Abundance and characterization of microplastics in wild and cultured blue mussels (Mytilus edulis) and American oysters (Crassostrea virginica) from Nova Scotia

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Abstract

Plastics have become ubiquitous within society as production has increased over the last few decades. Due to its rigid structure and composition, plastic pollution can persist within the environment and travel thousands of kilometers from its initial disposal site. Coastal cities, shipping activities, stormwater run-off, and drainage systems are some of the ways in which land-based plastic pollution can enter marine environments. Through mechanical and chemical processes these plastics degrade into micro-sized pieces defined as microplastics. Their small size and abundance within marine ecosystems make them easily ingested by filter feeders such as mussels and oysters. Shellfish aquaculture in Atlantic Canada is significant to the Canadian economy for both national and exported goods. Existing studies have found microplastic fragments in both wild and cultured blue mussels and American oysters. However, due to knowledge gaps within microplastic research, there is little information on the sources of microplastic pollution in shellfish. It is speculated that shellfish aquaculture practices may be impacting the number of microplastics ingested by commercially available shellfish. The objective of my research is to determine the abundance of microplastics in wild and cultured blue mussels and American oysters from Nova Scotia, to identify the size class and types of microplastics ingested, as well as to identify some potential sources of contamination. Contaminants associated with microplastics such as PFAS (Per- and polyfluoroalkyl substances), pharmaceuticals, and heavy metals may also be present in shellfish and are a concern for human health. This research may inform future recommendations for shellfish aquaculture policy, as well as potentially contribute to the movement toward plastic-free or plastic-reduced aquaculture practices.

Keywords: microplastics, plastic pollution, marine, shellfish

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