

Screening the Effects of Microplastics on Selected Invertebrates along Southern Coastal Belt in Sri Lanka: A Preliminary Approach to Coastal Pollution Control

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Primary and secondary microplastics entering into coastal and marine environment are potentially harmful to the health of aquatic organisms. Current study intended to assess plastic pollution effects on sessile invertebrates along the Southern coastal belt of Sri Lanka during July-December 2018. Twelve sampling sites (Hambantota, Godawaya, Rekawa, Tangalle, Dickwella, Polhena, Mirissa, Weligama, Unawatuna, Gallefort, Dodanduwa and Hikkaduwa) with different anthropogenic activities were selected as representing 03 districts (Hambantota, Matara, Galle) of Southern province. Biodiversity survey was conducted to identify prevalence of natural inhabitants in selected regional coasts and 03 dominant coastal mollusks: *Saccostrea cucullata* (Rock Oyster), *Littorina* sp. (Periwinkle) and *Patella* sp. (Limpets) were selected for screening microplastics accumulation level. Alkaline digestion protocol was identified as the most suitable procedure for microplastics extraction considering plastics recovery rate and digestion efficiency of flesh. Randomly collected, pooled biological samples (N=20-2) were subjected to KOH digestion and resultant microplastics were verified using hot needle test. As results revealed, all 03 invertebrates were contaminated with microplastics accumulation at average rates of 7.2-2.8counts/g in all sampling sites. Majority of contaminated microplastics were filamentous types (>90%) followed by rod shapes (1%). Microplastic accumulation rate varied significantly according to the type of species ($p<0.05$) due to differences of their feeding mechanism. Further, filter feeding organisms (Rock Oysters) were highly susceptible in accumulation of microplastics (7.2-4.1counts/g) in their bodies, while plastic accumulation rate was highest in oysters from Hambantota. Microplastic accumulation rate of mollusks was not significantly different according to the sampling site due to closer proximity ($p>0.05$). Tourism, unsustainable coastal fishery and harbor operational activities were identified as key factors affecting on higher plastic pollution level on Southern coast. Current study reflects negative aspect of plastic pollution on intertidal organisms.

Keywords: Anthropogenic activities, Plastic pollution, Microplastics accumulation rate, Intertidal zone, Bio-indicator organisms

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