



DI 04 Low-cost packing media for anaerobic filters to treat landfill – Leachate

Ranga U.K.S.,¹ Sajeevani H.K.M.,¹ Dayanthi W.K.C.N.²

¹Graduate, Faculty of Engineering, ²Department of Civil and Environmental Engineering, Faculty of Engineering

Anaerobic-filters are considered as an expensive leachate treatment method because of expensive packing media. Introducing low-cost packing media will make anaerobic-filters more economical. The aim of this study was to utilize low-cost materials such as coconut-coir fiber (CCF), rice-straw (RS), rice-husks (RH) and saw-chips (SC) as packing media in laboratory scale anaerobic filter columns in both up-flow and down-flow modes to treat landfill-leachate. The influent was the leachate collected from the Galle Municipal Council dump site. The experimental set-up consisted of properly sealed four columns. There were three experimental series. In all series, each column was loaded with CCF, RS, RH and SC, respectively. First and second series were conducted in down flow mode while the 3rd series was in up flow mode. The second series was conducted several days after the 1st series without unloading the columns. The durations of first, second and third series were 9, 7 and 7, respectively. The total volume of influent applied and the volume of effluent discharged every day were recorded. Based on the mass balance and removal efficiencies (75 % - 80 %), RS performed the best in removing chemical oxygen demand (COD) in the up-flow mode. The percentage removal of biochemical oxygen demand (BOD_5) lied within 70%-80% in all four media in series 2. In series 3 the removal efficiencies of BOD_5 in all media were almost equal which lied between 50%-60 %. The down-flow mode withstood higher organic loading rates and gave higher removal efficiencies for the organic matter. RH performed the best in removing total nitrogen in the up-flow mode. Its ultimate removal efficiency reached 80 %. The removal efficiency of total nitrogen in series 3 in all media increased with time, and it was greater than that of the down-flow mode.

Keywords: anaerobic filter columns, landfill-leachate, low-cost packing media, nitrogenous compounds, organic matter