Monsanto

FROM (NAME & LOCATION): J. P. Mieure - Technology Department - South Second Street

DATE: October 20, 1970

SUBJECT: IMPURITIES IN AROCLOR

REFERENCE:

TO: R. E. Keller
Research 1

cc W. B. Papageorge - GO
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Researchers at the University of Utrecht, The Netherlands, have reported finding low levels of polychlorinated dibenzofurans in competitive polychlorinated biphenyls. They also analyzed Aroclor 1260, lot AK-3, and did not detect any oxygenated impurities. Because of the reported high toxicity of polychlorinated dibenzofurans, a study was undertaken to determine if these, or related, compounds exist as impurities in our products. This memo contains the preliminary results of this study.

Low levels (about 25 ppm) of polychlorinated dibenzofurans were confirmed in Phenoclor D.P. 6, a competitor to Aroclor 1260 from Prodelec (France). Aroclor 5442 appears to contain about 2 ppm polychlorinated dibenzofurans; none were detected in any other Aroclor studied. However, each of the Aroclor 1200 series contains polychlorinated naphthalenes at varying levels. The Aroclor 5442 contains polychlorinated anthracene or phenanthrenes. Results are summarized in the accompanying table. The Aroclor 1242, 1254, and 1260 samples are the same lots tested for toxicity by Industrial Bio-Test Laboratories.

The method used to determine these impurities is similar to that of J. G. Vos, et al, Journal of Food and Cosmetics Toxicology, in press. The sample was eluted with hexane through a Florisil column. The impurities remained adsorbed on the column and were eluted later with diethyl ether. Qualitative identification was by GC/MS. Quantitation was by electron capture GC and mass spectrometry responses.

The concentrations reported are not precise. The quantitative and ~~reproducibility~~ aspects of the separation step could not be thoroughly investigated in a brief study. In addition, due to lack of suitable standards, no response factors could be determined for the electron capture GC measurements. All concentrations were calculated assuming their EC/GC response was identical to that of 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin. For these reasons concentration ranges, rather than precise values, are reported.

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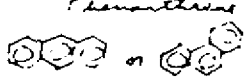
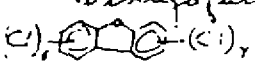
Impurities in Aroclor and Related Products

		Aroclor 1242 Lot AK-255	Aroclor 1242B MCS-1016-Drum 3	Aroclor 1254 Lot AK-33	Aroclor 1260 Lot AK-3	Aroclor 5442 Lot AI-0	Phenochlor D.P. 6 Prodelec
Polychlorinated Naphthalenes  X + Y ≤ 8	Pentachloro	5-20 ppm	N.D.	Trace	Trace	N.D.	Trace
	Hexachloro	Trace	N.D.	10-50 ppm	Trace	N.D.	50-150 ppm
	Heptachloro	Trace	Trace	10-20 ppm	20-50 ppm	N.D.	150-250 ppm
	Octachloro	N.D.	N.D.	N.D.	50-150 ppm	N.D.	Trace
Polychlorinated Anthracene or Phenanthrene  10 Chlorination Sites	Tetrachloro	N.D.	N.D.	N.D.	N.D.	5-20 ppm	N.D.
	Pentachloro	N.D.	N.D.	N.D.	N.D.	5-100 ppm	N.D.
	Hexachloro	N.D.	N.D.	N.D.	N.D.	10-200 ppm	N.D.
Polychlorinated Dibenzofurans  X + Y ≤ 8	Tetrachloro	N.D.	N.D.	N.D.	N.D.	1-3 ppm	Trace
	Pentachloro	N.D.	N.D.	N.D.	N.D.	N.D.	15-30 ppm

Trace - less than 3 ppm - detectable only by EC/GC

N.D. - none detected - estimated < 1-5 ppm depending on the specific impurity and product [illegible].

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