



RESPONSE SURFACE METHODOLOGY FOR OPTIMIZATION OF LANDFILL LEACHATE TREATMENT USING ION EXCHANGE RESINS

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Abstract

In this paper is presented the response surface modeling and optimization concerning the removal of several heavy metal ions from leachate, using a mixture of anionic and cationic exchange resins. Taking into consideration that the ions most frequently found in appreciable concentrations in leachate are represented by chromium, copper, lead, nickel and cadmium, their residual concentrations were chosen as responses, while resin dose, leachate dilution and pH value were selected as independent variables. As optimization criteria, the leachate removal efficiency has been selected. This was calculated based on the residual concentration of each heavy metal ion. Thus, the resin dose (g/L), leachate concentration (mg/L) and leachate pH have been considered as independent variables. The elaboration of the empirical mathematical model of the investigated process consisted in establishing the correlation between the removal efficiency and the already mentioned influence factors. A resin dose of 0.5 g/L, a leachate dilution of 0.125 and a pH value of 5.8 were the optimal operational conditions established by means of the response surface methodology and considered optimization methods.

Key words: heavy metal ions, ion exchange resin, leachate, sorption, wastewater treatment

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