KINETIC STUDIES ON THE BIOSORPTION OF ACID ORANGE 7 ONTO WASTE BIOMASS OF *Phaseolus vulgaris* L.

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Abstract. *The goal of this study was to evaluate the biosorption capacity of biomass of Phaseolus vulgaris L., as an effective material for the biosorption of organic azo dye Acid Orange 7 (AO7). The biosorption properties of the biomass were explored as a function of batch operating conditions including contact time, initial pollutant concentration and biomass dosage. The Phaseolus vulgaris L. hull were characterized using Fourier Transform Infrared spectroscopy (FTIR) and Scanning Electron Microscopy (SEM) coupled with Energy Dispersive Spectroscopy (EDX) analysis. Acid orange 7 was selected as a model pollutant due to its extensive use in textile and cosmetic industry. The obtained results show that the amount of dye uptake was found to increase with the increase of contact time and initial dye concentration. The maximum sorption capacity was 0.827 mg g-1 for AO7 at 20°C. The removal efficiency of AO7 is increasing with the increase on sorbent dose, in the range of studied concentration. Kinetic analysis of the biosorption process was performed, the experimental results were analyzed using pseudo-I order kinetic model, pseudo-II order kinetic model, Ritchie's second-order, Elovich and intraparticle diffusion equations. Results show that the pseudo II-order kinetic model agrees very well with the dynamic behavior of the biosorption of AO7 onto Phaseolus vulgaris L. hull. The experimental biosorption results indicated that agricultural waste of bean hull can be an alternative and cheaper biosorbent used for dye removal from industrial effluents.*

Keywords: agricultural waste, biosorption, dye, kinetic modelling, low-cost sorbent

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