

ADSORPTION OF REACTIVE BLUE 19 DYE ON MAGNETIC CHITOSAN MICROPARTICLES

Alina Ibanescu^a, Marcel Ionel Popa^a, Doina Hritcu^a, Ovidiu Chiscan^b

^aFaculty of Chemical Engineering and Environmental Protection,
“Gheorghe Asachi” Technical University of Iasi, 73, Bd. Prof. dr. docent Dimitrie
Mangeron, 700050, Iasi, Romania

^bDepartment of Physics, “Alexandru Ioan Cuza” University, 11, Carol I Bd.,
700506, Iasi, Romania

A relatively simple method to produce magnetite/chitosan composite (MCC) microparticles has been previously developed by our team [1] and the novel material has demonstrated superior adsorption properties towards some heavy metal ions compared to similar products described in the literature [2, 3, 4]. In this study, their applicability as non-expensive, environmentally friendly adsorbents for synthetic textile dye RB 19 (Reactive Blue 19) removal from simulated waste water was evaluated.

The MCC microparticles were prepared by an in-situ procedure. The magnetic material was produced by oxidation of ferrous ions incorporated in a chitosan-Fe(II) complex, using nitrate ions as a mild oxidizing agent, under alkaline conditions. The chitosan matrix was then crosslinked by addition of glutaraldehyde. Batch adsorption tests showed that the extent of RB 19 adsorption was dependent on dye concentration, adsorbent concentration, contact time, pH and temperature. The adsorption isotherms were analyzed using the Langmuir, Freundlich and Dubinin–Radushkevich models. The adsorption kinetics was tested for the pseudo-first order and pseudo-second order kinetic models.

ACKNOWLEDGEMENT: This work was supported by a grant of the Romanian National Authority for Scientific Research and Innovation CNCS/CCDI-UEFISCDI PN-III-P2-2.1-PED-2016-0456, within PNCDI III.

[1] Polymer Bulletin, 67(1), 177-186 (2011)

[2] Carbohydrate Polymers 87, 1185-1191 (2012)

[3] Chemical Engineering Journal 203, 130-141 (2012)

[4] International Review of Chemical Engineering (I.RE.C.H.E.), Vol. 4, N. 3