

Supporting information

Preparation and application of meso-adsorbent NiFe₂O₄ for ultrasound-enhanced removal of dye pollutant in water and wastewater: A multivariate study

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Caption of tables and figures

Table S1. Adequacy of model tested.

Table S2. Training parameters used.

Table S3. The optimal conditions for and model validation of the proposed method.

Table S4. Comparison of the results of the prediction and verification experiments.

Fig. S1. Diagnostic graphs of the analysis of adsorbtion.

Fig. S2. The plot of the observed results vs ANN predicted results.

Table S1. Adequacy of model tested.

Source	Std. Dev.	R²	Adjusted R²	Predicted R²	PRESS	Remarks
Linear	9.73	0.6279	0.5684	0.4254	3657.62	
2FI	7.75	0.8207	0.7264	0.7083	1856.90	
Quadratic	1.23	0.9964	0.9931	0.9813	119.34	Suggested
Cubic	0.86	0.9992	0.9966	0.9447	351.81	Aliased

Table S2. Training parameters used.

Learning rule	Levenberg–Marquardt
Transfer functions for hidden and output layers	Tan-sigmoid, purelin
The number of layers	3
The number of neurons on the layers	Input: 4, Hidden: 9, Output: 1

Table S3. The optimal conditions and model validation for the proposed method.

Optimum process parameters				Predicted/optimum value	Average actual values	Error (%)
Concentration of dye (mg/L)	Ultrasonic time (s)	Mass of adsorbent (mg)	pH			
2.0	231	13.5	7.9	98.18	98.85	0.68

Table S4. Comparison of the results of prediction and verification experiments.

Test	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	Predicted value	Actual value	Error (%)
1	8	240	10	4	45.17	44.73	0.98
2	6	180	25	6	77.36	78.15	1.01
3	8	120	10	8	59.95	60.86	1.49
4	6	300	15	6	66.97	67.31	0.51
5	4	120	10	8	80.48	81.25	0.95

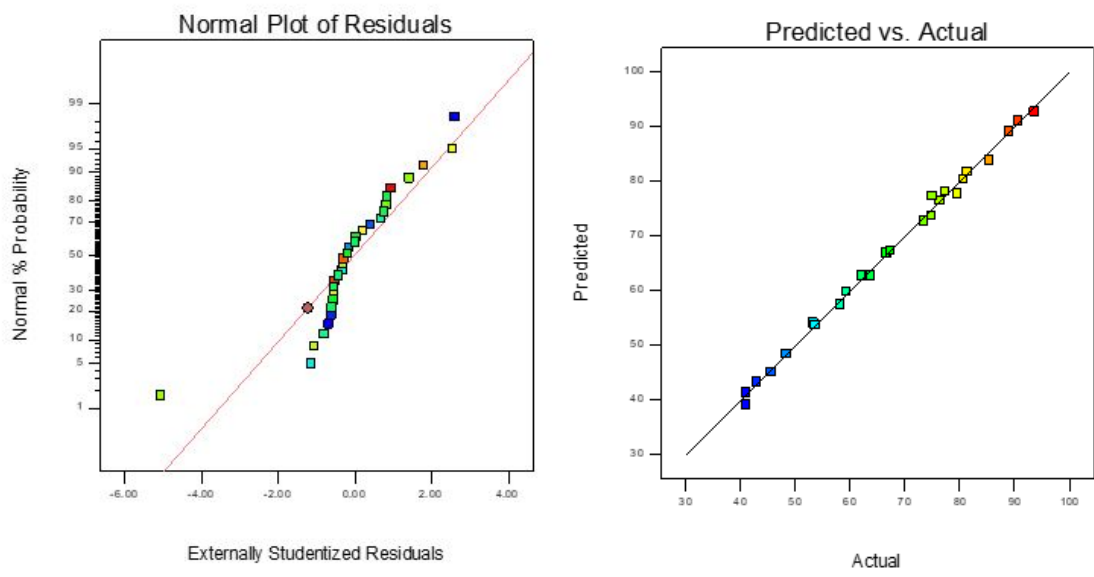


Fig. S1. Diagnostic graphs of the analysis of adsorption.

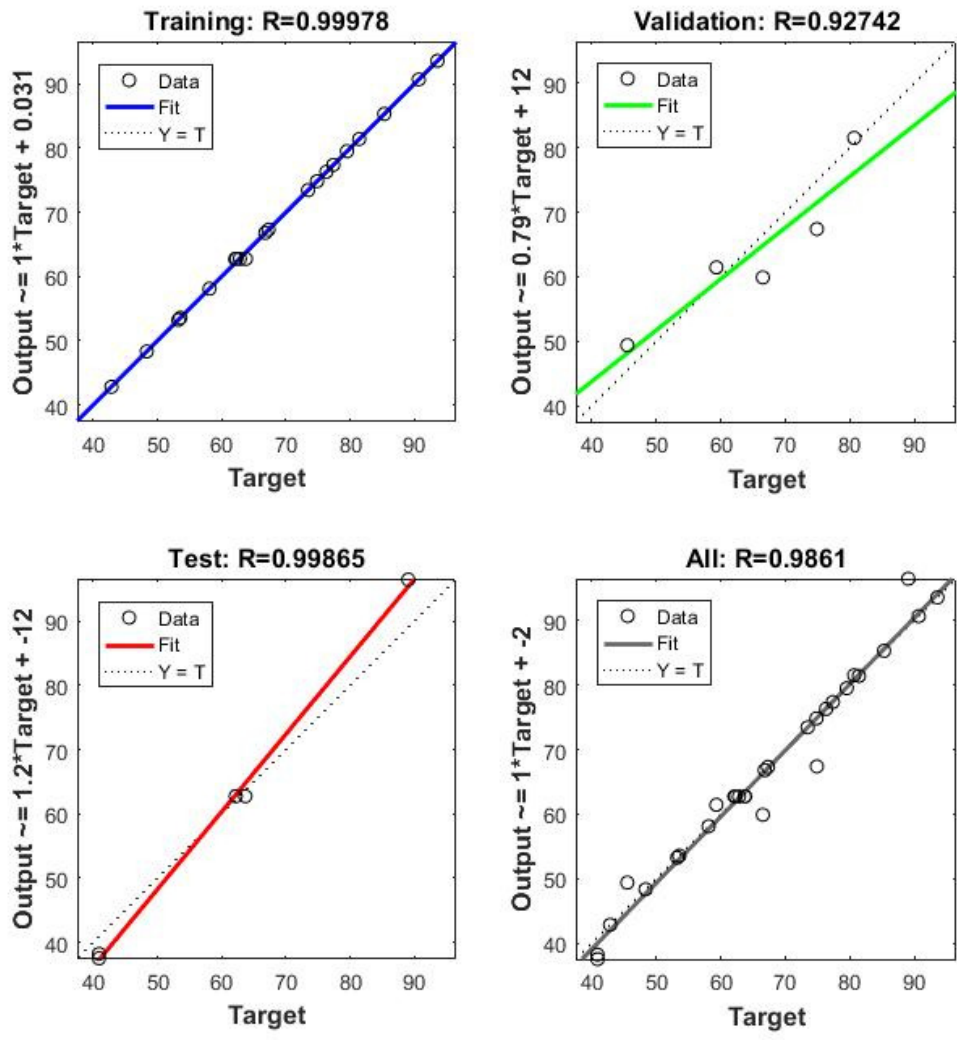


Fig. S2. The plot of the observed results vs ANN predicted results.