

Simultaneous grading of microplastic size sampling in the Small Islands of Bintan water, Indonesia

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| Abstract | <p>Despite Indonesia being considered as second highest source of marine plastic debris in the world, few studies have been conducted on plastic debris in Indonesia, particularly microplastics. By using a simple device to simultaneously grade floating microplastics, we investigated microplastic contamination in the ecosystem of small islands in Bintan Regency, Riau Island Province, Indonesia. The average number of floating microplastics from 11 beach stations around Bintan Island was 122.8 +/- 67.8 pieces per station, which corresponds to 0.45 pieces per m(3) and represents a low-medium microplastic pollution level compared to the levels of other marine environments worldwide. Polymer identification using Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) Spectroscopy successfully identified Polyethylene (PE) (17.3 +/- 8.3%), Low Density PE (17.6 +/- 5.5%), Oxidized LDPE (< 0.1%), Polypropylene (PP) (54 +/- 13%), PP Atactic (< 0.4%), PP isotactic (< 0.2%) and Polystyrene (PS) (10.4 +/- 9.1%) from different forms and shapes of microplastics i.e., fragments (50.9 +/- 4.9%), fibers (26.2 +/- 3%), granule (13.1 +/- 3.8%) and films (9.8 +/- 5.1%). We suggest that the generation of these microplastics was likely due to physicochemical processes, including biological degradation in this tropical ecosystem. Environmental implication of microplastics in this area increases the problems associated with ingestion, bioaccumulation and biomagnification across trophic levels and co-pollutants absorbed onto microplastics.</p> |
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