

CHARACTERIZATION OF ORGANIC CARBON FROM GOHAGODA MUNICIPAL SOLID LANDFILL LEACHATE

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Open Dumping of Municipal Solid Waste (MSW) has become a common practice in Sri Lankan economy due to high cost involved with advanced technologies for land filling, lack of technical capacity, lack of knowhow to manage landfill sites, and so on. The open dumping of MSW creates serious environmental issues especially on water pollution due to contamination by leachate. Currently, in Kandy, daily collected Municipal Solid Waste is disposed at the Gohagoda open dump site which produces a massive bulk of leachate. Unfortunately, this leachate flow is directly run to the Mahaweli River which is the main source of drinking water in the entire city. Humic substances are the least understood component of leachate, yet one of the most important materials which may adversely affect on the environment as well as human health. Specially, the dissolved organics in water are potential of producing disinfection byproducts in the presence of sunlight with halogens and forming complexes with heavy metals. Hence this study deals with isolation, purification and characterization of dissolved organic carbon (DOC) from landfill leachate in Gohagoda, Kandy. Samples were collected from four different locations (GS1, GS2, GS3 and GS4) located along the leachate drainage channel which extends from dumpsite to the Mahaweli River. Solid content (total solids, volatile solids, total suspended solids, volatile suspended solids and total dissolved solids) of leachate, total organic carbon (TOC) and dissolved organic carbon (DOC) were analyzed in all samples once a month basis for seven months. The DOC was fractionated into humic acid (HA), fulvic acid (FA) and hydrophilic fraction (Hyd.) by membrane filtration, ultracentrifugation, and XAD 7 resin technique and further characterized based on elemental and spectroscopic level. Frequently, the characteristics of Gohagoda landfill leachate such as total solids, volatile solids, total dissolved solids, TOC and DOC are decreasing towards the downstream of the leachate drainage channel. The percentages of hydrophobic acid fractions in leachate were accounted as 21% and 17% for HA and FA respectively. Also, HA is more dominant in all carboxylic, phenols, lactones and basic groups than FA and Hyd. The spectroscopic data revealed that FA and Hyd fractions are less humified substances compared to HA.