

POLYCHLORINATED BIPHENYLS AND ORGANOCHLOR PESTICIDES IN SEDIMENT OF THE BELGIAN CONTINENTAL SHELF

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Since the early eighties, polychlorinated biphenyls (PCBs) and organochlor pesticides (OCPs) have been monitored in sediment of the Belgian Continental Shelf (BCS) by the laboratory of organic contaminants of the Sea Fisheries Department. PCBs and OCPs are both determinants of highest priority in the international monitoring programmes of OSPAR (North Sea Task Force, 1993). Sediment samples are annually taken at more than 10 sampling stations by a Van Veen grabber on board of the research vessel Belgica. Sediment samples are stored frozen prior to analysis. As organic contaminants tend to adsorb on the fine matter, the sediment fraction less than $63\mu\text{m}$ is isolated by wet sieving. After Soxhlet extraction of the dried fine sediment fraction and removal of inorganic sulphur, the sample is cleaned-up and fractionated on a deactivated aluminum oxide and a silica column, respectively. Finally, the two fractions are quantified by a GC-system equipped with an electron capture detector (ECD). As such, 10 PCB congeners (CB 28, 31, 52, 101, 105, 118, 138, 153, 156 and 180) and 9 organochlor pesticides (HCB, alfa-HCH, lindane, transnonachlor, dieldrin, endrin, p,p'-DDT, p,p'-DDD and p,p'-DDE) are analysed. The participation at international laboratory proficiency tests organized by QUASIMEME is an important part of the quality assurance programme. Contents of PCBs and OCPs are expressed as nanogram per gram of dry fine sediment. In order to assess the BCS, the values for 8 sampling stations were averaged and considered as representative. The sampling stations consisted of 4 dredge dumping sites (Zeebrugge S1, Zeebrugge S2, Zeebrugge Oost and Oostende) and 4 reference stations (Oostende Bank, Raan, Steendiep and Westdiep). Results obtained between 1991 and 2003 are discussed.

Between 1991 and 2003, highest PCB and OCP values were observed in 1993. The sum of 10 PCBs amounted $30\text{ng}\cdot\text{g}^{-1}$, but gradually decreased to $9\text{ng}\cdot\text{g}^{-1}$ in 1997. From then on, an increase up to $23\text{ng}\cdot\text{g}^{-1}$ in 2002 was measured. In 2003, the PCB level dropped to $14\text{ng}\cdot\text{g}^{-1}$. In contrast, the OCP level sharply decreased between 1993 and 1997 and almost remained at the same low level until 2003. The average sum of 9 OCPs at that time was $1.7\text{ng}\cdot\text{g}^{-1}$. Dieldrin, endrin, transnonachlor, p,p'-DDT and alfa-HCH are below $0.2\text{ng}\cdot\text{g}^{-1}$ since 1997. In 2003, the HCB level was below $0.2\text{ng}\cdot\text{g}^{-1}$ as well. Lindane levels are around $0.4\text{ng}\cdot\text{g}^{-1}$ since 1997. p,p'-DDT has almost disappeared (lower than $0.07\text{ng}\cdot\text{g}^{-1}$) and is found as its degradation products p,p'-DDD and p,p'-DDE. The sum of both represents the largest part of the OCP fraction in the sediment of the BCS.

References

North Sea Task Force, North Sea Quality Status Report 1993, Oslo and Paris Commissions, London, UK, 1993.