**Supplementary Material**

**Table S1.** Design matrix for MG.

**Table S2.** Design matrix for MB.

**Table S3.** Analysis of variance (ANOVA) results of quadratic model to extraction MG using CoFe2O4.

**Table S4.** Analysis of variance (ANOVA) results of quadratic model to extraction MB using CoFe2O4.

**Table S1.** Design matrix for MG.

|  |  |
| --- | --- |
| Recovery (%) | Variables |
|  |
| Predicted | Experimental |  | D (min) | C(µL) | B | A (mg) | Exp. |
| 43.50 | 43.50 |  | 4 | 250 | 4 | 0.02 | 1 |
| 46.25 | 46.50 |  | 4 | 150 | 4 | 0.04 | 2 |
| 43.23 | 42.96 |  | 4 | 150 | 8 | 0.02 | 3 |
| 80.02 | 80.00 |  | 6 | 200 | 6 | 0.05 | 4 |
| 54.54 | 54.09 |  | 8 | 150 | 4 | 0.04 | 5 |
| 78.70 | 78.77 |  | 6 | 200 | 6 | 0.03 | 6 |
| 78.70 | 78.39 |  | 6 | 200 | 6 | 0.03 | 7 |
| 72.76 | 73.00 |  | 8 | 150 | 8 | 0.04 | 8 |
| 76.76 | 77.27 |  | 8 | 250 | 4 | 0.04 | 9 |
| 40.00 | 39.88 |  | 6 | 200 | 2 | 0.03 | 10 |
| 65.49 | 65.50 |  | 4 | 250 | 8 | 0.02 | 11 |
| 75.44 | 75.19 |  | 10 | 200 | 6 | 0.03 | 12 |
| 78.70 | 78.92 |  | 6 | 200 | 6 | 0.03 | 13 |
| 78.70 | 78.52 |  | 6 | 200 | 6 | 0.03 | 14 |
| 78.70 | 78.46 |  | 6 | 200 | 6 | 0.03 | 15 |
| 39.36 | 39.57 |  | 6 | 200 | 6 | 0.01 | 16 |
| 63.81 | 63.39 |  | 4 | 150 | 8 | 0.04 | 17 |
| 98.67 | 98.63 |  | 8 | 250 | 8 | 0.04 | 18 |
| 53.31 | 53.76 |  | 2 | 200 | 6 | 0.03 | 19 |
| 35.81 | 36.14 |  | 8 | 150 | 4 | 0.02 | 20 |
| 87.42 | 87.33 |  | 4 | 250 | 8 | 0.04 | 21 |
| 36.12 | 36.50 |  | 6 | 100 | 6 | 0.03 | 22 |
| 54.77 | 54.51 |  | 8 | 150 | 8 | 0.02 | 23 |
| 80.60 | 80.41 |  | 6 | 300 | 6 | 0.03 | 24 |
| 80.20 | 80.51 |  | 6 | 200 | 10 | 0.03 | 25 |
| 24.93 | 24.53 |  | 4 | 150 | 4 | 0.02 | 26 |
| 56.68 | 56.66 |  | 8 | 250 | 4 | 0.02 | 27 |
| 78.70 | 79.13 |  | 6 | 200 | 6 | 0.03 | 28 |
| 66.17 | 65.99 |  | 4 | 250 | 4 | 0.04 | 29 |
| 79.32 | 79.31 |  | 8 | 250 | 8 | 0.02 | 30 |

**Table S2.** Design matrix for MB.

|  |  |
| --- | --- |
| Recovery (%) | Variables |
|  |
| Predicted | Experimental |  | D (min) | C | B(µL) | A (mg) | Exp. |
| 68.33 | 68.86 |  | 4 | 8 | 150 | 0.04 | 1 |
| 83.09 | 82.89 |  | 6 | 6 | 200 | 0.05 | 2 |
| 78.03 | 77.93 |  | 6 | 6 | 300 | 0.03 | 3 |
| 83.16 | 82.96 |  | 6 | 10 | 200 | 0.03 | 4 |
| 99.30 | 99.05 |  | 8 | 8 | 250 | 0.04 | 5 |
| 95.04 | 95.94 |  | 6 | 6 | 200 | 0.03 | 6 |
| 57.05 | 56.49 |  | 4 | 4 | 150 | 0.04 | 7 |
| 44.46 | 44.42 |  | 6 | 6 | 100 | 0.03 | 8 |
| 84.15 | 84.73 |  | 8 | 8 | 250 | 0.02 | 9 |
| 95.04 | 94.48 |  | 6 | 6 | 200 | 0.03 | 10 |
| 95.04 | 95.7 |  | 6 | 6 | 200 | 0.03 | 11 |
| 67.32 | 67.45 |  | 4 | 8 | 250 | 0.02 | 12 |
| 67.60 | 67.18 |  | 8 | 4 | 250 | 0.02 | 13 |
| 53.19 | 53.37 |  | 8 | 4 | 150 | 0.02 | 14 |
| 95.04 | 93.92 |  | 6 | 6 | 200 | 0.03 | 15 |
| 87.49 | 87.33 |  | 4 | 8 | 250 | 0.04 | 16 |
| 79.47 | 80.04 |  | 8 | 4 | 250 | 0.04 | 17 |
| 76.81 | 77.09 |  | 8 | 8 | 150 | 0.04 | 18 |
| 51.96 | 51.42 |  | 4 | 8 | 150 | 0.02 | 19 |
| 61.26 | 61.24 |  | 8 | 4 | 150 | 0.04 | 20 |
| 71.94 | 72.09 |  | 4 | 4 | 250 | 0.04 | 21 |
| 95.04 | 95.78 |  | 6 | 6 | 200 | 0.03 | 22 |
| 55.05 | 54.79 |  | 4 | 4 | 250 | 0.02 | 23 |
| 83.65 | 83.27 |  | 10 | 6 | 200 | 0.03 | 24 |
| 62.61 | 62.85 |  | 2 | 6 | 200 | 0.03 | 25 |
| 55.33 | 55.39 |  | 6 | 2 | 200 | 0.03 | 26 |
| 54.85 | 54.92 |  | 6 | 6 | 200 | 0.01 | 27 |
| 95.04 | 94.41 |  | 6 | 6 | 200 | 0.03 | 28 |
| 43.96 | 44.33 |  | 4 | 4 | 150 | 0.02 | 29 |
| 65.47 | 65.43 |  | 8 | 8 | 150 | 0.02 | 30 |

**Table S3.** Analysis of variance (ANOVA) results of quadratic model to extraction MG using CoFe2O4.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Source | Sum of Squares | DF | Mean Square | F- Value | p- Value |  |
| Model | 10242.43 | 14 | 731.60 | 4921.48 | < 0.0001 | significant |
| A-Adsorbent amount (g) | 2479.65 | 1 | 2479.65 | 16680.57 | < 0.0001 |  |
| B-pH of solution | 2424.26 | 1 | 2424.26 | 16307.97 | < 0.0001 |  |
| C-Eluent volume (µL) | 2967.93 | 1 | 2967.93 | 19965.21 | < 0.0001 |  |
| D-Ultrasonication time (min) | 734.49 | 1 | 734.49 | 4940.94 | < 0.0001 |  |
| AB | 0.54 | 1 | 0.54 | 3.66 | 0.0751 |  |
| AC | 1.83 | 1 | 1.83 | 12.31 | 0.0032 |  |
| AD | 6.70 | 1 | 6.70 | 45.04 | < 0.0001 |  |
| BC | 13.60 | 1 | 13.60 | 91.47 | < 0.0001 |  |
| BD | 0.43 | 1 | 0.43 | 2.91 | 0.1088 |  |
| CD | 5.28 | 1 | 5.28 | 35.51 | < 0.0001 |  |
| A2 | 619.54 | 1 | 619.54 | 4167.61 | < 0.0001 |  |
| B2 | 593.10 | 1 | 593.10 | 3989.78 | < 0.0001 |  |
| C2 | 709.26 | 1 | 709.26 | 4771.15 | < 0.0001 |  |
| D2 | 351.56 | 1 | 351.56 | 2364.91 | < 0.0001 |  |
| Residual | 2.23 | 15 | 0.15 |  |  |  |
| *Lack of Fit* | 1.81 | 10 | 0.18 | 2.13 | 0.2093 | not significant |
| Pure Error | 0.42 | 5 | 0.085 |  |  |  |
| Cor Total | 10244.66 | 29 |  |  |  |  |

**Table S4.** Analysis of variance (ANOVA) results of quadratic model to extraction MB using CoFe2O4.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Source | Sum of Squares | DF | Mean Square | F- Value | p- Value |  |
| Model | 8430.29 | 14 | 602.16 | 1451.46 | < 0.0001 | significant |
| A-Adsorbent amount (g) | 1196.11 | 1 | 1196.11 | 2883.10 | < 0.0001 |  |
| B-Eluent volume (µL) | 1690.92 | 1 | 1690.92 | 4075.81 | < 0.0001 |  |
| C-pH of solution | 1161.62 | 1 | 1161.62 | 2799.99 | < 0.0001 |  |
| D-Ultrasonication time (min) | 663.71 | 1 | 663.71 | 1599.81 | < 0.0001 |  |
| AB | 14.50 | 1 | 14.50 | 34.94 | < 0.0001 |  |
| AC | 10.74 | 1 | 10.74 | 25.89 | 0.0001 |  |
| AD | 25.18 | 1 | 25.18 | 60.68 | < 0.0001 |  |
| BC | 18.25 | 1 | 18.25 | 44.00 | < 0.0001 |  |
| BD | 11.07 | 1 | 11.07 | 26.69 | 0.0001 |  |
| CD | 18.30 | 1 | 18.30 | 44.10 | < 0.0001 |  |
| A2 | 1164.70 | 1 | 1164.70 | 2807.39 | < 0.0001 |  |
| B2 | 1957.94 | 1 | 1957.94 | 4719.43 | < 0.0001 |  |
| C2 | 1140.69 | 1 | 1140.69 | 2749.53 | < 0.0001 |  |
| D2 | 822.97 | 1 | 822.97 | 1983.70 | < 0.0001 |  |
| Residual | 6.22 | 15 | 0.41 |  |  |  |
| *Lack of Fit* | 2.46 | 10 | 0.25 | 0.33 | 0.9371 | not significant |
| Pure Error | 3.76 | 5 | 0.75 |  |  |  |
| Cor Total | 8436.51 | 29 |  |  |  |  |