ATMOSPHERIC DEPOSITION OF MICROPLASTICS IN URBAN AND SEMI-URBAN ENVIRONMENTS: QUANTIFICATION AND CHARACTERIZATION AT PERADENIYA AND COLOMBO, SRI LANKA

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Atmospheric wet deposition has been identified as a significant but understudied pathway for microplastic transfer to terrestrial surfaces, particularly in Sri Lanka. This study quantified and characterized microplastics deposited via rainfall at two contrasting sites in Sri Lanka: *Meewathura* Experimental Station, Peradeniya and the main campus premises, University of Sri Jayewardenepura, Nugegoda, Colombo. Samples were collected biweekly for the duration of four months, using standardized rain gauges. Sample preparation involved vacuum filtration, digestion, density flotation, and fluorescence staining. Particle counting was carried out under fluorescence microscopy and analyzed using ImageJ (v.1.54f) software. Polymer identification was performed by FTIR spectroscopy. Among the ten collected samples, detectable levels of microplastics were found only in four samples, with mean deposition rates of 105 particles/m²/day in Colombo and 48 particles/m²/day in Peradeniya. Granule shaped particles were dominant among the microplastic particles collected at Colombo (42%), while fragments prevailed at Peradeniya (42%). The <20 μm size fraction was most abundant at both sites. PP, PA-6, PE, PS, PVC, PET, CA, PMMA, PC and PU polymer types were detected. No statistically significant ($p > 0.05$) difference in deposition rates was found between sites ($p = 1.000$). A direct positive correlation was observed between microplastic particle counts and the daily rainfall. These findings establish the first quantitative baseline assessment for atmospheric microplastic wet deposition in Sri Lanka, indicating that precipitation is an active transfer vector for airborne microplastics in both urban and semi-urban environments.

Keywords: atmospheric deposition, microplastics, polymer composition.

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