Biosorption of bemacid red dye by brewery waste using single and poly-parametric study

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A B S T R A C T

Brewery waste is used as a low-cost adsorbent to remove the BemacidRed dye. Effect of parameters: pH solution, initial dye concentration, adsorbent mass and contact time on the dye removal are determined by single parametric kinetic study. Two type forms of equilibrium isotherm are tested Langmuir and Freundlich models. The best fit of equilibrium data with maximum amount removal of 142 mg/g (pH = 2, contact time = 60 min, adsorbent mass = 50 mg) is provided by Langmuir isotherm. The poly-parametric study using the complete factorial design approach is performed. Residual analysis was used to confirm the validity of the linear model with first order interaction obtained by the poly-parametric method. It was observed that the initial pH have an important negative effect equal to –14 on Bemacid Red dye elimination. In contrast, the initial dye concentration has positive effect equal to +11. Furthermore, the results of the poly-parametric study are consistent and significant compared to the results of single-parametric study with a reduced number of experiments. These conclusions available to consider that the brewery waste can be successfully applied for the Bemacid Red dye removal.

Keywords: Bemacid Red dye; Brewery waste biosorption; Full factorial design; Isotherm

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