



Direct blue 71 dye removal probing by potato peel-based sorbent: applications of artificial intelligent systems

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ABSTRACT

In this study, the direct blue 71 (DB71) removal efficiency from aqueous solutions by potato peel-based sorbent was examined. Furthermore, influences of five operating parameters including initial pH, sorbent particle size, dose of sorbent, initial dye concentration, and contact time were studied. The Taguchi approach was used to design of experiments. The experiments were performed in a 200-mL batch reactor. Maximum DR% was 90% (448 mg/gr sorption capacity) in initial pH 3, sorbent particle size 225 μm , dose of sorbent 20 g/L, initial dye concentration 100 mg/L, and contact time 10 min. Also, maximum sorption capacity was 1,704 mg/g (85% dye removal) in initial pH 3, sorbent particle size 575 μm , dose of sorbent 5 g/L, initial dye concentration 100 mg/L, and contact time 150 min. The results revealed that the potato peel-based sorbent is promising for the sorption of DB71. After collecting data-set of DR%, artificial neural network (ANN) and genetic algorithm were applied for modeling and optimization of sorption efficiency. The R^2 and root mean square error of the test set were 0.99 and 3.4 for ANN model.

Keywords: Sorption; Potato peels; Design of experiment; Artificial neural networks; Genetic algorithm; Dye removal; Direct blue 71

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