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Synthesis and characterization of Fe^0@chitosan/cellulose biocompatible composite from natural resources as advanced carrier for Ibuprofen drug; reaction kinetics and equilibrium

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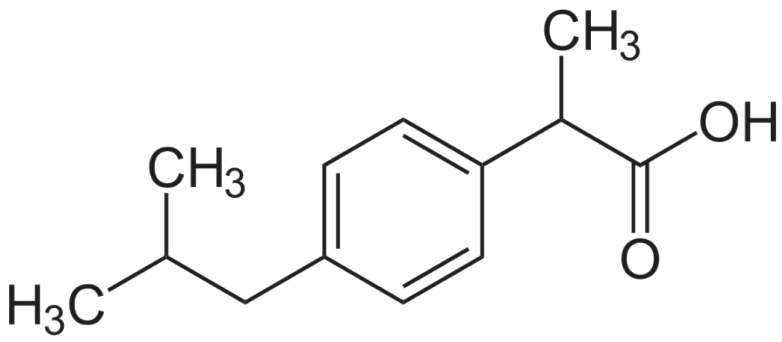

Fig.S1. chemical structure of the used Ibuprofen drug

Table S1. The representative equations of the studied kinetic and isotherm models in their linear and nonlinear forms

Kinetic models		
Model	**Linear equation**	**Parameters**
Pseudo-first-order	$q_t = q_e\,(1 - e^{-k_1 \cdot t})$	q_t (mg g^{-1}) is the adsorbed ions at time (t), and K_1 is the rate constant of the first-order adsorption (min^{-1})
Pseudo-second-order	$q_t = \frac{q_e^2 k_2 t}{1 + q_e k_2 t}$	qe is the quantity of adsorbed ions after equilibration (mg g^{-1}), and K_2 is the model rate constant (g mg^{-1} min^{-1}).
Isotherm models		
Model	**Equation**	**Parameters**
Langmuir	$q_e = \frac{q_{max}\, bC_e}{(1 + bC_e)}$	C_e is the rest ions concentrations (mg L^{-1}), q_{max} is the theoritical maximum adsorption capacity (mg g^{-1}), and *b* is the Langmuir constant (L mg^{-1})
Freundlich	$q_e = K_f C_e^{1/n}$	K_F is the constant of Freundlich model related to the adsorption capacity and n is the constant of Freundlich model related to the adsorption intensities
Dubinin–Radushkevich	$q_e = q_m e^{-\beta\varepsilon^2}$	β (mol^2 KJ^{-2}) is the D-R constant, ε (KJ^2 mol^{-2}) is the polanyil potential, and q_m is the adsorption capacity
Monolayer model with one energy site (Model 1)	$Q = nN_o = \frac{nN_M}{1 + (\frac{C1/2}{C})^n} = \frac{Q_o}{1 + (\frac{C1/2}{C})^n}$	Q is the adsorbed quantities in mg/g n is the number of adsorbed ion per site Nm is the density of the effective receptor sites (mg/g) Q_o is the adsorption capacity at the saturation state in mg/g C1/2 is the concentration of the ions at half saturation stage in mg/L