

INVESTIGATION OF LANDFILL LEACHATE TREATMENT FOR SELECTED POLLUTANT PARAMETERS BY COAGULATION AND FLOCCULATION

G.A.S.S. Jayathilaka and C.S. Kalpage

Department of Chemical and Process Engineering, University of Peradeniya, Peradeniya, Sri Lanka

Corresponding author: sudesh_jayathilaka@yahoo.com

Municipal solid waste management is one of the critical issues faced by all developing countries including Sri Lanka. Open dumping of non-segregated solid waste is commonly practiced in many such countries due to numerous limitations. One of the main outcomes due to open dumping is generation of leachate which contains number of contaminants such as Nitrogen, Organic and Inorganic Carbon, heavy metals, colloids, suspended and dissolved solids etc. Open dumps do not have leachate collection and treatment systems, hence highly polluted leachate is naturally gravitated and contaminates the natural water bodies which could pose serious threats to all living organisms. In the present study the removal of turbidity, colour, total nitrogen (TN), total organic carbon (TOC) and total inorganic carbon (TIC) of leachate collected from Gohagoda open dump in Katugasthota area which is maintained by Kandy Municipal Council was investigated. Commercially available alum ($KAl(SO_4)_2 \cdot 12H_2O$) was used as a coagulant. Experiment conducted with the aid of jar test apparatus revealed that all above parameters can be successfully removed by coagulation and flocculation and further, it showed that the initial pH of leachate can greatly alter the treatment efficiency. The best turbidity removal efficiency of 85% was achieved with 15.2 g/l alum dosage for leachate having an initial turbidity of 180 NTU at an initial pH of 8. This study further showed that the optimum removal efficiencies of colour, TOC and TIC are more than 88, 53 and 64 % respectively. Optimum alum dosage and best pH varied significantly for each constituent. But considering the overall results exposed throughout the research indicate that coagulation and flocculation is an effective treatment method to remove above pollutants.

Keywords: Alum, Coagulation and flocculation, Jar test apparatus, Leachate, Municipal solid waste