Monsanto

FROM (NAME & LOCATION): W. R. Richard - Research Center

DATE: March 27, 1970

SUBJECT: AROCLOR BIODEGRADATION

REFERENCE: Memo JHM to WRR, 3/20/70

cc: R. Munch Res. 2
N. Mueller Res. 1
Q. Thompson QTHOM
R. Weiss RWEIS
L. Stark/PDF LSTAR
P. Benignus/J.B. PBENI

TO : W. B. Papageorge - WPAPA

Aroclor 1242

Mainprize, with bugs from Evans of Bangor University, seems to be doing better on Aroclor 1242 than in previous experiments. Peaks 1 through 4 probably represent degradation of di- and trichlorobiphenyls. Previously we had only seen degradation of the 2,4' dichlorobiphenyl. We probably still have the higher isomers in Aroclor 1242 undegraded but this is not reported one way or the other by Mainprize.

R. Munch's samples refer to the fractionated Aroclors 1142, where we removed most of the 5 and 6 Cl isomers from Aroclor 1242, an 82% yield; and Aroclor 1130, where we removed some of the Cl_4's with a 90% yield. Mainprize again shows biodegradation of the four main GLC peaks. We have no word on the degradation of the Cl_4 peaks. I will write to Mainprize and see if we can clarify whether the fractionation has helped improve the biodegradability of the total sample.

Yesterday we discussed the need for a totally biodegradable capacitor fluid. We may also want to differentiate between a "new" capacitor Aroclor and say Aroclor 1242 which may have been spread around the environment from other applications. Analytical people can apparently characterize 1242 vs. 1248 vs. 1254 in biologically undegraded systems. We might tag "new" capacitor Aroclor by putting in a small amount of Aroclor 1221, or enriching with 2,4' dichlorobiphenyl, or fractionating out the more highly chlorinated fractions and then prove that this use was not contaminating the environment. Paul may have this experiment already in progress at G.E. with Aroclor 1232 as indicated in a letter to Bill Solberg at Hudson Falls.

The results on degradation of bromobiphenyls and bromo, chloro biphenyls is encouraging. We weren't sure whether or not bromine would be a problem to bugs. The advantage of Br is that one can use less of it on a mole basis, leave more H atoms on the ring to be attached by bugs and still retains fire resistance.

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P. Fowlkes-Lou Stark would like a BrCl biphenyl with 32% halogen as a component for hydraulic fluids. This would apparently be biodegradable and perhaps acceptable in a controlled discharge plant.

R. Weiss plans to submit a sample of the BrCl 1232 material to R. Munch for electrical measurement. I don't believe we have enough evidence to know whether Br can or can't be used in capacitors under thermal and electrical stress.

R. Weiss will issue a report on synthesis of Br and BrCl biphenyls this week.

WRR

W. R. Richard

/ms
Att.