

Adsorption of Basic Violet 16 dye from aqueous solution onto mucilaginous seeds of *Salvia sclarea*: kinetics and isotherms studies

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ABSTRACT

The *Salvia sclarea* seeds (SSS) were used as adsorbent for the removal of Basic Violet 16 (BV 16) dye from aqueous solutions. The structure and surface characteristics of the SSS were investigated by field emission scanning electron microscopy, Fourier transform infrared spectroscopy, Brunauer–Emmett–Teller and pH point of zero charge (pH_{pzc}) procedures. The effect of SSS dosage, pH of the solution, contact time and initial concentration of BV 16 dye on its removal was elucidated. The experimental data were analyzed by the Langmuir, Freundlich and Temkin isotherm models. The adsorption isotherm data were fitted well to Langmuir isotherm and the monolayer adsorption capacity was found to be 19.80 mg/g. The kinetic data obtained at different concentrations have been analyzed using a pseudo-first-order, pseudo-second-order equation. The kinetic studies showed that the pseudo-second-order kinetic model better described the adsorption of BV 16 dye onto the SSS. The findings reveal the feasibility of the SSS to be used as a potential and low-cost adsorbent in water and wastewater industry for the removal of various pollutants, more specifically cationic dyes.

Keywords: Adsorption; *Salvia sclarea* seeds; Basic Violet 16; Isotherm; Kinetics

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