Monitoring persistent organic pollutants (POPs) in sub-Arctic and Arctic marine mammals, 1984–2009

av

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Akademisk avhandling

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Hörsal M, Örebro universitet

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Abstract


The Arctic has become an important indicator region for assessing persistence and bioaccumulation properties of persistent organic pollutants (POPs). This thesis is aimed at evaluating the occurrence of persistent halogenated POPs in seven species of sub-Arctic and Arctic marine mammals over a 25-year period. The emphasis is on studying temporal variations in concentration of three categories of POPs, including naturally occurring organobromine compounds.

Polybrominated diphenyl ethers (PBDEs), Metoxylated diphenyl ethers (MeO-PBDEs), and polychlorinated naphtalenes (PCNs) were extracted from blubber tissue and analyzed by GC/MS. Polyfluoroalkyl substances (PFAS) were extracted from livers and analyzed by LC-MS/MS. Although restricted by the number of pooled samples, survey points, and species available from the specimen banks, the results showed some interesting contamination patterns.

Overall, pollutant concentrations showed signs of declining or levelling out, indicating a decrease in POP exposure in the studied areas in recent years. However, increasing levels of long-chain fluorinated compounds (PFCAs) present in most species is a finding of concern, and implies that a continuous monitoring of these compounds is important. Interestingly, a shift over time in the relative abundance of PFOS isomers in ringed seals was observed, indicating a change in exposure to PFOS in recent years.

In many of the investigated species the MeO-PBDE levels equalled or exceeded the levels of PBDEs, showing that MeO-PBDEs can be major contributors to the organobromine load in marine mammal species. No apparent relation was found between PBDE and MeO-PBDE levels, adding further support for a natural origin of MeO-PBDEs.

Keywords: Arctic, marine mammals, North Atlantic Ocean, POPs, temporal variations

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