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## SORPTIVE REMOVAL OF GATIFLOXACIN FROM SYNTHETIC WASTEWATER USING CHITIN: AN EQUILIBRIUM STUDY

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### Abstract

In this study, chitin (CT) has been used as a potential sorbent for the removal of antibiotic drug Gatifloxacin (GF) from aqueous solutions using batch experiments. The equilibrium drug uptake was studied as a function of sorbent dose, pH of sorbate solution and temperature. The experimental data was analyzed using Langmuir, Freundlich and Temkin isotherm models. It was found that to some extent, all the models showed their suitability. The equilibrium sorption capacity obtained at 18, 28 and 37 °C was  $97.108 \pm 2.35$ ,  $100.0 \pm 3.23$  and  $181.818 \pm 5.58$  mg g<sup>-1</sup> respectively. The optimum uptake was found to be in the drug solution with pH value of nearly 6.0. The thermodynamic parameters, free energy change ( $\Delta G_{sorp}^{\circ}$ ), change in enthalpy ( $\Delta H^{\circ}$ ) and change in entropy ( $\Delta S^{\circ}$ ) of sorption, were evaluated using equilibrium uptake data obtained at three temperatures.  $\Delta G_{sorp}^{\circ}$  was calculated from Langmuir, Frumkin and modified Frumkin models. The negative value of  $\Delta G_{sorp}^{\circ}$  and positive  $\Delta H^{\circ}$  indicated that drug uptake process was spontaneous and endothermic in nature respectively. The mean sorption energy  $E$ , as determined using Dubinin-Radushkevich (D-R) isotherm model, was found to be  $7.424 \pm 0.03$  kJ mol<sup>-1</sup> thus, indicating physical sorption process. Finally, the sorption of drug was also confirmed by antimicrobial test.

*Key words:* chitin, gatifloxacin, isotherm, sorption

*Received:* December 2010; *Revised final:* August, 2011; *Accepted:* August, 2011

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