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Assessing the concentration, distribution and characteristics of suspended microplastics in the Malaysian indoor environment

Abstract

This study examines the concentration, distribution, and characteristics of suspended microplastics (MPs) across various indoor environments in Malaysia, including offices, classrooms, landed homes, and apartments. Over a six-week period, MPs were collected using a vacuum pump and analyzed through gravimetric analysis, stereomicroscopy, and Raman spectroscopy. The results revealed significant variability in MPs concentrations among different locations, with fibers identified as the predominant morphological type. The average counts of MPs in the respective environments were found to be 599 ± 182 in offices, 399 ± 52 in classrooms, 505.17 ± 203.78 in apartments, and 515 ± 134 in landed homes. Statistical analysis indicated no significant differences in MPs counts across the sampled locations. Fibers were consistently the most prevalent shape, followed by films and foams. The MPs were predominantly transparent, with sizes ranging from 101 to 500 μm. Notably, the estimated daily intake (EDI) of MPs was significantly higher in residential settings compared to offices and classrooms, raising potential health concerns regarding prolonged exposure. These findings underscore the pervasive presence of MPs in the Malaysian indoor environment and emphasize the urgent need for further research to identify their sources, assess health impacts, and develop effective mitigation strategies.

Keywords

Estimated daily intake; Indoor environment; Microplastics; SDG; Statistical analysis