

Kinetic, equilibrium and thermodynamic studies for adsorption of nickel ions onto husk of *Oryza sativa*

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ABSTRACT

This research focus onto batch adsorption of nickel ions (Ni(II)) onto husk of *Oryza sativa* (HOS) from aqueous solution at room temperature. Several techniques such as Fourier transform infrared, scanning electron microscopy and energy dispersive X-ray were employed to confirm adsorption of Ni(II) onto HOS. The effect of operational parameters such as contact time, amount of adsorbent, initial concentration of metal ions, temperature and pH on the percentage removal of Ni(II) was evaluated. The removal of Ni(II) was 62.32% under optimum amount of adsorbent (0.3 g) at room temperature. Adsorption kinetics study has exhibited that experimental data fitted-well to pseudo-second-order kinetic model. Linear and nonlinear forms of Langmuir, Freundlich and Dubinin-Radushkevich isotherms were used to analyse experimental data and results showed that adsorption data fitted well to nonlinear and linear form of adsorption isotherms. Adsorption thermodynamic study has indicated that adsorption of Ni(II) onto HOS was an endothermic and spontaneous process.

Keywords: Nickel ions; Adsorption; Husk of *Oryza sativa*; Isotherms; Thermodynamics

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