

**ATMOSPHERIC POLLUTION BY MICROPLASTICS IN COLOMBO AND KANDY
URBAN ENVIRONMENTS OF SRI LANKA**

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Microplastics (MPs) have received considerable attention all over the world in the recent past since they are hazardous environmental pollutants. Even though several studies have been carried out on MPs in marine environments and inland water bodies of the world, less attention has been given to their occurrences in the atmosphere. The present study focused mainly on the characterization of MPs in the dust of Colombo and Kandy urban environments in terms of morphology and polymer chemistry. A total of 50 deposited and suspended dust samples were collected from households and roads of the municipal areas. Optical microscopic, scanning electron microscopic (SEM) and Fourier-transform infrared (FT-IR) analyses were carried out on the samples. The household dust samples showed a higher concentration of MP particles than road dust samples. Morphology of the studied MPs can be categorized into fiber, foam and fragment. Out of these morphologies, fibers are the most common fraction. SEM images of MPs in deposited dust samples showed presence of grooves, pits, adhering particles, fractures and flakes which indicate long-term exposure to the environment. In contrast, surfaces of MPs of the suspended dust do not show any degradation patterns and those are mostly fresh materials of recent derivation. Further, the fibers present in the suspended dust are shorter than those in the deposited dust samples. Therefore, it can be inferred that fibers in the suspended dust are more hazardous than fibers in the deposited dust since those can easily enter the respiratory system. High-density polyethylene, polystyrene, nylon and acrylonitrile butadiene styrene are the major polymer types found in the deposited dust. The fibers observed in the deposited dust samples may have derived from synthetic textile fibers, possibly generated due to the degradation of synthetic textile materials. The degradation patterns indicate that MPs investigated have been subjected to different levels of mechanical processes and chemical alteration. The morphology of the MPs mainly depends on the type and structure of the crystalline structure of the polymer they are made of. The high abundance of the fibers may be due to its high production rate which leads to high waste generation. Due to the high width to length ratio of the fibers, they could be transported to long distances and could deposit in remote areas. MPs can be identified as a high potential source of atmospheric pollution in urban environments which could pose a high risk to human health.

Financial assistance from the National Research Council (Grant No. AB 19-004) is acknowledged.

Keywords: Household dust, Microplastics, Road dust, Suspended dust, Urban pollution