

Detection of Microplastic Contamination in Selected Marine Macroalgae Species along the Rocky Shoreline of Mount Lavinia, Sri Lanka

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Microplastics (MPs) are one of the most widespread pollutants affecting aquatic ecosystems on a global scale. While research on microplastic contamination is growing, a significant knowledge gap remains regarding MPs contamination in marine macroalgae in Sri Lanka. The present study aimed to assess the presence and abundance of MPs in marine macroalgae collected from the rocky shoreline of Mount Lavinia in Sri Lanka during March to May 2025. Two common marine macroalgae species in the area, *Ulva intestinalis* and *Chaetomorpha antennina*, were collected with triplicate samples obtained from each species. Triplicate surface seawater samples were also collected around the macroalgae population to analyze MP contamination in the surrounding environment. To identify and quantify internally retained MPs in macroalgae species, the oven-dried samples were digested using 10% KOH at 60 °C for 4 h. The digested samples were filtered using 0.45 µm membrane filters and analyzed for MPs under a stereomicroscope. To identify externally attached MPs, macroalgae were rinsed with distilled water, and rinsed water was digested with 30% H₂O₂ for 4 h, filtered, and analyzed using a stereomicroscope to identify MPs. Further, the same procedure of rinsed water was followed for seawater. The study revealed that the abundance of internally retained MPs in algae varied widely between both species, with microfibers identified as the most dominant MPs. The highest MPs abundance was recorded in *U. intestinalis*, with an average of 3.20 ± 0.57 MPs g⁻¹ compared to *C. antennina* (0.93 ± 0.74 MPs g⁻¹). Abundance of externally attached microfibers was relatively similar between the two species, with values of 0.91 ± 0.27 MPs g⁻¹ in *U. intestinalis* and 0.98 ± 0.44 MPs g⁻¹ in *C. antennina*. A variation in microplastic colour was observed among species, where internally retained particles were predominantly transparent in *U. intestinalis* and black in *C. antennina*, while externally attached microplastics in both species were primarily dominated by black. Microplastic abundance in seawater was recorded as 5.83 ± 1.61 MPs L⁻¹, with black being the dominant colour of microfiber. The study revealed scientific evidence for MP contamination across both macroalgal species and surrounding seawater along the rocky shoreline of Mount Lavinia, highlighting their widespread distribution in this environment. These findings emphasize the need to reduce plastic production and to conduct regular beach cleanups to mitigate plastic contamination in coastal ecosystems.

Keywords: *Chaetomorpha antennina*, *Macroalgae*, *Microfibers*, *Microplastics*, *Ulva intestinalis*