Optimization of Landfill Leachate Treatment Process by Electrocoagulation, Electroflotation and Sedimentation Sequential Method

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This work is dealing with the performance of a sequential Electrocoagulation (EC), Electroflotation (EF), and sedimentation method for the treatment of landfill leachate of Gachsaran city. Effective parameters on the EC process such as electrode type, electrode distance, voltage, process time, and effect of pH have been investigated. Various water treatment criteria such as Chemical Oxygen Demand (COD), Total Suspended Solid (TSS), Oil and Grease (O&G) and turbidity were used to assess process efficiency. Also removal of Total Kjeldahl Nitrogen (TKN) and phosphorus was surveyed as nutrient pollutant criteria. Finally removal of Pb and Cr as typical heavy metals was assessed. Generally, using iron electrode as anode at the optimum condition of pH=8, Voltage = 40 V, Electrode Distance = 2 cm, and contact time of 90 min, the removal efficiency of COD, TSS, O&G, Turbidity, TKN, total phosphorus, Cr, and Pb were obtained 86.9%, 88.7%, 90.2, 93.7%, 81.8%, 90.3%, 70%, and 66% respectively. The results show that this technique is a promising method for treatment of the landfill leachate.

Keywords: landfill leachate treatment; Electrocoagulation; Electroflotation; Sedimentation; nutrient removal; heavy metals removal.

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