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A NEW ADSORBENT FROM AVOCADO LEAVES: PRODUCTION, CHARACTERIZATION, AND OPTIMIZATION OF ITS USE

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Abstract

A new biomass-based adsorbent was produced using avocado (*Persea americana Mill.*) leaves by physical activation. The adsorbent was characterized, and its efficiency was evaluated in removing Levafix Brilliant Red E-4BA and Remazol Black B dyes from synthetic textile wastewater. A central composite rotatable design (CCRD) with the response surface methodology (RSM) was used to obtain the best response for color removal by evaluating two adsorption parameters: agitation speed (0 – 200 rpm) and adsorbent dosage (5 – 10 g L^{-1}). The new adsorbent presented a specific surface area of 365 m^2 g^{-1}, a carbon content of 76%, and a point of zero charge of 9.49. The maximum decolorization efficiency (>98%) was found using an adsorbent dosage of 7.5 g L^{-1}, and an agitation speed of 100 rpm. The experimental results of dyes removal followed a pseudo-second-order kinetic model (R^2 = 0.999), representing chemical adsorption. The adsorbent led to decolorization efficiencies that placed the treated effluent under the limit of the color parameter of the local legislation after 10 minutes. The results indicated the potential to use the material for color removal as an alternative adsorbent.

Key words: biomass-based adsorbent, dye removal, *Persea americana Mill.*, response surface methodology

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