

The removal of basic and reactive dyes using quarternised sugar cane bagasse

Abstract

Sugar cane bagasse, an agricultural by-product, acts as an effective sorbent for the removal of both basic and reactive dyes from aqueous solution after modification by the quarternisation method. Batch adsorption studies were investigated for the removal of Basic Blue 3 (BB3) and Reactive Orange 16 (RO16). The sorption of dye solutions was strongly affected by the pH and the optimum pH is in the range of 6–8. The kinetics of dye sorption processes fit a pseudo-second order kinetic model. The adsorption isotherms fitted well into both the Langmuir and Freundlich equations. Results indicated that according to the Langmuir isotherm, the maximum sorption capacities are 37.59 and 34.48 mg g⁻¹ for BB3 and RO16, respectively. The effects of agitation rate, temperature, and sorbent dosage on the dye sorptions were investigated.

Keyword: Sugar cane bagasse; Quarternisation; Sorption; Reactive dyes; Basic dyes