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"Gheorghe Asachi" Technical University of Iasi, Romania

CONGO RED REMOVAL FROM AQUEOUS EFFLUENTS BY ADSORPTION ON CHERRY STONES ACTIVATED CARBON

Cristina-Gabriela Grigoraș[1], Andrei-Ionuț Simion[1], Lidia Favier[2], Lucian Gavrilă[1]*

[1] "Vasile Alecsandri" University of Bacău, Faculty of Engineering, Department of Food and Chemical Engineering, Calea Mărășești 157, 600115, Bacău, România
[2]University Rennes, Ecole Nationale Supérieure de Chimie de Rennes, CNRS, UMR 6226; 11 Allée de Beaulieu, CS 50837, 35708 Rennes Cedex 7, France

Abstract

Soluble dyes are intensively used in various industrial activities. They represent an important class of water pollutants from which they are rather difficult to remove. This paper focusses on the elimination of Congo Red (CR) ionic azo dye by adsorption on a low cost material. Cherry stones were used for activated carbon preparation by carbonization method. A temperature of 600 °C and a time of 4 h were found as adequate parameters for the physical activation and led to a final white powder with fine particles. The obtained product was put in contact with CR aqueous solutions having concentrations ranging between 200 mg/L and 1000 mg/L and pH values between 2 and 12 and the mixtures were magnetically agitated for periods of 10 to 180 minutes. The best results were recorded at acidic and neutral pH where the CR removal percentage was over 99 % while in alkaline environment the adsorption was negligible. The applied tests revealed that the process is well described by a pseudo-second-order kinetic model (with correlation coefficients close or equal to unity) and that Freundlich isotherm is suitable to insure a very good fit with the experimental data (with correlation coefficients values higher than 0.99).
The acquired results proved that cherry stones (a rarely used waste from food industry) can constitute an interesting and adequate alternative for manufacturing inexpensive materials possessing adsorption properties with high capacity for dye removal from aqueous solutions.

Key words: adsorption kinetics, cherry stones activated carbon, Congo Red dye, Freundlich isotherm

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* Author to whom all correspondence should be addressed: e-mail: lgavrila@ub.ro