
Laundry and Dry Cleaning Environments as a Source of Microplastics

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Abstract

This study aimed to evaluate the occurrence and abundance of microplastics (MPs) in dry cleaner shops. Dust samples were collected by sweeping, and the participant shops were allowed to fill out the questionnaire regarding the type of clothes washed and dried, etc. Dust samples were passed through the sieve ($\leq 5\text{mm}$). The density separation of collected samples was done by sodium iodide, and the upper portion of the samples, which we could easily hold with forceps and were visible to the human eye (mostly millimeters), were transferred for further analysis. These millimeter-size MPs would have occupied the maximum filter area, and it would have otherwise hindered the characterization of micro and nano-plastics. The samples were morphologically analyzed under a stereo microscope, and ATR-FTIR did their chemical characterization; however, micro and nano-plastics were analyzed under micro-Raman for further studies. Sample one and two showed the presence of 10 and 23 MPs, respectively. The common MPs types were fragment, pellet, film, and foam. While their dominant colors were red, white, transparent, and black. The fragment was the predominant type of MPs. White and transparent were the dominant color of these MPs. The size of the identified MPs was between 1.2 to 5 mm. PVA, Tencel, PA resin, PA-11, PU, EVA, and PET were the predominant type of MPs seen in the study. Based on the literature, this is the first study conducted in the indoor environments of dry cleaner shops. This study showed that indoor environments of dry cleaner shops are sources of MPs. The textiles are rich sources of MPs, and during the washing, with the effects of water, friction and abrasion, and detergents, these MPs can easily shed. More work should be done on the occupational health impacts of these MPs released from the textiles as they are very harmful.

Keywords: Polymeric particles, Microfibres, Indoor environment, Workers' health, Indoor air quality.

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