

Comparison between Two Sampling Methods of Airborne Microplastic Particles

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Sampling methods of airborne microplastics (MPs) affect studies of MPs in the air. Primarily, two methods are used for sampling airborne MPs: passive (diffusive) atmospheric deposition and active pumped samplers. This study aimed to identify the most appropriate airborne microplastic sampling method by comparing these two techniques. A laboratory which is situated in the University of Kelaniya, Sri Lanka was selected as the sampling site for this study. For the passive sampling method, a dry deposition was implemented over a 14-days. This method involves allowing microplastic particles to settle naturally over time. The active sampling method involved operating an active pumped sampler for five hours on a single day, selected from the 14-day period during which the passive sampling was conducted. This method actively draws air through a filter, capturing microplastic particles rapidly. MPs collected from both methods were counted using a stereomicroscope coupled with advanced micro imaging. Results indicated that the passive sampling method achieved an average deposition rate of 1.37×10^1 number $\text{m}^{-2} \text{h}^{-1}$, while the active sampling method achieved a collection rate of 9.22×10^2 number $\text{m}^{-2} \text{h}^{-1}$. This significant difference in collection rates suggests that the active sampling method is more effective in capturing MPs in a shorter duration. When analyzing samples, it was found that the active sampling method facilitates easier analysis due to the reduced accumulation of contaminants, attributed to the shorter sampling duration. This study underscores the importance of selecting appropriate sampling methods to accurately assess MP pollution in various environments. The findings highlight the advantages of active sampling for detailed temporal studies and suggest that passive sampling can be useful for long-term deposition trends. Future research should consider these methodological differences when designing studies to monitor and assess airborne microplastic pollution.

Keywords: *active sampling, airborne microplastics, passive sampling*