Supplementary Material

Cellulose-Based Waste in a Close Loop as an Adsorbent for Removing Dyes from Textile Industry Wastewater

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Table S1. The raw wastewater sampling site description, pH and conductivity of wastewater samples

Sample	Latitude	Longitude	Site description	Mean annual flow,m^3/annually	Population equivalent	pH	Conductivity, µS
W1	44.8257	20.4247	Catchment area of 323 ha	1,447,962	56,179	9.16	633
W2	44.7976	20.4346	The largest WW canal; a catchment area of 7277 ha	48,723,120	518,224	8.20	847
W3	44.8118	20.4494	Catchment area of 113 ha	7,726,320	23,041	8.28	759

Table S2. Pseudo-first and pseudo-second order adsorption rate constants, calculated using appropriate model, and experimental q_e values for adsorption of selected dyes on cotton-based adsorbents

Dye	Sample	Cott	$Cott_c$	$Cott_{ac}$	Cott/PES	$Cott/PES_c$	$Cott/PES_{ac}$
MO	$q_{e,exp}$,	0.250	0.330	99.8	0.310	0.500	37.8
MB	mg g^{-1}	10.8	2.85	99.3	6.30	1.62	79.4
Pseudo-first order model							
MO	$q_{e,cal}$,	0.231	0.283	96.3	0.282	0.401	33.5
MB	mg g^{-1}	10.3	2.59	99.9	5.82	1.40	72.3
MO	k_1,	0.0343	0.0798	0.298	0.0481	0.0877	0.159
MB	min^{-1}	0.109	0.198	0.393	0.117	0.181	0.0421
MO	R^2	0.9633	0.8087	0.6780	0.9163	0.5902	0.3417
MB		0.8356	0.6727	0.9831	0.5421	0.6206	0.7982

Pseudo-second order model							
MO	$q_{e,cal}$,	0.280	0.320	100	0.330	0.450	36.3
MB	mg g^{-1}	11.1	2.76	102	6.28	1.51	82.5
MO	k_2,	0.130	0.318	0.00650	0.165	0.241	0.00670
MB	g $mg^{-1}min^{-1}$	0.0151	0.122	0.0137	0.0292	0.190	0.0006
MO	R^2	0.9813	0.9210	0.9723	0.9357	0.7869	0.7169
MB		0.9562	0.9163	0.6852	0.8086	0.7806	0.8976

Table S3. Kinetic parameters for MO and MB adsorption on cotton-based adsorbents obtained by Elovich and intraparticle diffusion model

Material	Dye	Cott	$Cott_c$	$Cott_{ac}$	Cott/PES	$Cott/PES_c$	$Cott/PES_{ac}$
Elovich model							
R^2	MO	0.9903	0.9650	0.8748	0.9340	0.9232	0.9411
	MB	0.9315	0.9709	0.2482	0.9310	0.8467	0.9522
α,	MO	0.0220	0.100	$1.08x10^6$	0.0360	0.180	131
mg/g min	MB	14.6	55.2	$1.32x10^{16}$	10.3	11.2	12.6
β,	MO	16.7	18.3	0.170	14.3	13.2	0.230
g/mg	MB	0.660	3.66	0.410	1.19	5.98	0.0700
R_E	MO	0.240	0.164	0.0600	0.228	0.152	0.117
	MB	0.142	0.0961	0.0250	0.133	0.103	0.193
Intra-particle diffusion							
$k_{id,1}$,	MO	0.051	0.017	5.29	0.0872	0.024	1.64
mg/g $min^{1/2}$	MB	1.10	0.082	14.9	0.420	0.052	4.88
C_1,	MO	0.84	0.11	68	0.0020	0.16	20
mg/g	MB	3.2	1.8	52	2.6	0.93	17
$k_{id,2}$,	MO	0.022		0.51	0.022		0.18
mg/g $min^{1/2}$	MB	0.49		0.009	0.070		
C_2,	MO	0.024		94	0.079		35
mg/g	MB	6.6		99	5.4		
$k_{id,3}$,	MO	0.010			0.010		
mg/g $min^{1/2}$	MB	0.063					
C_3, mg/g	MO	0.12			0.17		
	MB	9.9					