

Abstract No: BO-28

Quantification of Microplastics contamination at Bundala National Park, Sri Lanka

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Microplastics (MPs) is an omnipresent contaminant in almost all environments of the world including oceans. Currently its negative consequences on ecology, economy, human health and food security have become a hot topic among scientists, environment managers and policy makers all around the globe. Hydrodynamic processes and ocean currents affect wide dispersion of MPs even into remote and isolated areas. In order to evaluate contamination of MPs in lagoons, coastal sands and waters in the southern Sri Lanka, Bundala National Park (BNP) was selected considering its importance for the turtles and sea birds which are mostly affected by MPs contamination globally. The selection of sites were mainly based on turtle nesting areas. Data were reported under two main size classes: particles 0.5 – 1.0 mm and 1.1 – 5.0 mm. Average abundance of the MPs in coastal sand of high tide line and dune ranged from 187 ± 10 to 53 ± 1 MPs/m² and from 196 ± 13 to 39 ± 3 MPs/m², respectively. A gradual increase of the abundance of MPs in the coastal sand was observed from the most western sites to the east. Average abundance of MPs in coastal water of BNP was 107 MPs/1000 m². Fragments and filaments were the most common shapes. FTIR and Raman analysis showed that Polyethylene, Polypropylene and Polystyrene were the major polymer types. About 40% of MPs found were observed oxidized state. Accuracy of visual identification of MPs as plastic (< 1 mm particles) was checked using a dye technique with Nile Red (9-diethylamino-5H-benzo[α] phenoxazine- 5-one) to recognize intact plastics. All data provide strong evidence of the presence of MPs in BNP. Further research is needed to investigate the impacts of MPs on marine organisms and to determine the ecological impact to the ecosystems.

Keywords: Bundala National Park, Microplastics, Turtles

Acknowledgement

The FTIR and Raman Spectra measurements were supported by the Instrument center, University of Sri Jayewardenepura and CSIR - National Chemical Laboratory in India.