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ADSORPTION KINETICS OF REMOVAL OF YELLOW LANASOL DYESTUFF USING GALLINACEOUS FEATHERS

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Abstract

Gallinaceous feathers are an abundant solid waste from the poultry processing industries, which poses disposal problems. A kinetic study dealing with the adsorption process of wool reactive dye, Yellow Lanazol 4G (CI Reactive Yellow 39), on gallinaceous (*Gallus gallus*, Cobb 500) feathers was carried out. The main research goals of this work were to evaluate the viability of using this waste as adsorbent and to study the kinetics of the adsorption process, using a synthetic effluent. The characterization of feathers was performed by scanning electron microscopy, mercury porosimetry and B.E.T. method. The study of several factors (stirring, particles size, initial dye concentration and temperature) showed their influence over the adsorption process. An adapted version of the Schumckler and Goldstein's unreacted core model fitted the experimental data. The best fit was obtained when the rate-limiting step was the diffusion through the reacted layer, which was expected considering the size of the dyestuff molecules. The comparison with the granular activated carbon (GAC) Sutcliffe GAC 10-30 indicate that in spite of the high adsorption capacities shown by feathers the GAC presented higher values, the values obtained were respectively 150 and 219 mg g⁻¹, for an initial concentration of 500 mg L⁻¹. The results obtained might open future perspectives both to the valorization of feathers and to the economical treatment of textile wastewaters.

Key words: adsorption, feathers, kinetics, textile wastewaters, reactive dyes

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