Risk Assessment of Microplastics in Indoor House Dust in Central Japan

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Abstract:

Currently, there is little information about the occurrence of microplastics in the indoor environment as compared to the outdoor environment. However, according to Soltani et al. (2022), indoor environments have reportedly higher concentrations than the outdoors. In Japan, it is reported that on average, the population spend about 94% of their time indoors (Statistics Bureau of Japan, 2023). Thus, chronic exposure to microplastics through house dust is expected. In this study, microplastics in indoor house dust in Central Japan were analyzed through three parameters – abundance, size, and polymer type. The relationship between household factors and microplastic concentration was also evaluated. Lastly, the oral exposure to microplastics from indoor house dust was estimated. A mean microplastic concentration of 3.07 particles/g dust was found for particles between 300µm-5mm, and a mean concentration of 0.437 mg MP/g dust was found for particles between 1-300µm. Five plastic polymers were found – PET, PVC, PE, Nylon, and PP, with PET and PVC as the most prevalent microplastic concentration. The estimated daily intake through house dust ingestion was determined, and it was found that young children had the highest intake of microplastics, while adults had the lowest.