



Biofilter in leachate treatment processes

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ABSTRACT

Landfill leachate is produced when rainwater infiltrates into the landfill and permeates through the decomposing waste within the landfill leaching out with it contaminants and pollutants. Untreated leachates can permeate ground water or mix with surface waters and contribute to the pollution of soil, ground water and surface water. In this study, biofilter was evaluated in treating synthetic landfill leachate. The total organic carbon (TOC) removal efficiency (of landfill leachate) was evaluated by sequential adsorption/biosorption (on granular activated carbon [GAC]). Experiments were conducted at high velocity (2m/h) and at low velocity (0.2m/h) to simulate *ex-situ* and *in situ* biofilter treatment respectively. GAC biofiltration led to a consistent TOC removal even after a long period of operation without the need to regenerate the activated carbon. Even after 15 days of continuous running, the effluent from the GAC biofilter was approximately 60% of the influent quality (i.e. 40% removal). A mathematical model was developed to simulate the organic removal efficiency of the GAC biofiltration system. In this simulation model, the performance can be described in two stages: adsorption during the initial stage and biodegradation in the latter stage. The biofiltration process was modelled and compared with the experimental data.

Keywords: Landfill leachate; Biofilters; Adsorption; Modelling

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