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Occurrence of microplastics in green mussels (*Perna viridis*) in Negombo and Kalpitiya lagoons, Sri Lanka

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Abstract

Microplastics (MPs), plastic particles less than 5 mm are considered as an emergent pollutant, which affects the aquatic ecosystems throughout the world. As an aquaculture commodity green mussel (*Perna viridis)* has high nutritional value and market demand. Current study investigated the MP contamination in green mussels, water, and sediments in Negombo lagoon (NL) and Kalpitiya lagoon (KL). Ten green mussels, three water samples (1L) and three sediment samples (1kg) from each site were collected. Nitric acid digestion protocol was used to isolate MPs by digesting organic matters. MPs were recorded in mussels, water and sediment samples with 100% detection frequency. Polymer composition was determined by Fourier-Transform Infrared Spectroscopy method (FTIR). The mean abundance of MPs/individual was significantly higher in NL (885.54±221.56) compared to that of KL (394.41±92.17). Similarly, MPs abundance in water and sediments of NL (62.66 ± 11.50 MPs/L, 226.33±17.78 MPs/kg) was significantly higher than that of KL (31.66 ± 1.52 MPs/L, 68.33±9.81 MPs/kg). Detected MPs were categorized into fragments, fibers and beads according to their shape. Fragments and fibers were the dominant morphotype in mussels, water and sediment of both lagoons. Predominant color was found as black followed by red and blue in all samples in NL and KL. Identified MPs were categorized into large (≥750 µm), medium (250 µm-750µm) and small (<250µm) size classes and the availability of small size MPs were significantly higher than medium and large size particles. According to FTIR analysis, polyethylene was the only polymer type identified with an adequate accuracy. This study provides thoughtful insights on how food safety and human health are affected by MPs. Policies should be implemented to reduce the MPs contamination in aquaculture environments.

Keywords

Microplastics, Perna viridis, Negombo lagoon, Kalpitiya lagoon, FTIR