

Determination of the toxic threat of coplanar PCBs in arctic ringed seal, *Phoca hispida*, from the Svalbard area.

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Toxic non- and mono-ortho coplanar polychlorinated biphenyls (PCBs) as well as total PCB concentrations have been determined in several terrestrial mammals, coastal marine mammals and marine mammals⁴. In general, the concentrations of mono-ortho coplanar PCBs were found to be higher than the non-ortho congeners and both PCB congener types were significantly higher than the levels of toxic dibenzo-p-dioxins (PCDD) and dibenzofurans (PCDF).

2,3,7,8-Tetrachloro-p-dioxin equivalent (TEQ) analysis revealed that higher aquatic predators receive a greater toxic threat from 2,3,3',4,4'- and 3,3',4,4',5-pentachlorobiphenyl than PCDDs and PCDFs⁷. Oehme et al.^{5,6} reported the presence of PCDDs and PCDFs in ringed seal from Spitsbergen and expressed the concentrations as TEQ values.

The objective of this study is to evaluate the relative toxicological importance of the coplanar PCBs compared with the toxicological contribution of PCDDs and PCDFs in the ringed seal from Svalbard. In this respect, we analysed the kidney, liver, blubber and blood of the arctic ringed seal, *Phoca hispida*, caught at Spitsbergen, for non- and

mono-ortho coplanar PCBs . We also quantitated the total DDT and total PCB concentrations in order to evaluate possible temporal trends in arctic ringed seal.

We calculated the TEQ values for the coplanar PCBs on the basis of PCB # 77 (Ballschmitter numbers¹) and # 126 (non-ortho substituted) and PCB # 105, # 114, # 118, # 156 and # 157 (mono-ortho substituted). The TEQ values of the selected PCB congeners and of PCDDs and PCDFs are shown in figure 1. Compared to the 1986⁶ and the 1981² PCDD and PCDF TEQ values in seal blubber, TEQ values for the selected PCBs are respectively 11 times and 7 times higher.

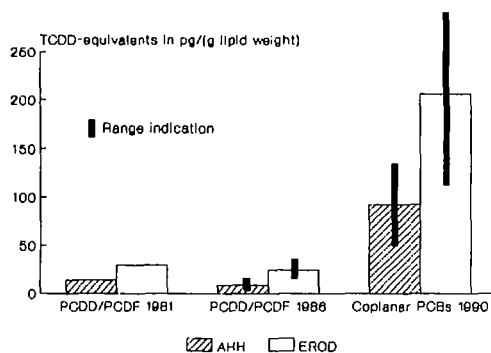


Figure 1: TEQ values of PCDDs, PCDFs and PCBs in ringed seal blubber. 1981 : Bignert² and 1986 : Oehme⁶

The temporal trends in total PCB and total DDT concentrations are illustrated in figure 2. It is important to know that in this figure, no distinction is made as to age, sex or reproductive status. This information for our study is presented in figure 3.

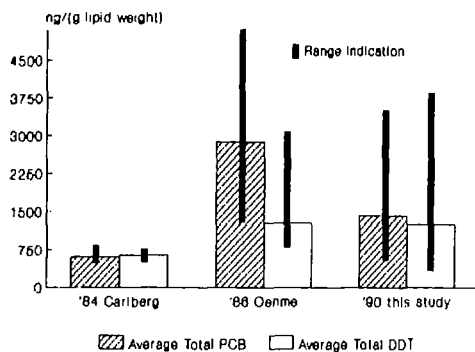


Figure 2: Evolution of the total PCB and total DDT concentrations in ringed seal blubber 1984 : Carlberg³ and 1986 : Oehme⁶

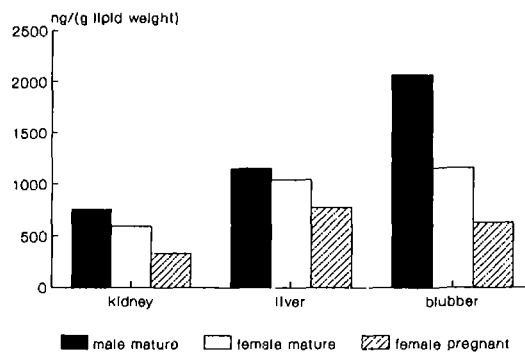


Figure 3: Variation with sex and reproductive status in total PCB concentration in ringed seal (this study)

Looking at figure 1 again, we can see that the differences in TEQ values between the PCB group and the dioxin group are so high, that they can not be explained by the difference in sampling date. This means that the coplanar PCBs do pose a greater toxic threat than the PCDDs and PCDFs.

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