



Using *Imperata cylindrica* as Natural Low-Cost Biosorbent for Rapid and Efficient Removal of Zinc(II) Ions from Aqueous Solutions

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Abstract: Zinc in lower quantities is considered as toxic affecting on the human health. The *Imperata cylindrica* was collected from the farmland abandoned as agricultural waste as an adsorbent to Zinc(II) ions adsorption from aqueous solution by utilizing Fourier transforms infrared spectroscopy, EDX spectra and electron microscopic scanning (SEM) of *cylindrica*. Simulating aqueous solution was used in batch experiments, the tests completed in ideal statuses of pH, initial Zinc (II) ions concentration, contact time and adsorbent dosage. The Langmuir, Freundlich, Temkin and Harkins-Henderson isotherm models were tested and isotherm models constants (which represented the adsorption efficiency) were 0.99, 0.95, 0.92 and 0.94, respectively. The Langmuir model was more suitable for describing the adsorption process than the other models. The kinetics results were, 0.989 for Pseudo-first-order, 0.947 for Pseudo-second order, 0.969 for Intra particle diffusion study and 0.905 for the Elovich model. Pseudo-first-order kinetic equation best described the kinetics of the reaction. The thermodynamics study affect temperature changes on the parameters of thermodynamic like change in free energy (ΔG°), enthalpy (ΔH°) and n entropy (ΔS°). The study indicates that *Imperata cylindrica* is an appropriate adsorbent to rid Zinc ions from wastewater.

Keywords: Adsorption, *Imperata Cylindrica*, Isotherm, Kinetics, Thermodynamic, Zinc(II) ions
