



## The performance of Defatted Jojoba Seeds for the removal of toxic high concentration of the aqueous ferric ion

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### ABSTRACT

This study has focused on the performance of Defatted Jojoba Seeds (DJS) for the removal of ferric ( $\text{Fe}^{3+}$ ) ion from the aquatic systems using a batch operation system. Equilibrium of sorption has been implemented through the influence of ferric ion initial concentration, the dosage amount of DJS, and temperature. The maximum removal of ferric ion was 96% (approx.) by using a high-level concentration of ferric ion ( $400 \text{ mg L}^{-1}$ ) and high dosage amount of DJS ( $60 \text{ g L}^{-1}$ ). Freundlich model has successfully analyzed the equilibrium of isotherms with  $R^2 = 1$ . Negative thermodynamic parameter  $\Delta G$  ( $= -12.954 \text{ kJ mol}^{-1}$ ) indicates to the spontaneous process. Adsorption reaction kinetic models, such as pseudo-first-order and pseudo-second-order, and adsorption diffusion model, such as Weber-Morris intra-particle diffusion model, have been used to describe the adsorption rate and mechanism of the ferric ion onto the DJS surface. Adsorption of ferric ion on the DJS has achieved Lagergren pseudo-second-order model ( $R^2 = 1.0$  approx.) more than Lagergren pseudo-first-order model. The kinetic parameters, rate constant, and sorption capacities have been calculated.

*Keywords:* Ferric; Jojoba; Dynamic isotherm; Freundlich isotherm; Pseudo-second-order

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