

# Polychlorinated Terphenyls in the Environment

by

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The presence of polychlorinated biphenyls (PCB's) in the environment has frequently been reported in the literature. Good review papers on this subject are available (see e.g. 1, 2).

Besides the PCB's a group of analogous substances is being produced for tens of years: the polychlorinated terphenyls (PCT's). The PCT's are in use for similar applications as the PCB's. Because of the analogy between the two groups of substances one might expect that the PCT's also accumulate in biological systems. In two recent publications the presence of PCT in eggs, fatty tissue of herring gulls (*Larus argentatus*) and tissues of cod (*Gadus morhua*) has been reported (3, 4). These investigations were carried out with gas chromatographic techniques.

The objective of the present research is to investigate several different samples on the presence of PCT. The number of samples was not such that the figures are representative from a statistical point of view.

The samples were: water of the Rhine river (mixture of samples of the water), oysters, eel and human fat. In the samples the amounts of PCB's were also determined for comparison purposes.

## Experimental

### Extraction and clean-up

The samples were extracted with n.hexane. The extracts were cleaned by column chromatography, either on alumina (5) or Florisil (6). The eel extracts contained much oily residue and were cleaned over both Florisil and alumina.

### Method of analysis

The analysis of PCT was carried out with a combination of a mass spectrometer (Varian Mat CH 5) and a gas chromatograph (Varian 1740) used in the mass fragmentography mode. Two  $m/e$ -values were selected ( $m/e = 436$  and  $m/e = 470$ ) and from all samples mass fragmentograms were taken on these  $m/e$ -values (see Fig. 1 and 2).

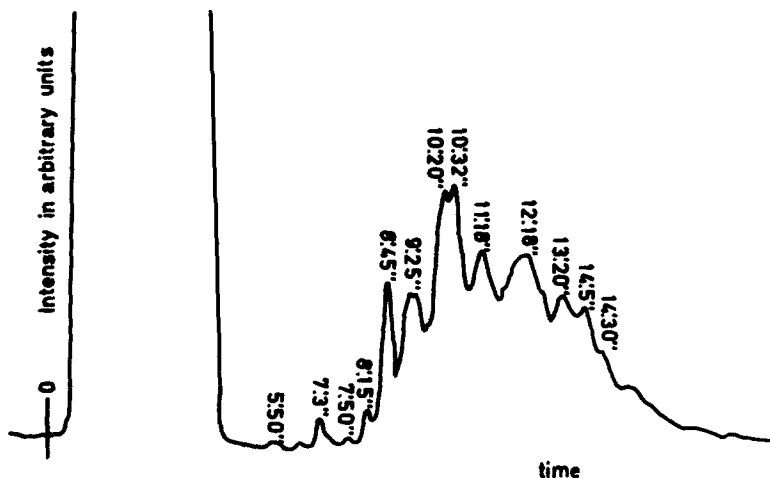


FIGURE 1

Mass fragmentogram on  $m/e = 436$  of a standard of the polychlorinated terphenyl Clophen Harz (W)

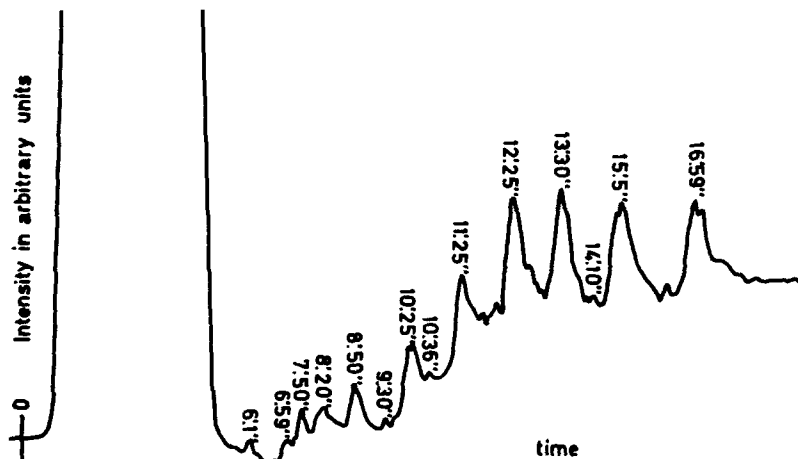


FIGURE 2

Mass fragmentogram on  $m/e = 436$  of a sample of oyster

The gas chromatographic conditions were: column length 3', 1/8" O.D. (Pyrex), filled with 3% OV-17 on Varaport 30. Temperature programming was used: 6°C/min., 200° → 285°C for m/e = 436 and 8°C/min., 200° → 285°C for m/e = 470. The gas chromatographic conditions for the PCB's were: same column, temperature programming 4°C/min., 125° → 200°C for m/e = 256; 6°C/min., 125° → 200°C for m/e = 290, and 6°C/min., 150° → 250°C for m/e = 324.

## Results

The content of PCT was compared with the Clophen Harz (W) standards. Since two fragmentograms were made, we will give the separate results of each mass fragmentogram (the figures of the mass fragmentograms are of course averages too). The results are represented in Table 1.

In all recent samples PCT was found. Two of the older samples of human fat (1969) did not show PCT, while a third one did contain PCT. The amounts are slightly lower than those of PCB but of the same order of magnitude. The investigation on the occurrence of PCT will be continued.

TABLE 1

sample	PCT m/e = 436	PCT m/e = 470	PCT average	PCB comparison	remarks
water of Rhine river (1972)	0,08 ppb	0,05 ppb	0,07 ppb	0,08 ppb	water basis
oysters from Oosterschelde near Ierseke (1971)	0,15 ppm	0,08 ppm	0,12 ppm	0,2 ppm	tissue basis
eel from IJssel- meer (1971)	0,5 ppm	0,2 ppm	0,4 ppm	4,7 ppm	fat basis
human fat (1969)	not observed	not observed	-	0,5 ppm	fat basis
human fat (1969)	0,5 ppm	0,5 ppm	0,5 ppm	0,4 ppm	fat basis
human fat (1969)	not observed	not observed	-	1,0 ppm	fat basis
human fat (1972)	1 ppm	0,5 ppm	0,8 ppm	0,8 ppm	fat basis

## References

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