

[Comparison of granular activated carbon bio-sorption and advanced oxidation processes in the treatment of leachate effluent](#)

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Abstract:

Landfill leachate is a toxic effluent of a decomposing landfill that is produced when rainwater percolates through the landfill leaching out contaminants and pollutants. Untreated leachate is a potential source for the contamination of soil, surface and ground water. In this study, the treatment processes such as granular activated carbon (GAC) adsorption/bio-sorption (batch), and advanced oxidation processes (AOP) viz. photocatalysis and Fenton's process were evaluated and compared by using synthetic landfill leachate (SLL) as a contaminant. TiO₂ was used as a catalyst in photocatalysis, and Fenton's reagent (H₂O₂/Fe⁽⁺²⁾) was used in Fenton's process. The degradation of SLL effluent by the three above-mentioned processes was characterized by the % TOC removal. The % TOC removed by photocatalysis, Fenton oxidation and bio-sorption (which includes adsorption and biodegradation) was 30, 60 and 85%, respectively. The bio-sorption increased with the increasing GAC dose. The optimum dose of Fenton's reagent in advanced oxidation was 15 and 400 milli moles of Fe⁽⁺²⁾ and H₂O₂, respectively. The Fenton's process showed faster degradation kinetics compared to biodegradation and photocatalysis.

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