Removal of Landfill Leachate's Organic load by modified Electro-Fenton process

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The leachate of landfill is a potential pollutant source containing a high rate of non- biodegradable pollutants and organic resistant material. The aim of this study was to evaluate the effects of the various operating parameters such as treatment time, current voltage (potential difference), distance between the electrodes, electrode material, initial pH value of the solution, initial concentration of hydrogen peroxide (H_2O_2), and the determination of optimal range by the Electro-Fenton (E-Fenton) process to remove refractory organic material from the landfill leachate. The treatment process was evaluated in a discontinuous reactor made up of a Plexiglas tank with the dimensions 20 cm × 16 cm × 10 cm, and an effective volume of 1 l. The highest removal efficiencies of the Chemical Oxygen Demand (COD), ammonia nitrogen (NH₃-N), phosphate, and turbidity were 85%, 30.9%, 78.2%, and 56.2%, respectively, under optimal operating conditions; these efficiencies were achieved in a duration of 30 minutes, a current voltage of 30 V, a distance of 3 cm between the electrodes, an initial pH value of 3.5 by the iron electrode, and the addition of hydrogen peroxide in a single step with a concentration of 15 mg/l. The results showed that the E-Fenton process, as a flexible technology, could be used for the treatment and the mineralization of landfill leachate with a high concentration of the pollutant.

Keywords: Current voltage, Electro-Fenton, Electrode, Turbidity

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