Elimination of organic pollutants from wastewater. Application to p-nitrophenol

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ABSTRACT

The present study concerns the elimination of a phenolic compound such as p-nitrophenol from aqueous solutions, by adsorption onto sawdust. These compounds are recognized as organic pollutants because of their high toxicity and possible accumulation in the environment. The effects of various operating parameters such as the pH of the solution, the contact time, the initial concentration and the adsorbent dose, on the adsorption of p-nitrophenol, were investigated. The experimentally determined adsorption equilibrium data for p-nitrophenol was best fitted by the Freundlich isotherm model. The p-nitrophenol adsorption rate followed a pseudo-second-order kinetics. A competitive adsorption involving p-nitrophenol, o-chlorophenol and phenol was also considered and the maximum adsorption capacity varied in an increasing order as p-nitrophenol > o-chlorophenol > phenol. Finally this study showed that sawdust can be regarded as an interesting adsorbent for the elimination of organic pollutants such as aromatic compounds which are usually encountered in many industrial wastewater effluents.

Keywords: Sawdust; Phenols; p-nitrophenol; Adsorption; Retention; Freundlich

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