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ADSORPTION BEHAVIOR OF CHITOSAN-MWCNTs NANOCOMPOSITE FOR THE ELIMINATION OF OFLOXACIN MEDICATION

Zainab Jasim Khudair [a] and Zeina Mohammad Kadam [b*]

[a] *Department of Science, College of Basic Education, Al-Muthanna University, Al-Qishla str., Samawah, 66001, Iraq*
[b] *Department of Chemistry, College of Science, Al-Qadisiyah University, Um-Alkhail str., Diwaniyah, 58001, Iraq*
[*] *e-mail: zeina.m.kadam@qu.edu.iq*

Abstract. A nanocomposite of chitosan and poly acrylic acid grafting multi-walled carbon nanotubes p(CS-co-AA)/MWCNTs was produced using free radical polymerization to study its efficiency in eliminating the antibiotic ofloxacin (OFL) from aqueous solutions. The synthesized nanocomposite material has undergone characterization using FTIR, XRD, FESEM, TEM, EDX, and Zeta potential techniques. The adsorption of OFL on the p(CS-co-AA)/MWCNTs has been evaluated using three established Langmuir, Freundlich, and Temkin isotherm models. The isotherm constant (*KF*) of 0.218 and the separation factor (R^2) of 0.956 indicate strong and desirable adsorption of OFL on p(CS-co-AA)/MWCNTs with a concentration of 100 mg/L at a temperature of 293K and an acidic medium with a pH of 7.0. The primary cause of the reduction in OFL adsorption and dehydrogenation is the increase in pH level. The Van't Hoff equation indicates that the OFL adsorption process exhibits fast kinetics, as seen by a negative thermodynamic parameter ΔH of -0.012 kJ/mol. The pseudo-second-order kinetic model (R^2= 1.00) confirms this observation. The results indicate that the synthesized nanocomposite can effectively remove OFL from polluted aqueous solutions.

Keywords: multi-walled carbon nanotubes, chitosan nanocomposite, ofloxacin drug, adsorption, thermodynamic.

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