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Microplastic contamination in selected commercial fish species in Negombo Lagoon, Sri Lanka

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Microplastics (MPs) act as physical anthropogenic pollutants and their ability to act as contaminant vectors in biological matrices has become a serious ecosystem and human health concern. The present study, for the first time, has screened and detected MPs in the gastrointestinal tract and gill of a select group of commonly consumed fish species from Negombo lagoon, Sri Lanka. Negombo lagoon is one of the most productive ecosystems in Sri Lanka. A total of 60 fish samples were investigated for the microplastic presence, abundance, and morphological types within the guts and gills of commercial fish consisting of seven (7) species: *Siganus javus* (SJ: n=5), *Leiognathus splendens* (LS: n=8), *Leiognathus blochii* (LB: n=5), *Mugil cephalus* (MC: n=19), *Strongylura leiura* (SL: n=10), *Stolephorus indicus* (SI: n=10), and *Caranx heberi* (CH: n=3) with different feeding habits and habitats. Samples were collected between July–December 2022. Fish gut content was screened for the presence of MPs using the alkaline digestion and density gradient separation technique (NaCl hypersaline solution) and examined using a stereomicroscope and micro-Fourier transform infrared spectrometer (m-FTIR). Microplastics, ranging from 0.05 to 4.80 mm, were found in the investigated fish species. Remarkably, this study revealed that 51.67% and 32.00 % of the fish samples contained microplastic in their guts and gills respectively. A total number of 67 MP particles (size < 5 mm) were found in the excised fish guts of the seven species. The most common morphology of microplastics discovered in fish guts was fragments, which accounted for 87.5% of all MPs present. The MP content in guts differed between species. Of that *Mugil cephalus* recorded the greatest amount of MP ingestion, with an average MP count of 2.68±0.23 items per individual in fish gut corresponding to an average abundance of 0.22±0.26 particles/g and 0.84 ±0.46 items per individual in gills corresponding to an average abundance of 0.41±0.68 particles/g. The majority of ingested particles were fragments (40.3%), followed by fibers (34.33%), films (19.40%), microbeads (4.48%), filament (2.29%), and no pellets were observed. In terms of colour, the most abundant were blue (58.20%), followed by green (13.43%), transparent particles (8.96%), yellow (7.46%), red (5.97%), black (2.98%), white, brown, pink (1.49%) were found in low number. The majority of MPs presented were identified by m-FTIR as particles of polypropylene and polyethylene (HDPE), rayon. The results are evident in the growing threat of MPs on biological matrices and ingested MPs in edible fish species present in the Negombo lagoon.

Keywords: Fish species, Gill & guts, Microplastics, Negombo lagoon, m-FTIR

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