**Supplementary Material**



**Fig. S1.** Absorption spectrum of 100 ppm TBP in Evian water (cuvette width, 10 mm).

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|  | Sum ofSquares | df | MeanSquare | FValue | p-value |
| Source | Prob > F |
| Model | 333.9700 | 4 | 83.4900 | 279.8600 | 0.0001 |
|  A-pH | 0.0913 | 1 | 0.0913 | 0.3059 | 0.5858 |
|  B-Conc TBP | 8.5300 | 1 | 8.5300 | 28.5800 | 0.0001 |
|  C-Eq H2O2 | 305.8000 | 1 | 305.8000 | 1025.0500 | 0.0001 |
|  C2 | 38.4500 | 1 | 38.4500 | 128.9000 | 0.0001 |
| Residual | 6.5600 | 22 | 0.2983 |  |  |
| Cor Total | 340.5300 | 26 |  |  |  |
|  |  |  |  |  |  |
| Std. Dev. | 0.5462 |  | R-Squared | 0.9807 |  |
| Mean | 6.7400 |  | Adj R-Squared | 0.9772 |  |
| C.V. % | 8.1000 |  | Pred R-Squared | 0.9697 |  |
|  |  |  | Adeq Precision | 40.5729 |  |
|  |  |  |  |  |  |
| (P release 60min)0,5 |  = |  | Model | Significant |  |
| 2.133590 |   |  |  A-pH | Non Significant |  |
| 0.021709 |  \* pH |  |  B-Conc TBP | Significant |  |
| -0.001526 |  \* Conc TBP |  |  C-Eq H2O2 | Significant |  |
| 0.479000 |  \* Eq H2O2 |  |  C2 | Significant |  |
| -0.006663 |  \* Eq H2O2 2 |  | Std. deviation | Significant |  |
|  |  |  | Adequation | Significant |  |
|  |  |  | Precision | Significant |  |

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$$\sqrt{Y\_{PO4} (60 min)}=2.13+0.022⋅pH-0.0015⋅C\_{TBP}+0.479⋅D\_{H\_{2}O\_{2}}-0.0067 ⋅D\_{H\_{2}O\_{2}}^{2}$$

**Fig. S2.** Output of the fitting software Design Expert 11 for the reduced quadratic model of phosphate release after 1h.

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| --- | --- | --- | --- | --- | --- |
|  | Sum ofSquares | df | MeanSquare | FValue | p-value |
| Source | Prob > F |
| Model | 16595.9600 | 8 | 2074.4950 | 74.4900 | 0.0001 |
|  A-pH | 211.4400 | 1 | 211.4400 | 7.5900 | 0.0130 |
|  B-Conc TBP | 199.4400 | 1 | 199.4400 | 7.1600 | 0.0154 |
|  C-Eq H2O2 | 11243.8900 | 1 | 11243.8900 | 403.7200 | 0.0001 |
|  AB | 433.6300 | 1 | 433.6300 | 15.5700 | 0.0009 |
|  BC  | 261.2500 | 1 | 261.2500 | 9.3800 | 0.0067 |
|  A2 | 349.2100 | 1 | 349.2100 | 12.5400 | 0.0023 |
|  B2 | 1125.3700 | 1 | 1125.3700 | 40.4100 | 0.0001 |
|  C2 | 935.8000 | 1 | 935.8000 | 33.6000 | 0.0001 |
| Residual | 501.3200 | 18 | 27.8511 |  |  |
| Cor Total | 17097.2800 | 26 |  |  |  |
|  |  |  |  |  |  |
| Std. Dev. | 5.2800 |  | R-Squared | 0.9707 |  |
| Mean | 45.8100 |  | Adj R-Squared | 0.9576 |  |
| C.V. % | 11.5200 |  | Pred R-Squared | 0.9358 |  |
|  |  |  | Adeq Precision | 26.8683 |  |
|  |  |  |  |  |  |
|  |  |  | Model | Significant |  |
| TOC removal 60min |  = |  |  A-pH | Significant |  |
| -25.402910 |   |  |  B-Conc TBP | Significant |  |
| 15.574030 | \* pH |  |  C-Eq H2O2 | Significant |  |
| 0.092403 | \* Conc TBP |  |  AB | Significant |  |
| 0.244197 | \* Eq H2O2 |  |  BC | Significant |  |
| -0.004065 | \* pH \* Conc TBP  |  |  A2 | Significant |  |
| -0.000531 |  \* Conc TBP \* Eq H2O2 |  |  B2 | Significant |  |
| -1.179240 |  \* pH ² |  |  C2 | Significant |  |
| -6.90E-05 |  \* Conc TBP ² |  | Std. deviation | Non Significant |  |
| 0.032868 |  \* Eq H2O2 ² |  | Adequation | Significant |  |
|  |  |  | Precision | Significant |  |

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$$X \left(60 min\right)=- 25.403+15.574⋅pH+0.092⋅C\_{TBP}+0.244⋅D\_{H\_{2}O\_{2}}-0.0041 ⋅pH⋅C\_{TBP}-5.31⋅10^{-4}⋅C\_{TBP}⋅D\_{H\_{2}O\_{2}}-1.179⋅pH^{2}-6.90⋅10^{-5}⋅ C\_{TBP}^{2} +0.033⋅D\_{H\_{2}O\_{2}}^{2}$$

**Fig. S3.** Output of the fitting software Design Expert 11 for the reduced quadratic model of TOC removal after 1h.

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| --- | --- | --- | --- | --- | --- |
|  | Sum ofSquares | df | MeanSquare | FValue | p-value |
| Source | Prob > F |
| Model | 236.7700 | 5 | 47.3500 | 154.2300 | 0.0001 |
|  A-pH | 1.6500 | 1 | 1.6500 | 5.3800 | 0.0306 |
|  B-Conc TBP | 37.2200 | 1 | 37.2200 | 121.2300 | 0.0001 |
|  C-Eq H2O2 | 196.2000 | 1 | 196.2000 | 638.9900 | 0.0001 |
|  BC | 2.0400 | 1 | 2.0400 | 6.6500 | 0.0175 |
|  C2 | 6.5800 | 1 | 6.5800 | 21.4400 | 0.0001 |
| Residual | 6.4500 | 21 | 0.3070 |  |  |
| Cor Total | 243.2100 | 26 |  |  |  |
|  |  |  |  |  |  |
| Std. Dev. | 0.5541 |  | R-Squared | 0.9735 |  |
| Mean | 5.0100 |  | Adj R-Squared | 0.9672 |  |
| C.V. % | 11.0700 |  | Pred R-Squared | 0.9559 |  |
|  |  |  | Adeq Precision | 38.0325 |  |
|  |  |  |  |  |  |
| (P release 15min)^0.5 |  = |  | Model | Significant |  |
| 1.821930 |   |  |  A-pH | Significant |  |
| 0.092345 |  \* pH |  |  B-Conc TBP | Significant |  |
| -0.002251 |  \* Conc TBP |  |  C-Eq H2O2 | Significant |  |
| 0.304611 |  \* Eq H2O2 |  |  BC | Significant |  |
| -4.70E-05 |  \* Conc TBP \* Eq H2O2 |  |  B2 | Significant |  |
| -0.002757 |  \* Eq H2O2 2 |  | Std. deviation | Significant |  |
|  |  |  | Adequation | Significant |  |
|  |  |  | Précision | Significant |  |

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| $$\sqrt{Y\_{PO4} (15 min)}=1.822+0.092⋅pH-0.0023⋅C\_{TBP}+0.305⋅D\_{H\_{2}O\_{2}}-4.70⋅10^{-5}⋅C\_{TBP}⋅D\_{H\_{2}O\_{2}}-0.0028 ⋅D\_{H\_{2}O\_{2}}^{2}$$ |

**Fig. S4.** Output of the fitting software Design Expert 11 for the reduced quadratic model of phosphate release after 15 min.