

## Box–Behnken experimental design for the optimization of Basic Violet 03 dye removal by groundnut shell derived biochar

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### ABSTRACT

The current experimental work was designed to explore the maximum biosorption efficiency of biochar derived from agricultural waste groundnut shell (GnSB) for the removal of Basic Violet 03 (BV03) dye from aqueous solution. To validate and optimize interactions among different parameters (pH, biochar dosage, temperature, initial dye concentration and contact time) for the removal of BV03 in aqueous solution, the Box–Behnken design (BBD) model of response surface methodology was employed. Forty-six base run was carried out with six center points. The values of *F* and *P* obtained from this design revealed that the BBD model was suitable for analyzing the effects of interaction among different parameters. Pareto analysis has been used to found the most influential process condition as biochar dose. The optimum conditions were found to be 42°C of temperature, 6 g L<sup>-1</sup> of biochar dosage, 60 min of contact time at a concentration of 50 mg L<sup>-1</sup> and pH 7. The study confirms that 96.56% of dye removal was obtained in the optimized condition.

*Keywords:* Biochar; Groundnut; Basic Violet 03; Response surface methodology

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