A PIONEER ASSESSMENT OF MICROPLASTICS IN SELECTED COASTAL MANGROVE FORESTS OF MAURITIUS

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Mode of Presentation: Oral Presentation

Abstract

The occurrence of significant amount of plastic litter in the marine environment has led to the emergence of microplastic contamination. Firstly overlooked, the deleterious effects of microplastics have now gained global recognition nonetheless the number of studies conducted in an ecologically pristine ecosystem as mangrove forests are still scarce. The present study was conducted in two mangrove forests of Mauritius, dominated by Rhizophora mucronata stands, namely Mahebourg which has a relatively high human settlement and Ferney which is uninhabited and isolated from anthropogenic activities. The aim of this study was to quantify the abundance of microplastic and classify them based on their size and type for a study period of October 2018 to December 2018. In this study, six size classes with a size range greater than 0.6 mm to 4.0 mm and five microplastic types; fibre, fragment, pellet, foam and film, were used for the classification purpose. Each study area was firstly classified into three tidal inundation zones. Sediment samples were collected in triplicates (n=3) in each tidal inundation zone using a 50cm x50 cm polyvinylchloride quadrat with a total of 9 sediment samples (n=9) collected in each mangrove forest. Microplastics were extracted from the sediment sample using a three step procedure, namely, density separation, sieving and visual sorting. Subsequently, the extracted microplastics were examined under a stereomicroscope, counted and categorized. Microplastics were observed in all three tidal inundation zones with the highest overall amount observed in inundation zone 1 at Ferney (55%) and in inundation 4 at Mahebourg (53%). The latter had the highest total number of microplastic recorded (65%) during this study period. Results showed that the most abundant microplastic by type was plastic fragments (53%) and by size were those in the size range greater than 0.8 mm to less or equal to 1.0 mm (> 0.8 to ≤ 1.0 mm) and greater than 1.0 mm to less or equal to 2.0 mm (> 1.0 to ≤ 2.0 mm). The least encountered microplastics were plastic pellets (1%) by type and those with a size range greater than 0.6 mm to less or equal to 0.7 mm (> 0.6 to ≤ 0.7mm). The prevalence of microplastics in these mangrove forests is likely due to the accumulation and degradation of anthropogenic plastic debris. This study serves as an eye opener for future management strategies and monitoring to prevent microplastic intrusion in the marine ecosystems and to work towards its protection especially as a habitat that harbours organisms at the base of food chains.

Keywords: Mauritius, mangrove, microplastics; quantification; classification