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عنوان مقاله :

Airborne microplastic particle concentrations and characterization in indoor urban microenvironments

چکیده :

Airborne microplastics (MPs) have recently drawn the attention of the scientific community due to their possible human inhalation risk. Indoor environments are of relevance as people spend about ۹۰٪ of their time indoors. This study evaluated MPs concentrations in three indoor environments: houses, public transport and working places, which are representative of urban life. Sampling involved the collection of airborne particulate matter on nylon ۲۰ μm pore size filters. Samples were first visually inspected, and particles were characterized (colour, length or area). Polymer identification was performed through μFTIR analysis. Working conditions were controlled to guarantee quality assurance and avoid background contamination. Limits of detection, recovery tests and repeatability were performed with home-made polyethylene (PE), polypropylene (PP), and polystyrene (PS) standards. The highest average MP concentrations were found in buses (۱۷,۳ ± ۲,٤ MPs/m۳) followed by ٥,۸ ± ۱,۹ MPs/m۳ in subways, ٤,۸ ± ۱,٦ MPs/m۳ in houses, and ٤,۲ ± ۱,٦ MPs/m۳ in the workplaces. Polyamide, PA (٥۱٪), polyester PES (٤۸٪) and PP (۱٪) were the polymers identified and most common in personal care products and synthetic textiles. Most of these polymers were below ۱۰۰ μm in size for both fibres (٦٤ ± ۸٪) and fragments (۷۸ ± ۱۱٪). The frequency of MP particles in our study decreased with increasing size, which points to their potential as an inhalation hazard.