

The role of microplastics as a vector for PCBs through the marine trophic levels

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Recently, the occurrence of microplastic litter is recognized as an area of global concern. Depending on the presence, size, density, shape, colour and biofouling, microplastics could be introduced to marine organisms and ingested when mistaken as food. It is known that plastic litter tends to accumulate hydrophobic organic compounds such as PCBs from the marine environment due to the higher partition coefficients of organic pollutants for plastics than for seawater or sediments. The ingestion of microplastics may therefore provide an additional biomagnification route for plastic-adsorbed contaminants in the marine ecosystem. Otherwise, ingested synthetic polymers may possibly counteract biomagnification by adsorbing contaminants from the tissues of the marine organisms.

Given the little data available on the role of microplastics as a vector for PCBs through the marine trophic levels, an impact study is required via controlled conditions. Benthic marine organisms such as the common shore crab and Norway lobster were exposed to PCB loaded microplastics under controlled laboratory conditions. In these experiments, 500-600 μm diameter polyethylene or polystyrene spheres were loaded with the 7 ICES PCBs. It is expected that spheres of 500-600 μm will pass the digestive tract without accumulation in the organisms. Within this research, it is investigated whether this short period in the digestive system is sufficient for the plastic spheres to release or adsorb PCBs? After 3 weeks of exposure, the PCB levels in the tissues of the tested organisms were quantified using a Bligh and Dyer extraction followed by GC-ECD analysis. The results will be presented and discussed during the conference.

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