Assessment of microplastics contamination in marine protected areas in Southern Sri Lanka

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Microplastics (MPs) are ubiquitous in the marine environment and they cause various detrimental impacts on organisms from lower trophic level to higher trophic levels. Hydrodynamic processes and ocean currents affect wide dispersion of MPs even into remote areas. In order to evaluate abundance, composition and distribution of MPs in coastal sand and water, two Marine Protected Areas (MPAs) were selected and sampling was conducted during South West monsoon period. To acquire better understanding of contamination level, sub sites were also selected from each MPAs. MPs were reported under two main size classes; 0.5 – 1.0 mm and 1.1 – 5.0 mm. Average abundance of MPs in coastal sand of BNP and HNP, ranged from 39 ± 3 to 196 ± 13 MPs/m^2 and 52 ± 4 to 234 ± 11 MPs/m^2, respectively. Average abundance of MPs in coastal water of BNP was 107 number of MPs/1000 m^2 and in HNP, it was 203 number of MPs /1000 m^2. Fragments and filaments were the most common shapes. FTIR and Raman analysis showed that polyethylene, polypropylene and polystyrene were the major polymer types and about 40% of MPs were oxidized. The particles smaller than 1 mm were stained using Nile Red to confirm visually identified MPs were in fact plastics. The result of this study indicate the presence of MPs in MPAs in Southern Sri Lanka at considerable high levels. This research is the first to survey MPs contamination in MPAs in the Southern coast and provides baseline information for further research at species level.

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