Supplementary Data

This supplementary data is a part of a paper entitled "An Optimization of the Adsorption Method for Methylene Blue Using Faujasite Zeolite-X Synthesized from Coal-Fly Ash Utilizing RSM Coupled with Central Composite Design Approach".

Table S1. Range and levels of variables

Independent variables	Variables range and levels				
	−2	−1	0	1	2
(A) pH	3	5	7	9	11
(B) Time (min)	20	40	60	80	100
(C) Temperature (°C)	25	35	45	55	65
(D) Initial concentration (mg/L)	50	75	100	125	150
(E) Sorbent mass (g/L)	1	1.5	2	2.5	3

Table S2. Central composite design matrix

Run	A	B	C	D	E	MB dye removal %	
						Experimental values	Predicted values
1	9	80	55	75	1.5	86.79	86.42
2	7	60	45	50	2.0	92.96	92.37
3	7	60	45	100	3.0	98.17	98.79
4	7	20	45	100	2.0	93.15	92.65
5(C)	7	60	45	100	2.0	90.45	91.42
6	9	40	35	125	2.5	96.45	97.12
7	5	80	55	75	2.5	97.98	98.67
8	9	40	55	125	2.5	99.07	99.23
9	7	100	45	100	2.0	92.89	92.47
10	5	80	35	125	2.5	97.83	98.32
11	7	60	45	100	2.0	90.34	89.46
12(C)	7	60	25	100	2.0	91.56	91.29
13	5	40	35	75	2.5	97.27	97.86
14	9	80	35	75	2.5	96.12	95.38
15(C)	7	60	45	150	2.0	91.43	90.79
16(C)	7	60	45	100	2.0	91.17	91.5
17	7	60	45	100	2.0	90.23	90.65
18	9	80	55	125	2.5	96.82	97.42
19	5	80	35	75	1.5	86.14	86.78
20(C)	11	60	45	100	2.0	90.84	91.26
21	9	40	35	75	1.5	83.73	84.13
22	7	60	45	100	2.0	94.47	94.46
23	9	80	35	125	1.5	84.71	84.69
24	5	40	35	125	1.5	86.43	86.79
25	5	40	55	75	1.5	88.03	87.89
26	7	60	45	100	1.0	84.96	84.56
27	3	60	45	100	2.0	98.04	98.21
28	9	40	55	75	2.5	97.18	96.48

Run	A	B	C	D	E	MB dye removal %	
						Experimental values	Predicted values
29	9	40	55	125	1.5	85.76	85.13
30(C)	7	60	45	100	2.0	90.74	91.16
31	5	80	55	125	1.5	86.75	86.15
32	7	60	65	100	2.0	92.79	93.67

Table S3. ANOVA results for %MB dye removal

Source	Sum of squares	df	Mean square	F-value	*p*-value	
Model	669.39	20	33.47	705.16	< 0.001	significant
A-pH	34.61	1	34.61	729.42	< 0.001	
B-Time	0.56	1	0.56	1.18	< 0.001	
C-Temperature	5.12	1	5.12	108.12	< 0.001	
D-Initial concentration	0.15	1	0.15	3.23	0.008	
E-sorbent mass	6.09	1	6.09	1283.52	< 0.0001	
AB	5.25	1	5.25	11.07	< 0.001	
AC	2.35	1	2.35	4.95	< 0.001	
AD	4.42	1	4.42	0.93	< 0.001	
AE	0.12	1	0.12	0.25	< 0.001	
BC	0.27	1	0.27	0.57	< 0.001	
BD	4.16	1	4.16	8.76	< 0.001	
BE	0.62	1	0.62	1.32	< 0.001	
CD	116.12	1	116.12	24.33	< 0.001	
CE	0.004	1	0.004	0.01	< 0.001	
DE	23.71	1	23.71	49.93	< 0.001	
A^2	125.55	1	125.55	264.15	< 0.001	
B^2	3.57	1	3.57	7.52	< 0.001	
C^2	2.39	1	2.39	5.04	< 0.001	
D^2	5.31	1	5.31	11.20	< 0.001	
E^2	3.60	1	3.60	7.60	< 0.001	
Residual	0.52	11	4.75			
Lack of Fit	0.37	6	6.18	2.04	0.2253	not significant
Pure Error	0.15	5	3.03			
Cor Total	721.64	31				
Summary of quadratic model						
Response	Mean	SD	R^2	Adj-R^2	Pred-R^2	CV %	AP
%CV	91.94	0.21	0.9978	0.9965	0.9843	0.2362	0.636

df: degrees of freedom, CV %: coefficient of variation, SD: standard deviation, R: regression coefficient, AP: adequate precision