



Full factorial experimental design applied to methylene blue adsorption onto Alfa stems

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ABSTRACT

Full factorial experimental design technique was used to study the main effects and interactions between operational parameters in batch adsorption of methylene blue (MB) using Alfa stems as adsorbent. The important parameters which affect MB removal efficiency and adsorption amount, such as initial concentration, particle size, solution pH, and contact time, were investigated. One set of full 2^4 factorial designs with two central points (18 experiments) was tested. The effects of individual variables and their interactions were observed on adsorbed MB amount q_t (mg/g). From statistical analysis, the most effective parameters of adsorbed MB amount were initial concentration and solution pH. The interaction between initial concentration and solution pH was the most important factor. The maximum quantity retained was 25.89 mg/g; it was obtained with an initial concentration of 100 mg/L, adsorbent dose of 4 g/L, granulometry of [0.50–0.63 mm], and pH of the solution 12, with a stirring velocity of 500 rpm for 120 min.

Keywords: Alfa; Adsorption; Full factorial design; Methylene blue; Dye; Water treatment

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