

Metagenomics Composition During and After Wet Deposition and the Presence of Airborne Microplastics

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Abstract : Environmental pollution from microplastics (MPs) is an emerging concern worldwide. While the presence of microplastics has been well established in the marine and terrestrial environments, the prevalence of microplastics in the atmosphere is still poorly understood. Wet depositions such as rain or snow scavenge impurities from the atmosphere as it falls to the ground. These wet depositions serve as a useful tool in the removal of airborne particles that are suspended in the air. Therefore, the aim of this study is to investigate the presence of atmospheric microplastics and fibres through the analysis of air, rainwater and snow samples. Air samples were collected with filter-based air samplers from outdoor locations in Singapore. The sampling campaigns were conducted during and after each rain event. Rainwater samples from Singapore and Siberia were collected as well. Snow samples were also collected from Siberia as part of the ongoing study. Genomic DNA was then extracted from the samples and sequenced with shotgun metagenomics approach. qPCR analysis was conducted to quantify the total bacteria and fungi in the air, rainwater and snow samples. The results compared the bioaerosol profiles of all the samples. To observe the presence of microplastics, scanning electron microscope (SEM) was used. From the preliminary results, microplastics were detected. It can be concluded that there is a significant amount of atmospheric microplastics present, and its occurrence should be investigated in greater detail.

Keywords : atmospheric microplastics, metagenomics, scanning electron microscope, wet deposition

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