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Optimization of the process parameters for the removal of phosphate from drinking water by electrocoagulation

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ABSTRACT

The present studies provide the purification of drinking water containing phosphate by electrocoagulation process using zinc as the anode and stainless steel as the cathode. The experimental parameters like electrolyte pH, temperature and current density, and so forth, on the removal efficiency of phosphate were carried out. The adsorption capacity was evaluated using both Langmuir and Freundlich isotherm models. The kinetic studies show that the adsorption obeys second-order kinetics. The maximum removal efficiency of 98.8% was achieved at a current density of 0.05 A/dm^2, at a pH of 7.0. Thermodynamic parameters were evaluated. Overall adsorption process was endothermic and spontaneous. The adsorption of phosphate preferably fitting the Langmuir adsorption isotherm suggests monolayer coverage of adsorbed molecules.

Keywords: Electrocoagulation; Phosphate; Removal; Adsorption; Kinetics; Isotherms

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