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ADSORPTION PERFORMANCE EVALUATION FOR MALACHITE GREEN USING PINE NUT (PINUS PINEA) SHELLS AS AN AGRICULTURAL WASTE

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Abstract

In this study, the adsorption of malachite green (MG) from synthetic wastewater using pine nut shells which is nature-friendly and economical material as an adsorbent was investigated. The maximum MG adsorption capacities of pine nut (Pinus pinea) shells were calculated 25.641 mg/g at pH 10. SEM images showed significant porosity and confirmed the adsorption of malachite green on the surface. After adsorption, sem results show that the surface of pine nut shells as an adsorbent was covered by MG molecules. The effect of adsorption parameters, initial dye concentration, thermodynamic parameters and pH were calculated. Also, The Langmuir isotherm was better fitted to the equilibrium data, and the pseudo-second-order model was better suited to describe the kinetics. The Gibbs free energy change value is 6.041 Kj/mol (298 K). Hence it is shown that pine nut shells could be used as an eco-friendly, economical and promising adsorbent for MG from synthetic wastewater.

Key words: adsorption, agricultural waste, isotherm, malachite green, SEM

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