

Supplementary Tables

Table S1. (a) ANOVA of Quadratic Model

Source	COE	SS	DOF	MS	F	p> F	Remark
(a) TOC							
Model		7876.80	20.00	393.84	1594.83	< 0.0001	Highly Significant
intercept	56.50						
A	-8.20	1076.01	1.00	1076.01	4357.24	< 0.0001	Highly Significant
B	6.03	582.46	1.00	582.46	2358.66	< 0.0001	Highly Significant
C	7.22	833.40	1.00	833.40	3374.81	< 0.0001	Highly Significant
D	-5.57	496.25	1.00	496.25	2009.54	< 0.0001	Highly Significant
E	-7.02	789.42	1.00	789.42	3196.70	< 0.0001	Highly Significant
AB	5.92	140.16	1.00	140.16	567.56	< 0.0001	Highly Significant
AC	1.35	7.25	1.00	7.25	29.35	< 0.0001	Highly Significant
AD	6.36	161.67	1.00	161.67	654.69	< 0.0001	Highly Significant
AE	5.76	132.94	1.00	132.94	538.31	< 0.0001	Highly Significant
BC	0.94	3.57	1.00	3.57	14.44	0.0008	Significant
BD	3.92	61.49	1.00	61.49	248.99	< 0.0001	Highly Significant
BE	12.60	634.78	1.00	634.78	2570.51	< 0.0001	Highly Significant
CD	-4.71	88.91	1.00	88.91	360.04	< 0.0001	Highly Significant
CE	-0.34	0.45	1.00	0.45	1.83	0.1878	
DE	10.74	461.64	1.00	461.64	1869.39	< 0.0001	Highly Significant
A ²	-6.64	384.82	1.00	384.82	1558.29	< 0.0001	Highly Significant
B ²	2.03	35.99	1.00	35.99	145.75	< 0.0001	Highly Significant
C ²	-1.47	18.75	1.00	18.75	75.95	< 0.0001	Highly Significant
D ²	10.26	918.61	1.00	918.61	3719.84	< 0.0001	Highly Significant
E ²	8.02	561.53	1.00	561.53	2273.88	< 0.0001	Highly Significant
Residual		6.17	25.00	0.25			
Lack of fit		0.00	20.00	0.00	0.00	1.0000	not significant
Pure of Error		6.17	5.00	1.23			
Cor Total		7882.98	45.00				

Table S1. (b) ANOVA of Quadratic Model

Source	COE	SS	DOF	MS	F	p> F	Remark
(b) Tot. Fe leaching							
Model		7.83	20.00	0.39	75.89	< 0.0001	Highly Significant
intercept	1.17						
A	-0.16	0.42	1.00	0.42	81.44	< 0.0001	Highly Significant
B	-0.04	0.03	1.00	0.03	5.96	0.0221	Significant
C	0.21	0.71	1.00	0.71	137.81	< 0.0001	Highly Significant
D	-0.01	0.00	1.00	0.00	0.32	0.5762	
E	0.17	0.46	1.00	0.46	88.88	< 0.0001	Highly Significant
AB	-0.41	0.69	1.00	0.69	132.97	< 0.0001	Highly Significant
AC	0.12	0.05	1.00	0.05	10.37	0.0035	Significant
AD	-0.28	0.31	1.00	0.31	60.01	< 0.0001	Highly Significant
AE	-0.75	2.25	1.00	2.25	436.27	< 0.0001	Highly Significant
BC	-0.05	0.01	1.00	0.01	1.82	0.1890	
BD	-0.03	0.00	1.00	0.00	0.87	0.3587	
BE	-0.12	0.06	1.00	0.06	11.05	0.0027	Significant
CD	-0.08	0.02	1.00	0.02	4.76	0.0388	Significant
CE	-0.35	0.48	1.00	0.48	93.34	< 0.0001	Highly Significant
DE	-0.19	0.15	1.00	0.15	28.81	< 0.0001	Highly Significant
A ²	-0.23	0.48	1.00	0.48	92.51	< 0.0001	Highly Significant
B ²	-0.26	0.60	1.00	0.60	116.94	< 0.0001	Highly Significant
C ²	-0.23	0.48	1.00	0.48	92.88	< 0.0001	Highly Significant
D ²	-0.46	1.85	1.00	1.85	359.44	< 0.0001	Highly Significant
E ²	-0.11	0.11	1.00	0.11	21.26	0.0001	Highly Significant
Residual		0.13	25.00	0.01			
Lack of fit		0.04	20.00	0.00	0.13	0.9996	not significant
Pure of Error		0.08	5.00	0.02			
Cor Total		7.96	45.00				

Table S2. Adequacy of Test Models

Source	SSS	DOF	MS	F	Prob > F	SSS	DOF	MS	F	Prob > F	Remark
Sequential Model Sum of Squares (TOC)						Sequential Model Sum of Squares (Tot. Fe leaching)					
Mean	169749.24	1.00	169749.24			23.59	1.00	23.59			
Linear	3777.54	5.00	755.51	7.36	< 0.0001	1.62	5.00	0.32	2.05	0.0925	
2FI	1692.85	10.00	169.29	2.11	0.0564	4.03	10.00	0.40	5.22	0.0002	
Quadratic	2406.41	5.00	481.28	1948.9	< 0.0001	2.18	5.00	0.44	84.63	< 0.0001	Suggested
Cubic	0.00	15.00	0.00	0.00	1.0000	0.01	15.00	0.00	0.09	1.0000	
Residual	6.17	10.00	0.62			0.11	10.00	0.01			
Total	177632.22	46.00	3861.57			31.55	46.00	0.69			
Model Summary Statistics (TOC)						Model Summary Statistics (Tot. Fe leaching)					
Source	Std. dev.	R ²	R ² (Adj)	R ² (Pred)	PRESS	Std. dev.	R ²	R ² (Adj)	R ² (Pred)	PRESS	
Linear	10.13	0.48	0.41	0.29	5601.35	0.71	0.40	0.20	0.10	-0.04	
2FI	8.97	0.69	0.54	0.18	6434.71	0.56	0.28	0.71	0.56	0.48	
Quadratic	0.50	1.00	1.00	1.00	8.89	0.01	0.07	0.98	0.97	0.96	Suggested
Cubic	0.79	1.00	1.00	1.00	8.89	0.01	0.11	0.99	0.94	0.74	

R²: correlation coefficient, R²(adj): adjusted correlation coefficient, R²(Pred): Predicted correlation coefficient; PRESS: predicted residual error sum of square.

Table S3. Optimization of the Individual Responses Using Derringer's Desirability Function

Name	Goal	Lower Limit	Upper Limit
A:pH	in range	2	6
B:Hydrogen peroxide dose (mmol)	in range	0.15	0.5
C:Catalyst dose (g/L)	Minimize	0.1	1
D:Py conc.(mg/L)	Maximize	0	200
E:Qn conc.(mg/L)	Maximize	0	200
% Removal of TOC	Maximize	0	100
Tot. Fe leaching (mg/L)	in range	0	2

Table S4. Model Validation of Pprocess Variables with Their Experimental Values

Variables	Optimum value	%Removal of TOC		Tot. Fe leaching (mg/L)	
		Predicted	Experimental	Predicted	Experimental
A:pH	3.5				
B: Hydrogen peroxide dose (mmol)	0.34				
C:Catalyst dose (g/L)	0.55	83.56	85.12	0.84	0.79
D:Py conc.(mg/L)	200				
E:Qn conc.(mg/L)	200				