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Microorganisms and heavy metals associated with atmospheric deposition in a congested urban environment of a developing country: Sri Lanka

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Atmospheric deposition plays a crucial role in the cycling of pollutants, including heavy metals(HMs), bacteria, and polycyclic aromatic hydrocarbons(PAHs). While many studies have focused on HMs or bacteria individually, simultaneous investigations of both in urban atmospheric deposition remain limited. This study examined the presence of bacteria and heavy metals in atmospheric deposition in Kandy,Sri Lanka, an urban area with significant traffic congestion. Both dry and wet deposition samples were analysed for heavy metals like Al, Cr, Mn, Fe, Ni, Cu, Zn, Cd, and Pb. Their concentrations were measured using the US EPA method 200.8 and an Agilent 8800 Triple Quadrupole ICP-MS. High concentrations of Al and Fe were detected, potentially resuspended by vehicular activity. Toxic metals like Cr and Pb in dissolved forms were observed. Significant Zn levels were linked to vehicle emissions and Zn-coated roofing materials. The concentrations varied across four sampling sites, with traffic significantly influencing metal loadings. Bacterial investigations identified nine species of culturable bacteria, including opportunistic pathogens like Sphingomonas sp., Pseudomonas aeruginosa, and Klebsiella pneumonia. Pigmented and endospore-forming bacteria were abundant in atmospheric depositions, likely due to their ability to withstand harsh conditions. This study highlights the potential risks posed by harmful bacteria and heavy metals to human health and the environment.

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