Polychlorinated Terphenyls in the Environment

by V. Zitko, O. Hutzinger, W. D. Jamieson, and P. M. K. Choi

Fisheries Research Board of Canada
Biological Station, St. Andrews, New Brunswick
Atlantic Regional Laboratory, National
Research Council of Canada, Halifax, Nova Scotia
and
McMaster University, Hamilton, Ontario

This paper describes the detection of polychlorinated terphenyls (PCT) in eggs and fatty tissue of herring gulls (Larus argentatus) from Bay of Fundy, Canada.

Industrial applications of PCT and polychlorinated biphenyls (PCB) are similar. Aroclor series 25 and 44 contain mixtures of PCB and PCT, the series 54 contains only PCT (1).

PCT are not eluted from GLC columns under conditions used for PCB (2). We found that PCT can be determined by GLC on a 6 ft x 4 mm glass column, containing 3% OV-210 (Pierce Chemical Co.) on Chromosorb WAW 60/80, and operated at 200°C. Other conditions were as described (3). Aroclor 5460 gives 8 major peaks (Fig. 1). Detector response based on the total height of the peaks 3.10, 3.96, and 4.83 is 0.122 per ng relative to decachlorobiphenyl.

More than 90% of Aroclor 5460 was eluted in the fraction II of the previously described extraction and cleanup (4). The level of PCT in subcutaneous fat and eggs of herring gulls was 1.4 and 0.1 μg/g, respectively, when expressed as Aroclor 5460 on wet weight basis. PCT were not detectable in eggs and fatty tissue of double-crested cormorants (Phalacrocorax auritus) from the same area.

PCT residues were confirmed by chlorination with $SbCl_5$ in sealed glass tubes for 4 h at 170-180°C, yielding two peaks with retention times of 18.9 and 22.8 relative to decachlorobiphenyl, respectively. Identical peaks were obtained from similarly treated Aroclor 5460. The confirmation of PCT residues by mass spectrometry and the analysis of PCT-spiked and other biological samples is underway.

The presence of PCT in herring gulls and their absence in cormorants may reflect the different feeding habits of these species and may indicate that PCT are not as widely distributed in the environment as PCB, which are present in both species in significant concentrations (5).

Bulletin of Environmental Contamination & Toxicology, Vol. 7, No. 4, 1972, © by Springer-Verlag New York Inc.

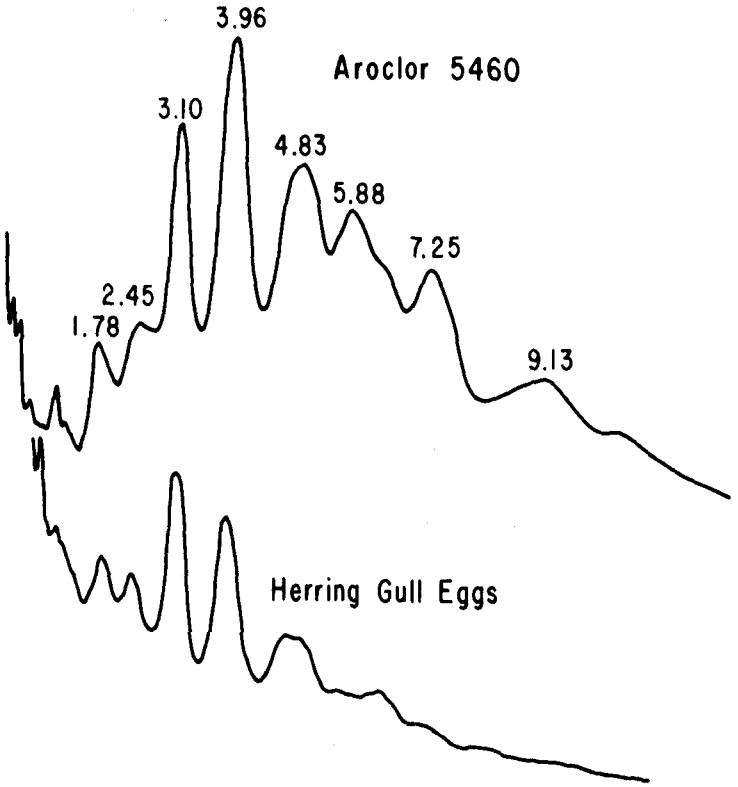

Fig. 1. Gas chromatogram of PCT. Retention times relative to decachlorobiphenyl.

References

1. ANON., Aroclor resins and plasticizers for chlorinated rubber. Tech. Bull. No. PL-311, Monsanto Chemical Company, April 1962.
2. REYNOLDS, L.M., Residue Reviews 34, 27 (1971).
3. ZITKO, V., J. Chromatog. 59, 444 (1971).
4. ZITKO, V., Bull. Environ. Contam. Toxicol. 6, 464 (1971).
5. ZITKO, V., and CHOI, P.M.K., Fisheries Research Board of Canada Technical Report No. 272, PCB and other industrial halogenated hydrocarbons in the environment (1971).