

**PCB Pattern in Human and Animal Samples Collected
in Croatia**

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The PCB pattern was evaluated in human serum and milk samples, and in fat-containing samples of animal origin (pig's fat and fat tissue, hen's fat tissue, cow's butter and milk). Samples were collected over the years 1981-1987: from the Zagreb city area 223 samples (169 human and 54 animal) and from villages near Karlovac (50 km south of Zagreb) 17 samples (9 human and 8 animal). A total of 162 human milk samples were collected; 88 of those were not analyzed individually but made up into three pools. Samples were extracted by methods described earlier^{1,2}. The gas chromatographic determination was done using the 5% OV-101 on Chromosorb W DMCS AW 80/100 mesh packed column installed in the Pye Unicam 204 gas chromatograph with 63Ni EC detector. The chromatograms were compared with the following Aroclor standards: Ar 1016, Ar 1248, Ar 1254, and Ar 1260. Comparisons of the chromatograms showed that the pattern of Aroclor 1260 correspond best to the pattern of the polychlorinated biphenyls present in the analysed samples. Therefore, Aroclor 1260 was used as the standard. The Sawyer method³ for individual peak quantitation was used to calculate the concentrations of individual peaks in each sample. Peaks were assigned as relative retention times to p,p'-DDE multiplied with 100 ($R_{DDE \times 100}$). Peaks at $R_{DDE \times 100}$ 98+104 overlapped with p,p'-DDE, while peaks 160 and 174 overlapped with p,p'-DDT. Those peaks were therefore not evaluated. It was assumed that those peaks represented 18.3 % of the PCB content³, and the total PCB concentration was therefore recalculated accordingly.

All analysed samples contained PCB. The distribution of the individual PCB peaks is given in the Table 1. Results were expressed as percent of the total PCB concentration in each group of samples.

Peaks 70, 84, 125, 146, 203, 280 and 332 were present in almost all human samples, while peaks 360+372 and 448 were not found in any serum sample. The highest concentration was found for peak 146 in human milk, while in the serum two peaks, 146 and 332 were about equally high. Generally, peaks

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Table 1. PCB pattern in human and animal samples. N is the number of analysed samples. The number of positive samples is given in parenthesis.

RDDEX100	% total PCB concentration							
	Human			Pig		Hen	Cow	
	Serum	Milk Ind. Pool	Fat	Fat tissue	Fat tissue	Butter	Milk	
70	12.8 (16)	5.5 (76)	7.6 (3)	13.9 (5)	33.4 (2)	12.4 (6)	12.7 (8)	16.7 (13)
84	11.6 (16)	3.6 (72)	3.2 (3)	11.2 (11)	16.5 (9)	6.0 (8)	15.0 (8)	10.5 (11)
117	4.2 (9)	2.1 (10)	0 (0)	8.6 (6)	3.3 (5)	6.2 (2)	0 (0)	2.7 (8)
125	7.8 (13)	8.4 (77)	6.2 (2)	25.3 (14)	34.5 (9)	15.9 (9)	18.8 (8)	14.7 (13)
146	16.4 (16)	30.6 (78)	26.5 (3)	17.4 (13)	19.2 (6)	23.7 (8)	17.2 (10)	19.2 (13)
203	7.1 (15)	9.1 (77)	6.6 (3)	11.6 (15)	12.2 (5)	12.7 (9)	7.6 (4)	7.1 (7)
232+244	5.2 (6)	6.5 (67)	8.8 (3)	10.2 (7)	12.4 (3)	4.8 (5)	13.2 (3)	6.6 (5)
280	10.5 (14)	12.9 (78)	10.6 (3)	10.0 (16)	10.3 (5)	9.4 (9)	6.7 (9)	9.8 (11)
332	16.9 (15)	4.5 (78)	6.5 (3)	6.9 (12)	11.1 (1)	4.9 (9)	15.3 (9)	11.4 (6)
360+372	0 (0)	2.2 (17)	0 (0)	7.5 (4)	0 (0)	3.7 (2)	0 (0)	0 (0)
448	0 (0)	1.2 (3)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
528	1.6 (1)	1.0 (19)	0 (0)	4.4 (5)	0 (0)	0.6 (1)	0 (0)	4.8 (2)
N	16	78	88	17	10	10	12	13

117, 360+372 and 528 were found only in every tenth sample. These peaks were therefore not detected in the pooled human milk samples. Apart from that, no other difference between pooled and individual milk samples was noticed.

Peak 146 was also found in almost all analyzed animal samples. If compared to other peaks its concentration was highest in the hen's fat tissue and cow's milk. In the other animal samples, peak 125 was highest. Peak 448 was not detected in any animal sample, while peaks 117, 360+372 and 528 were only found in few samples.

When human and animal samples were compared, a pronounced difference was evident in the relative concentrations of peaks 70, 125, 203 and 232+244, which contributed more to the total PCB in animal samples than in human samples.

When samples collected in Karlovac were compared with those collected in Zagreb no difference was observed and data from these two collection places are therefore not presented separately.

The concentrations of total PCB are listed in Table 2. Concentrations in animal samples were lower than in human

Table 2. Concentrations of total PCB in human and animal samples. All concentrations are expressed in $\mu\text{g}/\text{kg}$ fat, except for human serum which is given in $\mu\text{g}/\text{L}$ serum.

Samples	Total PCB	
	Median	Range
Human		
- serum	3	2 - 17
- milk		
- individual samples	540	150 - 1640
- pooled samples	300	300 - 380
Animal		
- Pig		
- fat	9	5 - 18
- fat tissue	7	0 - 40
- Hen		
- fat tissue	24	5 - 65
- Cow		
- butter	17	2 - 39
- milk	72	39 - 159

milk samples; the lowest PCB concentration was found in pig's fat. Concentrations in human serum cannot be compared with the other data, because they were expressed in different units.

References:

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