these recent findings.

I was glad to learn that the appendices on analytical methodology have been completed and look forward to seeing these. Do we now have a good estimate of the distributions of homologues being used before and after the Monsanto action and can we estimate the probable inputs to the environment?

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In reply to your other questions the answers to 1, 2 and 3 are yes. Question 4 may be answered in part by the preceding suggestions, but also to some extent by the way in which the rates are derived from the experimental results. We now have several more points on the degradation curves for the various isomers and will use these to provide, hopefully, more accurate data.

Regards and best wishes,

H.A. Volden

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