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Microplastic contamination in shrimps from the Negombo Lagoon- Sri Lanka

P. L. M. J. H. Lawan¹, D. S. M. De Silva^{1*}, A. A. D. Amarathunga², A. McGoran³, A. Bakir³ and D. B. Sivyer³

¹Department of Chemistry, University of Kelaniya, Sri Lanka

²National Aquatic Resources Research and Development Agency (NARA), Sri Lanka

³Centre for Environment, Fisheries and Aquaculture Science (Cefas), United Kingdom
sujeewa@kln.ac.lk*

Microplastics (MPs) are minute pieces of plastic debris that are smaller than 5 millimeters in size. They are created through the fragmentation or degradation of more oversized plastic items such as bottles, bags, and packaging materials. Additionally, MPs can also be intentionally manufactured for certain products like microbeads in personal care products. Microplastic pollution has turned into a severe global issue affecting freshwater systems, coastal regions, and oceans. These non-biodegradable materials have a detrimental impact on marine species and ecosystems, causing disruption to their feeding, breathing, and reproduction. The intention of this study was to identify and categorize the MPs present in shrimps from the Negombo lagoon, Sri Lanka, based on the type, shape, size, and color and to characterize the polymer composition of the identified MPs. Fresh samples of two species of shrimps, *Penaeus monodon* (n=25) and *Penaeus indicus* (n=95) were collected from the ten locations where the known habitats of shrimps in the Negombo lagoon and MPs were isolated by gastrointestinal tracts and gills by alkali digestion followed by vacuum filtration. Stereomicroscopy coupled with advanced micro-imaging and analyzing software was used for characterizing the isolated MPs. From those samples, 415 MPs were identified and characterized. The results showed that the average number of MPs per individual was higher in *P. monodon* (4.72 ± 2.72) compared to *P. indicus* (3.13 ± 2.04). The average number of MPs per gram of gut tissue was also higher in *P. monodon* (8.29 ± 4.63) compared to *P. indicus* (5.52 ± 3.78). Identified MPs were categorized into five size groups, <100 μm , 100-250 μm , 250-500 μm , 500-1000 μm , and >1000 μm . The majority of MPs identified were under the category of >1000 μm , and six color categories were observed, with blue being the most prevalent. The study identified two main types of MPs; fibers and fragments, and the predominant form of MPs was fiber (93.0%), with the remaining being fragments. The polymer composition of most of the MPs included polystyrene, polyamide, polyester, polypropylene, and rayons, as identified by μ -FTIR and ATR-FTIR studies.

Keywords: Microplastics, Negombo lagoon, Shrimps, FTIR, Pollution

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