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A modeling study by artificial neural network on ethidium bromide adsorption optimization using natural pumice and iron-coated pumice

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ABSTRACT

In this study, the potential of natural pumice (NP) and iron-coated pumice stone (Fe-CP) as novel low-cost adsorbents to remove ethidium bromide (EtBr) from aqueous solutions was investigated. The operational parameters affecting removal efficiency and adsorption capacity such as adsorbent dose, initial EtBr concentration, pH, and contact time were studied in order to maximize EtBr removal. The maximum amount of adsorbed EtBr (q_m) using NP and Fe-CP was 40.25 and 45.08 mg g^{-1}, respectively. It was found that EtBr adsorption followed the Freundlich isotherm model and fitted the pseudo-second-order kinetics equation for both adsorbents. In addition, the experimental system could be easily modeled by artificial neural network calculations.

Keywords: Artificial neural network (ANN); Ethidium bromide (Etbr); Pumice; Iron-coated pumice; Adsorption isotherms; Kinetics studies

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