



Assessment of Microplastics in Gill, Gut, and Muscle Tissues of *Decapterus russelli*

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Plastic pollution in the marine environment and its degradation into microplastics (MPs) pose growing risks related to seafood safety. Evaluating MPs in commercially important fish species is therefore of increasing scientific and public interest. The present study aimed to assess the MPs in the gill, gut, and muscle tissues of a commercially important fish species, *Decapterus russelli*, collected from the Beruwala Fishing Harbour, Sri Lanka. Sixteen fish samples were collected, and their external surfaces were washed with filtered distilled water, and total body weight and length were measured. The gills, entire gastrointestinal tract (GIT), and muscle tissues were digested separately with 40% H₂O₂ at 60 °C for 24 hours in an incubator, followed by density separation (1.2 mol dm⁻³ NaCl) and filtration (0.45 µm fiberglass filter paper). Contamination was minimised using pre-filtered reagents, triple-rinsed glassware in a plastic-free environment, and a recovery study was conducted. The stereomicroscope was used for visual identification, characterisation by size, shape, and colour, and quantification of MPs. Optica TCB5.0 software was used to measure the size of MPs. A hot needle test was performed to identify plastic particles. Mean MP levels for gut, gills, and muscle were 2.7 ± 0.9 , 2.5 ± 0.4 , and 0.72 ± 0.2 MPs g⁻¹ of tissue, respectively. The plastic particle contamination factor (pCf) and the microplastic diversity integrated index (MDII) were calculated for each tissue. The pCf values of *D. russelli* ranged from 0.30 to 1.14, and the MDII ranged from 0.39 to 0.55. Gut (0.55) and gill (0.54) tissues showed higher MPs diversity than muscle tissue (0.39). Red, blue, and black were the most prominent colours, and pellets, fibres, and fragments were the main MPs shapes identified. MPs ranging from <200 µm to 2000 µm were recorded, and the MPs smaller than 200 µm were the most abundant in muscle tissue. The present study confirmed that all tissues of the *D. russelli* were contaminated with MPs with significantly high amounts in the gill and gut tissues. Based on pCf values, muscle tissue (0.30) showed a low contamination level, while gill (1.06) and gut (1.14) tissues showed moderate MP contamination, indicating potential health risks to *D. russelli* in the marine ecosystem.

Keywords: Beruwala Fishing Harbour, Microplastic diversity integrated index, Plastic particle contamination factor, Sri Lanka