

Microplastics in Fish from Grenada, West Indies: Problems and Opportunities

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Abstract : Microplastics are small particles produced for industrial purposes or formed by breakdown of anthropogenic debris. Caribbean nations import large quantities of plastic products. The Caribbean region is vulnerable to natural disasters and Climate Change is predicted to bring multiple additional challenges to island nations. Microplastics have been found in an array of marine environments and in a diversity of marine species. Occurrence of microplastic in the intestinal tracts of marine fish is a concern to human and ecosystem health as pollutants and pathogens can associate with plastics. Studies have shown that the incidence of microplastics in marine fish varies with species and location. Prevalence of microplastics (≤ 5 mm) in fish species from Grenadian waters (representing pelagic, semi-pelagic and demersal lifestyles) harvested for human consumption have been investigated via gut analysis. Harvested tissue was digested in 10% KOH and particles retained on a 0.177 mm sieve were examined. Microplastics identified have been classified according to type, colour and size. Over 97% of fish examined thus far (n=34) contained microplastics. Current and future work includes examining the invasive Lionfish (*Pterois* spp.) for microplastics, investigating marine invertebrate species as well as examining environmental sources of microplastics (i.e. rivers, coastal waters and sand). Owing to concerns of pollutant accumulation on microplastics and potential migration into organismal tissues, we plan to analyse fish tissue for mercury and other persistent pollutants. Despite having ~110,000 inhabitants, the island nation of Grenada imported approximately 33 million plastic bottles in 2013, of which it is estimated less than 5% were recycled. Over 30% of the imported bottles were 'unmanaged', and as such are potential litter/marine debris. A revised Litter Abatement Act passed into law in Grenada in 2015, but little enforcement of the law is evident to date. A local Non-governmental organization (NGO) 'The Grenada Green Group' (G3) is focused on reducing litter in Grenada through lobbying government to implement the revised act and running sessions in schools, community groups and on local media and social media to raise awareness of the problems associated with plastics. A local private company has indicated willingness to support an Anti-Litter Campaign in 2018 and local awareness of the need for a reduction of single use plastic use and litter seems to be high. The Government of Grenada have called for a Sustainable Waste Management Strategy and a ban on both Styrofoam and plastic grocery bags are among recommendations recently submitted. A Styrofoam ban will be in place at the St. George's University campus from January 1st, 2018 and many local businesses have already voluntarily moved away from Styrofoam. Our findings underscore the importance of continuing investigations into microplastics in marine life; this will contribute to understanding the associated health risks. Furthermore, our findings support action to mitigate the volume of plastics entering the world's oceans. We hope that Grenada's future will involve a lot less plastic. This research was supported by the Caribbean Node of the Global Partnership on Marine Litter.

Keywords : Caribbean, microplastics, pollution, small island developing nation

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