

Poster 47

## Airborne fibers: passive sampling and environmental contamination

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### Abstract

**Background:** Microplastics are synthetic particles or fibers <5mm [1] released from plastic objects into the environment, contaminating indoor and outdoor air and leading to human exposure with unknown consequences [2]. Only a small number of studies with a high geographical distribution have determined the concentration of airborne microplastics, especially of fibers. **Objective:** This work aimed at conducting passive sampling of airborne fibrous microplastics in four areas to study the deposition of synthetic fibers. **Methods:** Sampling was conducted on February 15<sup>th</sup>, 2023 in the CESPU's university campus (Gandra, Portugal). Three indoor areas (Library, Auditorium, Cafeteria) and one outdoor area (Balcony) were sampled in four replicates, along with four blanks. Sampling was conducted by opening previously decontaminated glass petri dishes (30 min in 1% HNO<sub>3</sub>, distilled water, dried at 60°C, cleaned with air jet) for approximately 4h, starting at 12:00. Fibers were photographed in an Eclipse TE2000-U microscope, controlled by the ACT-1 software, version 2.70 (Nikon); images analyzed in ImageJ, and data analysis conducted in IBM SPSS Statistics 26, considering  $\alpha=0.05$ . **Results:** Fibrous and non-fibrous particles were detected in petri dishes. Deposited fibers showed a significantly greater length and smaller width than non-fibrous materials (length  $U=2477,0$ ,  $p<0.001$ ; width  $U=810,5$ ,  $p<0.001$ ). The Auditorium presented significantly greater fiber lengths, except the Cafeteria ( $H=10,772$ ,  $p=0.029$ ). The number of particles was only significantly different from blanks in the Library ( $H=14,588$ ,  $p<0.006$ ), presenting a total 3.1 particles hour<sup>-1</sup> with median lengths 123  $\mu\text{m}$ . **Conclusions:** Despite the decontamination procedure, blanks presented particles or artifacts which interfered with analysis. Moreover, the method requires user experience and has a wide area of analysis. The higher number of particles in the Library likely originated from foot traffic and harder to clean surfaces. Nonetheless, particles sizes found in the Library were not inhalable and do not pose a risk to health.

**Keywords:** fibers; microplastics; human health

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### References

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