

Supplementary material

Table S.1 Box-Behnken Design experience matrix.

	Factor 1	Factor 2	Factor 3	Response 1	
Std Run	A : Concentration	B : pH	C : Temperature	Adsorption capacity	
	(mg/L)		(°C)	(mg/g)	
10	1	80	10	30	96.584
17	2	80	6	40	60.5
11	3	80	2	50	34.695
4	4	150	10	40	122.978
9	5	80	2	30	46.51
3	6	10	10	40	7.277
15	7	80	6	40	60.5
1	8	10	2	40	3.08
6	9	150	6	30	106.39
2	10	150	2	40	67.155
12	11	80	10	50	67.45
5	12	10	6	30	7.531
7	13	10	6	50	6.117
13	14	80	6	40	60.5
8	15	150	6	50	99.3
16	16	80	6	40	60.5
14	17	80	6	40	60.5

Table S2. Experimental ranges and levels of input variables used in BBD model.

Variables	Symbol	Low (-1)	medium (0)	High (1)
Initial concentration (mg/L)	A	10	80	150
Initial pH	B	2	6	10
Temperature (°C)	C	30	40	50

Table S3. Kinetic parameters and regression coefficients for the adsorption of MB onto SSW/FeCl₂-FeCl₃ at 25°C.

Models	Parameters	Values
PFO model (Non-linear form)	$q_{e,exp}$ (mg/g)	81.47
	$q_{e,calc}$ (mg/g)	75.78 ± 2.53
	k_1 (min ⁻¹)	2.07 ± 0.696
	R^2	0.9478
PSO model (Non-linear form)	$q_{e,calc}$ (mg/g)	77.38 ± 2.49
	k_2 (g/mg.min)	0.059 ± 0.033
	R^2	0.9604
IPD model (Non-linear form)	K_{id} (mg/g.min ^{1/2})	5.60 ± 2.49
	C (mg/g)	42.04 ± 12.81
	R^2	0.3655
IPD model (Linear form)	K_{id1} (mg/g.min ^{1/2})	11.37 ± 4.91
	C (mg/g)	29.81 ± 15.65
	R^2	0.4662
	K_{id2} (mg/g.min ^{1/2})	0.548 ± 0.288
	C (mg/g)	76.65 ± 2.23
	R^2	0.5671
Elovich model (Non-linear form)	α (mg/g.min)	$2.65.10^7 \pm 1.05.10^8$
	β (g/mg)	0.246 ± 0.056
	R^2	0.9835

Table S4. Isotherm parameters and regression coefficients for the adsorption of MB onto SSW/FeCl₂-FeCl₃.

Models	Parameters	values
Langmuir model (Non-linear form)	q_m (mg/g)	114.47 ± 13.38
	K_L (L/mg)	0.092 ± 0.027
	R_L	0.098-0.521
	R^2	0.9344
Freundlich model(Non-linear form)	K_F (mg/g)(L/mg) ^{1/n}	18.93 ± 5.61
	n	2.41 ± 0.533
	1/n	0.415
	R^2	0.8362
Temkin model (Non-linear form)	B_T (J/mol)	27.37 ± 3.16
	K_T (L/mg)	0.709 ± 0.173
	R^2	0.9381
D-R model (Linear form)	q_{mDR} (mg/g)	81.45
	K_{DR} (mol ² /kJ ²)	3.62 ± 0.163
	E (kJ/mol)	0.372
	R^2	0.9879