

ASSESSMENT AND CHARACTERIZATION OF MICROPLASTICS PRESENCE IN THE LEACHATE FROM THE GOHAGODA DUMPSITE KANDY SRI LANKA

E. B. R. N. U Edirisinghe^{1*}, S. M. Young¹, I. P. L. Jayarathna²

¹*Department of Environmental Technology, Faculty of Technology, University of Colombo, Mahenwatta,
Pitipana, Homagama, Sri Lanka.*

²*National Institute of Fundamental Studies, Hantana Road, Kandy, Sri Lanka.*

**Correspondence E-mail: 2020t00728@stu.cmb.ac.lk, TP: +94778329050*

Abstract: Microplastics (MPs) have emerged as a significant global environmental threat, particularly in uncontrolled open dumpsite. This research focuses on the assessment, and characterization, of microplastics in the leachate and surrounding soil of the Gohagoda open dumpsite in Kandy, Sri Lanka. Gohagoda dumpsite is a major municipal landfill situated near to the Mahaweli River in Kandy Sri Lanka. Samples from leachate and soil were collected in six locations across three sampling rounds. Microplastics were analysed in leachate by, pre filtration, H₂O₂ digestion, final filtration, stereomicroscope and FTIR. Microplastics were analysed in soil by, density separation, H₂O₂ digestion, final filtration, stereomicroscope and FTIR. The observation of this study confirmed widespread microplastic (MP) presence in both leachate and soil. Raw leachate locations (L1, L2, L3, L6) had higher MP concentrations than treated locations (L4, L5). In 2nd sampling round, it shows higher microplastic abundances than the 1st and 3rd sampling round. Predominant MP sizes were 0.1–1 mm in leachate and 2–5 mm in soil. Fragments were common in leachate, while fibres dominated in soil, with white and transparent particles originating from package material. FTIR identified PE, PP, PET, PS, and PVC polymers. Microplastics were detected in all leachate and soil samples. Average leachate MP concentrations were 14.83 particles/L (Round 1), 14.67 particles/L (Round 2), and 13.33 particles/L (Round 3). Soil samples contained 17.67, 19.17, and 10.50 particles/50g, respectively. White and transparent particles were predominant in both matrices. The Gohagoda dumpsite is a key source of microplastic, stressing the need for better waste management, filtration, policy updates, and regular monitoring to protect the environment. It is recommended to establish runoff and leachate filtration systems to trap MPs and reduce their release into the nearby Mahaweli river.

Keywords: Microplastics; dumpsite leachate; dumpsite soil