

## PCB Congeners and Organochlorine Pesticides in Human Serum Samples Collected in Zagreb, Croatia, during 1994/95

**Blanka Krauthacker, Mirjana Kralj, Elsa Reiner**

Laboratory of Biochemistry, Institute for Medical Research and Occupational Health, Ksaverska c. 2,  
P.O. Box 291, HR-10001 Zagreb, Croatia

### 1. Introduction

Levels of organochlorine pesticides in human serum samples collected in Croatia are being monitored since 1975<sup>1)</sup> and levels of total PCB since 1985<sup>2)</sup>. No results are however available so far on the content of individual PCB congeners. The congener specific PCB analysis has therefore been introduced in our Laboratory and this paper deals with levels of the following congeners in human sera: PCB-28, PCB-52, PCB-101, PCB-138, PCB-153 and PCB-180 (congeners are numbered according to IUPAC recommendations). The same serum samples were also analysed for their content of the following organochlorine pesticides: HCB (hexachlorobenzene), alpha-, beta-, and gamma- HCH (hexachlorocyclohexane), DDT and its metabolites DDD and DDE.

### 2. Collection of Serum Samples

Samples were collected from one group of donors from the general population and one group of occupationally exposed workers. From the general population samples were collected from 14 donors (3 males and 11 females; between 14 and 83 years old). Fifteen samples were collected from donors who were workers employed between 3 months and 28 years repairing transformers and capacitors. All donors were residents of Zagreb, a continental town and capital of Croatia. Blood was taken by venipuncture; serum was separated and samples were kept frozen until analysis.

### 3. Materials and Methods

Extraction of compounds was done by hexane and the extracts were purified with sulphuric acid according to the procedure published earlier<sup>1,3)</sup>. Qualitative and quantitative analysis was performed by gas chromatography with <sup>63</sup>Ni electron capture detectors on two packed columns: 3% OV-1 on Chromosorb W HP 80/100 mesh and 5% OV-101 on Chromosorb W DMCS/AW 80/100 mesh, and on two capillary columns: 30m long, 0.25mm I.D., 0.25µm film of SPB-1701 and 60m long, 0.25 mm I.D., 0.25µm film of SPB-5. Chromatographic conditions for capillary columns were: detector temperature was 270 °C, injector temperature was 240 °C, initial column temperature was 100 °C for SPB-5 and 110 °C for SPB-1701 column than programme 4 °C/min to 240 °C and upper time was 55 min. Total PCB were determined on packed columns using Aroclor 1260 as standard. The recoveries were from 40 to 94 % depending on the compound. All results were corrected for recoveries.

# HUM (po)

## 4. Results and Discussion

The median concentrations of the analysed organochlorine compounds are given in Table 1. All serum samples contained PCB-138 and PCB-153, which are both hexachlorobiphenyls. All samples also contained HCB and p,p'-DDE. Almost all samples contained PCB-52 and PCB-180 (tetra- and heptachlorobiphenyls) and gamma-HCH. The tri- and pentachlorobiphenyls (PCB-28 and PCB-101) had a lower incidence.

Table 1. Concentrations (median, µg/L serum) of organochlorine pesticides in human serum samples collected in Zagreb, Croatia. N is the number of analysed samples. The number of positive samples is given in parenthesis. NA stands for not analysed. Zero denotes values below detection limit.

Compound	General population N=14	Exposed workers N=15	Detection limit
PCB-28	0.1 (11)	0.4 (10)	0.1
PCB-52	0.7 (14)	1.6 (14)	0.1
PCB-101	0.4 (13)	0.6 (11)	0.1
PCB-138	0.5 (14)	0.9 (15)	0.1
PCB-153	0.5 (14)	1.3 (15)	0.1
PCB-180	0.3 (14)	0.9 (14)	0.1
Σ PCB cong.	2.4 (14)	6.6 (15)	-
total PCB	NA	9 (15)	1
HCB	0.3 (14)	0.2 (15)	0.1
alpha-HCH	0 (0)	0 (3)	0.1
beta-HCH	1.2 (14)	0.5 (12)	0.1
gamma-HCH	0.3 (14)	0.3 (14)	0.1
p,p'-DDE	3.4 (14)	4.9 (15)	0.1
p,p'-DDD	0.2 (10)	0 (0)	0.1
p,p'-DDT	0.6 (14)	0 (0)	0.3
o,p'-DDT	0 (6)	0 (0)	0.1

The six PCB congeners were present at higher levels in the exposed workers than in the general population, but there was no difference between the two groups concerning the concentration of organochlorine pesticides. All levels of organochlorine pesticides and total PCB were fully within the concentration range found for the same compounds in the general population over the past ten years<sup>2,3,4,5</sup>.

The distribution pattern of PCB congeners in human serum and human milk was shown to correlate well with Aroclor 1260<sup>4,6</sup>. The sum of the six PCB congeners found in the analysed serum samples was lower than the total PCB content determined with Aroclor 1260 (Table 1). The same was found for human milk samples collected in Zagreb during the same year<sup>7</sup>. This indicates that more than six analysed PCB congeners should be determined in order to assess the total PCB body burden.

## 5. References

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