Occurrence of Microplastics in Gut and Muscles of Commerson's Anchovy in Madu-Ganga Estuary of Southern Province, Sri Lanka

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Plastic pollution causes serious ecological risks on biodiversity with toxicological effects on the biota. The objective of this study was to assess microplastic accumulation in seasonally common fishery resource: *Stolephorus commersonnii* (Commerson's Anchovy) harvested from Madu-ganga estuarine ecosystem. Fifteen matured fish samples (n=15) were randomly collected from local fishermen from November 2019 to January 2020. Microplastic particles were extracted from the digestive tract and muscles of anchovies using the recommended protocol of 10% KOH digestion. Hot needle test and Fourier Transform Infrared Radiation (FTIR) analysis were used for the confirmation of microscopically observed microplastics in anchovy samples. Microscopically observed microplastics were counted and categorized according to the size, color, and shape of plastics. Results revealed the microplastic accumulation in both the digestive tract and muscles of anchovies. Microplastics accumulate into the muscles via translocation and different respiratory modes. The average microplastic accumulation rate of anchovy gut and muscles were recorded as 301.70±3.58 items/g and 29.33±1.19 items/g respectively. White/transparent microplastic particles were the most abundant type in both guts (145.50±2.18 items/g) and muscles (13.55±1.23 items/g) of fish. However, blue (71.33+0.83 items/g: gut, 9.85+1.13 items/g: muscle), black (37.85+1.07 items/g: gut, 2.49+0.44 items/g: muscle), red (28.31+0.60 items/g: gut, 2.31+0.3 items/g: muscle) and pink (15.31+0.34 items/g: gut 0.96+0.24 items/g: muscle) microplastic debris were also recorded from gut and muscle samples. The majority of accumulated plastics in both gut and muscles were at the size range of 0.50 -1.00 mm. Fiber shape microplastics were observed in all the samples. FTIR results revealed that polypropylene as the only polymer type of microplastics in fish muscles and gut. This polymer is a key component of fishing ropes, netting materials, bottle caps, and packaging materials that enter through tourism/recreational activities and fishery operations into the estuarine ecosystem. Therefore, the current study recommends sustainable, integrated fishery management and eco-tourism programs focusing on plastic pollution control and prevention activities in Madu-ganga estuarine ecosystem. In conclusion, this study highlights the occurrence of microplastic contamination in the estuarine biota and the urgent need for plastic wastes management programs.

Keywords: Coastal fishery resources, Estuarine ecosystem, Integrated fishery management, Microplastic accumulation rate, Plastic pollution control programmes