Supporting Information

Insight into the loading and release properties of MCM-48/biopolymer composites as carriers for 5-fluorouracil; equilibrium modeling and pharmacokinetic studies

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Content

1. Representative equation of kinetic and equilibrium models

Table S1. the representative equations of the studied kinetic and isotherm model and their parameters

Kinetic models		
Model	**Linear equation**	**Parameters**
Pseudo-first-order	$\ln(q_e - q_t) = \ln\ q_e - k_1 t$	q_t (mg/g) is the adsorbed drug at time (t), and K_1 is the rate constant of the first-order adsorption (min^{-1})
Pseudo-second-order	$\frac{t}{q_t} = \frac{1}{K_2 q_e^2} + \frac{t}{q_e}$	qe is the quantity of adsorbed drug after equilibration (mg/g), and K_2 is Lagergren model rate constant (g/mg min).
Isotherm models		
Model	**Equation**	**Parameters**
Langmuir	$\frac{C_e}{q_e} = \frac{1}{bq_{max}} + \frac{C_e}{q_{max}}$ $(Linear)$ $q_e = \frac{q_{max}\, bC_e}{(1 + bC_e)}$ $(Nonlinar)$	C_e is the rest drug concentrations (mg/L), q_{max} is the theoritical maximum ibuprofen drug capacity (mg/g), and *b* is the Langmuir constant (L/mg)
Freundlich	$Log\ qe = (1/n)\ log\ Ce + log\ K_f$ *(Linear)* $q_e = K_f C_e^{1/n}$ *(Nonlinear)*	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	$\ln(qe) = \ln(q_m) - \beta\varepsilon^2$ $(Linear)$ $q_e = q_m e^{-\beta\varepsilon^2}$ *(Nonlinear)*	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

2. Determination coefficient values of the pharmacokinetic models

Table S2. The determined values of the determination coefficient which were obtained for linear regression fitting of the releasing results with the pharmacokinetic models

Models	Materials	Determination coefficient (R^2)	
		pH 1.2	pH 7.4
Zero-order model	MCM-48	0.5	0.62
	MCM/ST	0.68	0.61
	MCM/CH	0.75	0.67
	MCM/CD	0.73	0.66
First order model	MCM-48	0.54	0.75
	MCM/ST	0.90	0.86
	MCM/CH	0.91	0.88
	MCM/CD	0.93	0.92
Higuchi model	MCM-48	0.71	0.82
	MCM/ST	0.87	0.82
	MCM/CH	0.92	0.86
	MCM/CD	0.90	0.85
Hixson-Crowell model	MCM-48	0.52	0.71
	MCM/ST	0.84	0.80
	MCM/CH	0.87	0.83
	MCM/CD	0.88	0.85
Korsmeyer-peppas model	MCM-48	0.82	0.85
	MCM/ST	0.93	0.90
	MCM/CH	0.94	0.91
	MCM/CD	0.93	0.92