

Table S1. Influence of various factors and their interactions on the removal rate of different pollutants

(a) NH<sub>3</sub>-N removal rate

| Source         | Sum of squares | df | Mean square | F value | P value |
|----------------|----------------|----|-------------|---------|---------|
| Model          | 9708.15        | 14 | 693.44      | 17.93   | <0.0001 |
| A              | 2380.08        | 1  | 2380.08     | 61.54   | <0.0001 |
| B              | 3054.11        | 1  | 3054.11     | 78.97   | <0.0001 |
| C              | 77.01          | 1  | 77.01       | 1.99    | 0.1800  |
| D              | 1335.21        | 1  | 1335.21     | 34.52   | <0.0001 |
| AB             | 20.48          | 1  | 20.48       | 0.53    | 0.4788  |
| AC             | 17.06          | 1  | 17.06       | 0.44    | 0.5174  |
| AD             | 46.58          | 1  | 46.58       | 1.20    | 0.2910  |
| BC             | 136.77         | 1  | 136.77      | 3.54    | 0.0810  |
| BD             | 539.63         | 1  | 539.63      | 13.95   | 0.0022  |
| CD             | 5.83           | 1  | 5.83        | 0.15    | 0.7036  |
| A <sup>2</sup> | 72.30          | 1  | 72.30       | 1.87    | 0.1931  |
| B <sup>2</sup> | 1669.10        | 1  | 1669.10     | 43.16   | <0.0001 |
| C <sup>2</sup> | 187.13         | 1  | 187.13      | 4.84    | 0.0451  |
| D <sup>2</sup> | 762.01         | 1  | 762.01      | 19.70   | 0.0006  |
| Residual       | 541.45         | 14 | 38.67       |         |         |
| Lack of Fit    | 479.47         | 10 | 47.95       | 3.09    | 0.1438  |
| Pure Error     | 61.98          | 4  | 15.50       |         |         |
| Cor Total      | 10249.60       | 28 |             |         |         |

(b) TN removal rate

| Source         | Sum of squares | df | Mean square | F value | P value |
|----------------|----------------|----|-------------|---------|---------|
| Model          | 3454.78        | 14 | 246.77      | 42.20   | <0.0001 |
| A              | 1335.84        | 1  | 1335.84     | 228.42  | <0.0001 |
| B              | 977.05         | 1  | 977.05      | 167.07  | <0.0001 |
| C              | 24.42          | 1  | 24.42       | 4.18    | 0.0603  |
| D              | 176.10         | 1  | 176.10      | 30.11   | <0.0001 |
| AB             | 2.18           | 1  | 2.18        | 0.37    | 0.5517  |
| AC             | 15.33          | 1  | 15.33       | 2.62    | 0.1278  |
| AD             | 9.33           | 1  | 9.33        | 1.60    | 0.2271  |
| BC             | 127.80         | 1  | 127.80      | 21.85   | 0.0004  |
| BD             | 15.52          | 1  | 15.52       | 2.65    | 0.1255  |
| CD             | 12.89          | 1  | 12.89       | 2.20    | 0.1598  |
| A <sup>2</sup> | 401.59         | 1  | 401.59      | 68.67   | <0.0001 |
| B <sup>2</sup> | 347.29         | 1  | 347.29      | 59.38   | <0.0001 |
| C <sup>2</sup> | 288.12         | 1  | 288.12      | 49.27   | <0.0001 |
| D <sup>2</sup> | 89.45          | 1  | 89.45       | 15.29   | 0.0016  |
| Residual       | 81.88          | 14 | 5.85        |         |         |
| Lack of Fit    | 69.13          | 10 | 6.91        | 2.17    | 0.2370  |
| Pure Error     | 12.75          | 4  | 3.19        |         |         |
| Cor Total      | 3536.66        | 28 |             |         |         |

(c) TP removal rate

| Source         | Sum of squares | df | Mean square | F value | P value |
|----------------|----------------|----|-------------|---------|---------|
| Model          | 4977.94        | 14 | 355.57      | 2.76    | 0.0337  |
| A              | 1902.60        | 1  | 1902.60     | 14.77   | 0.0018  |
| B              | 1772.93        | 1  | 1772.93     | 13.76   | 0.0023  |
| C              | 35.12          | 1  | 35.12       | 0.27    | 0.6097  |
| D              | 219.56         | 1  | 219.56      | 1.70    | 0.2127  |
| AB             | 11.22          | 1  | 11.22       | 0.087   | 0.7722  |
| AC             | 6.84           | 1  | 6.84        | 0.053   | 0.8211  |
| AD             | 9.70           | 1  | 9.70        | 0.075   | 0.7877  |
| BC             | 4.58           | 1  | 4.58        | 0.036   | 0.8531  |
| BD             | 95.84          | 1  | 95.84       | 0.74    | 0.4029  |
| CD             | 105.47         | 1  | 105.47      | 0.82    | 0.3808  |
| A <sup>2</sup> | 273.42         | 1  | 273.42      | 2.12    | 0.1672  |
| B <sup>2</sup> | 649.30         | 1  | 649.30      | 5.04    | 0.0414  |
| C <sup>2</sup> | 36.55          | 1  | 36.55       | 0.28    | 0.6026  |
| D <sup>2</sup> | 123.23         | 1  | 123.23      | 0.96    | 0.3446  |
| Residual       | 1803.35        | 14 | 128.81      |         |         |
| Lack of Fit    | 998.81         | 10 | 99.88       | 0.50    | 0.8316  |
| Pure Error     | 804.54         | 4  | 201.14      |         |         |
| Cor Total      | 6781.29        | 28 |             |         |         |

(d) COD<sub>Mn</sub> removal rate

| Source         | Sum of squares | df | Mean square | F value | P value |
|----------------|----------------|----|-------------|---------|---------|
| Model          | 1646.60        | 14 | 117.61      | 4.33    | 0.0048  |
| A              | 524.57         | 1  | 524.57      | 19.31   | 0.0006  |
| B              | 382.39         | 1  | 382.39      | 14.08   | 0.0021  |
| C              | 86.56          | 1  | 86.56       | 3.19    | 0.0959  |
| D              | 390.45         | 1  | 390.45      | 14.37   | 0.0020  |
| AB             | 17.47          | 1  | 17.47       | 0.64    | 0.4359  |
| AC             | 30.75          | 1  | 30.75       | 1.13    | 0.3054  |
| AD             | 56.78          | 1  | 56.78       | 2.09    | 0.1703  |
| BC             | 1.08           | 1  | 1.08        | 0.040   | 0.8447  |
| BD             | 5.81           | 1  | 5.81        | 0.21    | 0.6509  |
| CD             | 5.20           | 1  | 5.20        | 0.19    | 0.6684  |
| A <sup>2</sup> | 100.50         | 1  | 100.50      | 3.70    | 0.0750  |
| B <sup>2</sup> | 2.65           | 1  | 2.65        | 0.097   | 0.7596  |
| C <sup>2</sup> | 9.62           | 1  | 9.62        | 0.35    | 0.5613  |
| D <sup>2</sup> | 28.54          | 1  | 28.54       | 1.05    | 0.3228  |
| Residual       | 380.28         | 14 | 27.16       |         |         |
| Lack of Fit    | 351.58         | 10 | 35.16       | 4.90    | 0.0696  |
| Pure Error     | 28.70          | 4  | 7.17        |         |         |
| Cor Total      | 2026.87        | 28 |             |         |         |

(e) Turbidity removal rate

| Source         | Sum of squares | df | Mean square | F value | P value |
|----------------|----------------|----|-------------|---------|---------|
| Model          | 3854.86        | 14 | 275.35      | 11.68   | <0.0001 |
| A              | 1829.78        | 1  | 1829.78     | 77.63   | <0.0001 |
| B              | 1177.90        | 1  | 1177.90     | 49.98   | <0.0001 |
| C              | 0.27           | 1  | 0.27        | 0.012   | 0.9158  |
| D              | 46.97          | 1  | 46.97       | 1.99    | 0.1799  |
| AB             | 1.95           | 1  | 1.95        | 0.083   | 0.7781  |
| AC             | 6.05           | 1  | 6.05        | 0.26    | 0.6202  |
| AD             | 0.73           | 1  | 0.73        | 0.031   | 0.8627  |
| BC             | 19.58          | 1  | 19.58       | 0.83    | 0.3775  |
| BD             | 2.45           | 1  | 2.45        | 0.10    | 0.7519  |
| CD             | 7.45           | 1  | 7.45        | 0.32    | 0.5828  |
| A <sup>2</sup> | 710.78         | 1  | 710.78      | 30.16   | <0.0001 |
| B <sup>2</sup> | 85.32          | 1  | 85.32       | 3.62    | 0.0779  |
| C <sup>2</sup> | 112.75         | 1  | 112.75      | 4.78    | 0.0462  |
| D <sup>2</sup> | 14.65          | 1  | 14.65       | 0.62    | 0.4436  |
| Residual       | 329.97         | 14 | 23.57       |         |         |
| Lack of Fit    | 261.52         | 10 | 26.15       | 1.53    | 0.3629  |
| Pure Error     | 68.45          | 4  | 17.11       |         |         |
| Cor Total      | 4184.83        | 28 |             |         |         |

(Annotation: A refers to Filtration rate, B refers to Filter depth, C refers to Hydraulic head, D refers to Temperature)