

Treatment of stabilized landfill leachate using coupled Fenton-like and adsorption process onto Moroccan bentonite clay

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ABSTRACT

The present study aims to explore the feasibility to apply a sequential process combining Fenton-like and adsorption onto local Moroccan bentonite clay for the treatment of the stabilized landfill leachate of Fez City (Morocco). The stabilized landfill leachate was firstly treated using a homogeneous Fenton-like (FL) process using FeCl_3 as a catalyst source. The pretreatment of landfill leachate using the FL process was performed under the optimal conditions: $[\text{Fe}^{3+}] = 250 \text{ mg L}^{-1}$, $[\text{H}_2\text{O}_2] = 1,000 \text{ mg L}^{-1}$, $\text{pH} = 3$, and contact time = 30 min, then the pretreated and neutralized leachate was treated by adsorption process on natural bentonite clay using the optimal mass 5 g L^{-1} and $\text{pH} = 7$. The experimental data of adsorption kinetic were well fitted to the pseudo-second-order model, while the isotherms data were in good correlation with the Langmuir model. The Fenton-like process reduced the chemical oxidation demand (COD) by 72% and the adsorption process enhanced further the COD removal efficiency to 85%. These findings represent a further contribution towards developing a promising technology for landfill leachate treatment.

Keywords: Landfill leachate; Fenton-like; Advanced oxidation processes; Chemical oxidation demand removal; Adsorption; Natural bentonite

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