Bioconcentration of Microplastics in Mangrove-Associated Lagoon Cockle, Corbicula Fluminea in Batticaloa Lagoon, Sri Lanka

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Microplastics (MP) enter lagoons and mangrove forests in many ways, interfering with the environment and organisms' health. This study assessed the levels of MPs in lagoon water and tissues of mangrove clams, and their ability of bioaccumulation. The filter-feeding edible cockles, *Corbicula fluminiea* (n=21) were collected and the water samples (50 L) were filtered along a 100 m line transect along the bank of Navatkudah, Batticaloa Lagoon. The entire tissue mass of the clam and water samples were screened for MPs following wet peroxidase oxidation (30% H_2O_2) and saturated NaCl density separation. Shape, size and colour of the extracted MPs were recorded with a widefield stereomicroscope and an ocular micrometer. The mean MP concentration in water was 4,722.22±1,448.22 items/m^3 (0.75±0.48 items/g) whereas that in tissues was 1.31±0.23 items/g for the clam mean tissue wet weight 1.479±0.243 g. The bioconcentration factor (BCF) was 2.78 items/L. Thus, the clams have a high concentration of tissue MPs compared to water. MPs were in the form of threads, fragments, and pellets. Maximum size of water-borne MPs was 4 mm while in clams it was 50 µm. Red, Orange, black, blue and white were the detected MP colours in both samples, with purple in tissues only. A negative correlation was observed in tissue MPs to their tissue WW ($r=-0.684$, $p<0.05$) affirming an allometric relationship depending on the animals' surface area to volume ratio, suggesting smaller animals have a higher tendency for MP accumulation. No correlation was observed between MP in tissue and water ($r=0.416$, $p>0.05$). Since, the BCF is greater than 1, it is apprehensive to predict that the clams have come in contact with MPs mainly by means of water. MPs in these edible clams reveal a potential risk of entering food web and reaching the organisms in higher trophic levels including humans.

Keywords: Batticaloa, Bioconcentration Clams, Correlation, Microplastic