**Ecotoxicological Effects of Microplastics: A Review on its Source, Adsorption, Interaction and Effects on Aquatic Ecology**

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**Abstract**

Microplastics (MPs) production in the environment can be linked to human dumping, either directly or indirectly. MPs come in two varieties: primary microplastics (MPs), which are made from plastic that has been millimetre-sized, and secondary microplastics (MPs), which are made from the breakdown of plastics. Chemicaladditivesin plastics have the tendency to adsorb organic contaminants from the surrounding media and increase the wildlife exposure to an amalgamated pool of toxicants. MPs are hydrophobic molecules that adsorb and collect organic compounds like PCBs and PAHs. Phenanthrene and pyrene can be strongly adsorbed by MPs made of PE, PS, and PVC. Previous reports found that PE has the strongest antibiotic adsorption capacity, up to 18,700 ng/g of PCBs in Tokyo and 24,000 ng/g PAHs in Portugal. Moreover, Heavy metals linked to MPs are moved through physical, chemical, and biological migration after entering the aquatic system. In the presence of heavy metals, MPs transition to a negatively charged state on their surface at an alkaline pH (above 7) and got adsorbed to positively charged heavy metals. The main heavy metals linked to MPs are Cadmium, lead, arsenic, zinc, chromium, nickel, and copper. Prior studies have noted the adsorption of heavy metals, including Cr (430 g/g), Ni (131 g/g), Fe (97.8 g/g), Co (107 g/g), and Cd (76.7 g/g), on polyethylene resin pellets up to several hundred micrograms per gramme. The available scientific evidence demonstrates that exposure to microplastics alone or with other contaminants can cause a range of toxic effects, from feeding disruption to reproductive performance, physical ingestion, energy metabolism disturbances, neurological complications, liver physiology changes, and other hydrophobic organic contaminants to aquatic organisms. Risk assessment and legislative intervention are needed to respond to microplastic accumulation and its negative impacts. This review indicates that aquatic life forms are seriously threatened by the ecological consequences of MPs linked to hydrophobic organic pollutants and heavy metals, but we found there is a significant study gap in the behaviour change of fish and other aquatic organisms caused by microplastics due to a shortage of research in this field.

Keywords: **Microplastics, PAHs, PCBs, Heavy metals**

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