Supplementary Materials

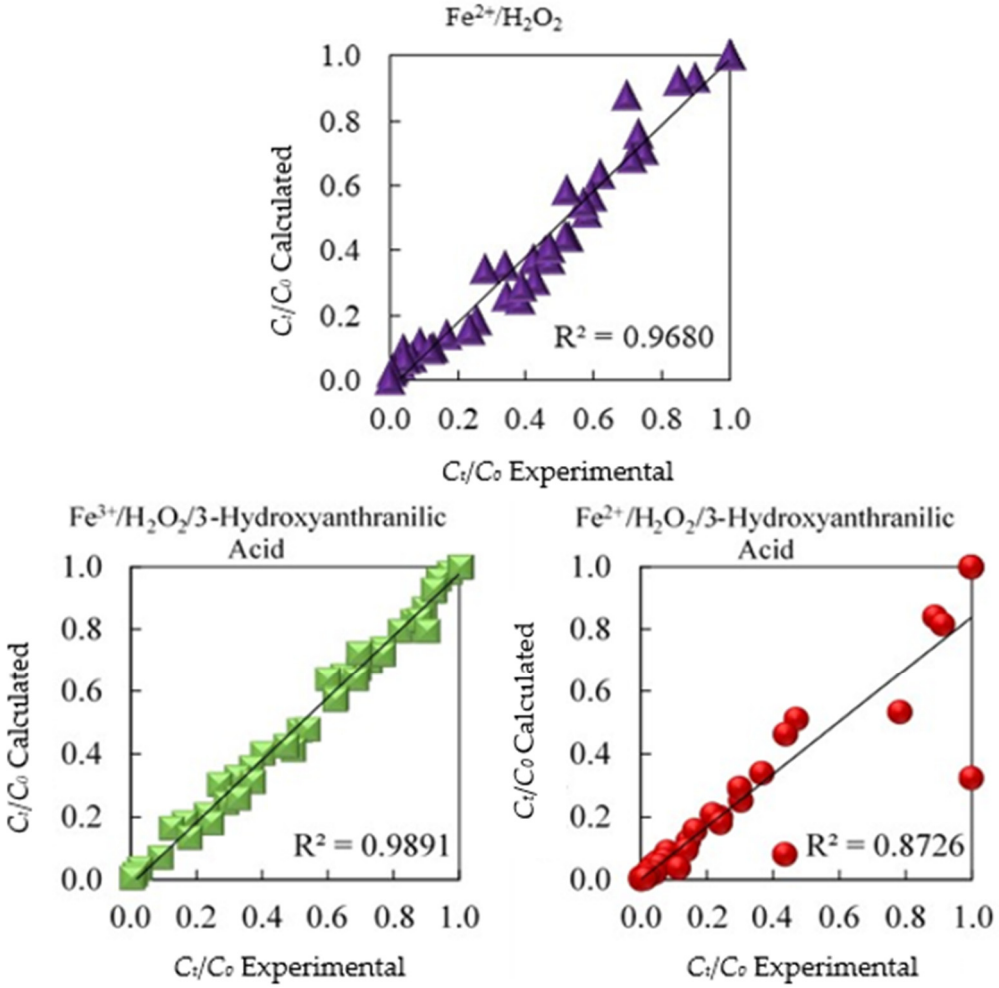

Figure S1. Parity plots of Phenol Red decolorization data by Fenton processes in the absence (control) or presence of 3-Hydroxyanthranilic Acid as reducer. Reaction systems: Fe^{2+}/H_2O_2 (▲), Fe^{2+}/H_2O_2/reducer (●) and Fe^{3+}/H_2O_2/reducer (■).

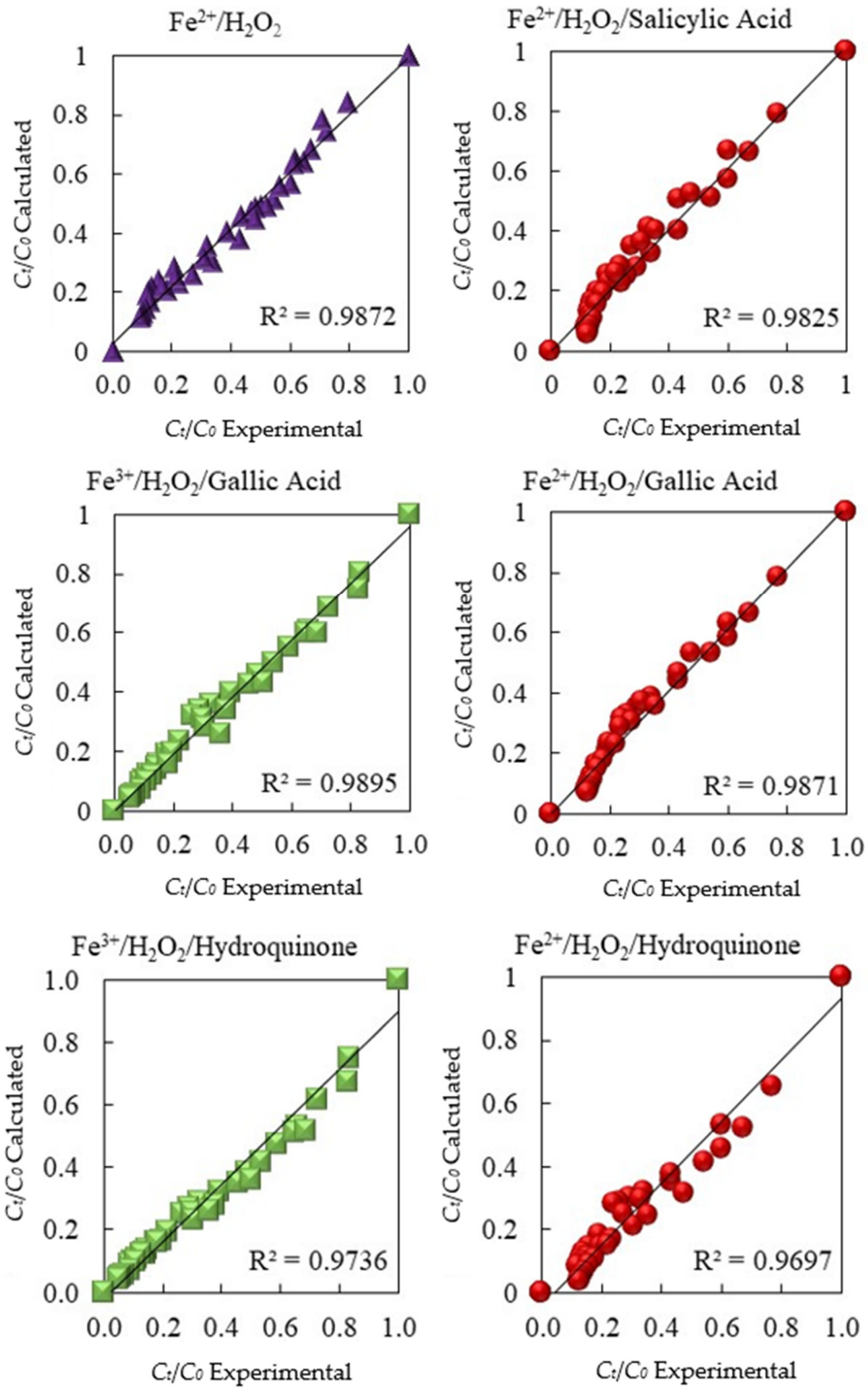

Figure S2. Parity plots of Bismarck Brown Y decolorization data by Fenton processes in the absence (control) or presence of Hydroquinone, Gallic Acid or Salicylic Acid. Reaction systems: Fe^{2+}/H_2O_2 (▲), Fe^{2+}/H_2O_2/reducer (●) and Fe^{3+}/H_2O_2/reducer (■).

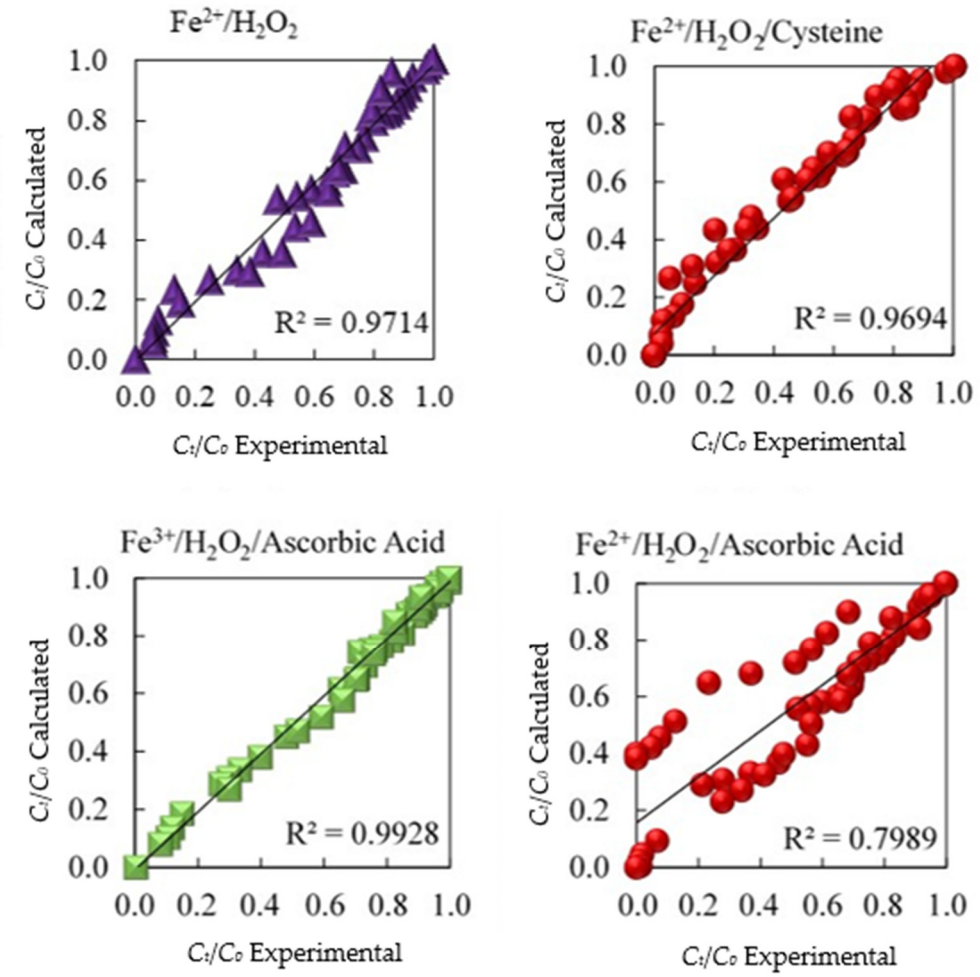

Figure S3. Parity plots of Safranin T decolorization data by Fenton processes in the absence (control) or presence of Cysteine or Ascorbic Acid as reducers. Reaction systems: Fe^{2+}/H_2O_2 (▲), Fe^{2+}/H_2O_2/reducer (●) and Fe^{3+}/H_2O_2/reducer (■).

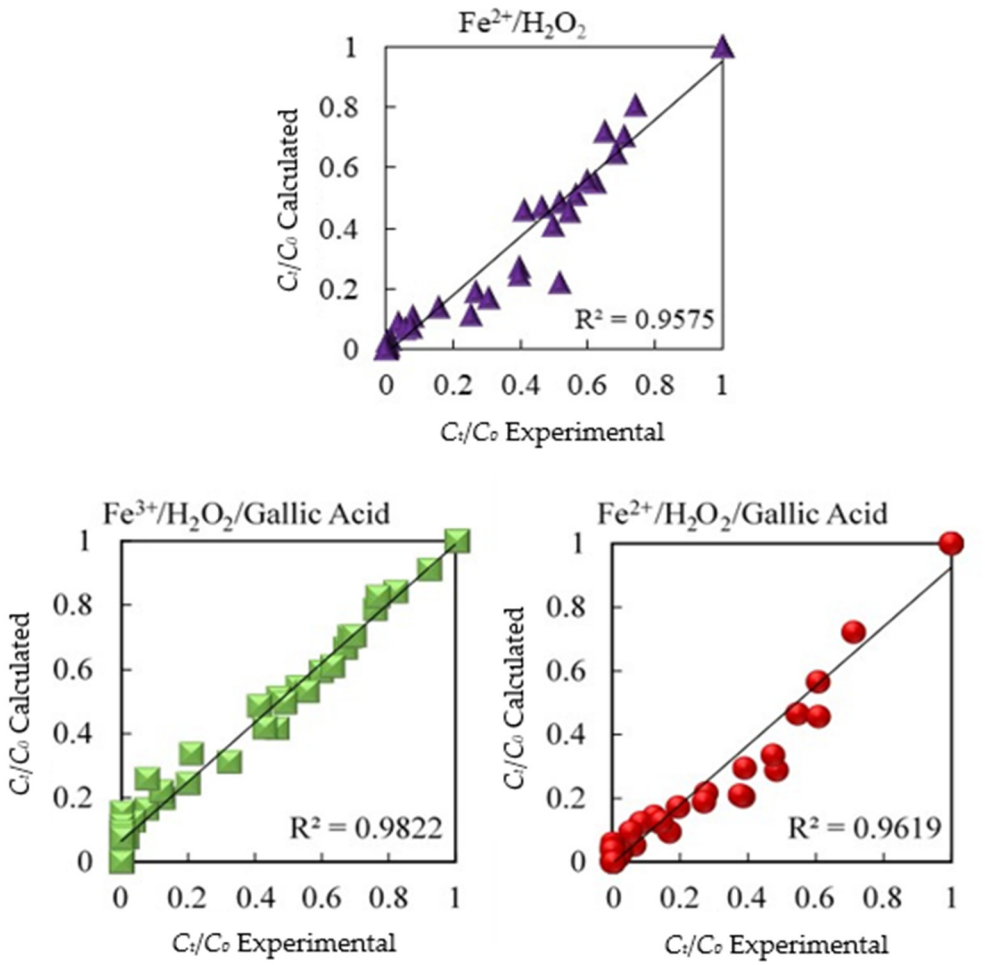

Figure S4. Parity plots of Methyl Orange decolorization data by Fenton processes in the absence (control) or presence of Gallic Acid as reducer. Reaction systems: Fe^{2+}/H_2O_2 (▲), Fe^{2+}/H_2O_2/reducer (●) and Fe^{3+}/H_2O_2/reducer (■).

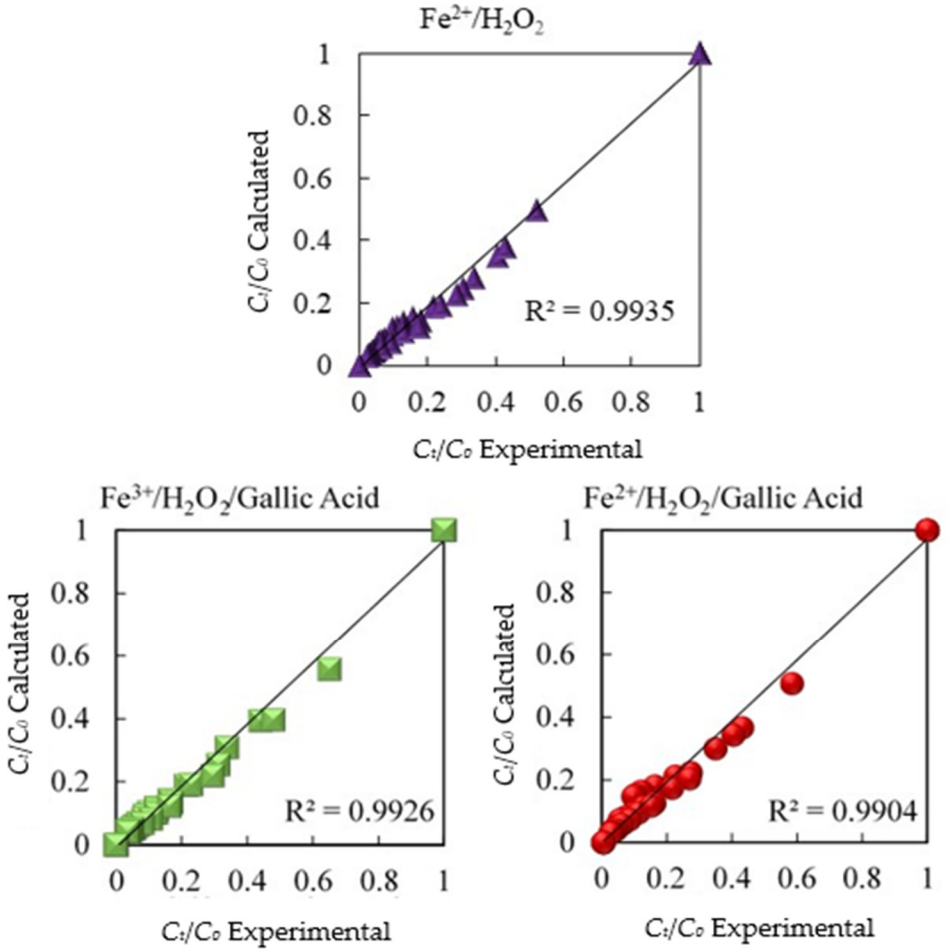

Figure S5. Parity plots of Chromotrope R decolorization data by Fenton processes in the absence (control) or presence of Gallic Acid as reducer. Reaction systems: Fe^{2+}/H_2O_2 (▲), Fe^{2+}/H_2O_2/reducer (●) and Fe^{3+}/H_2O_2/reducer (■).

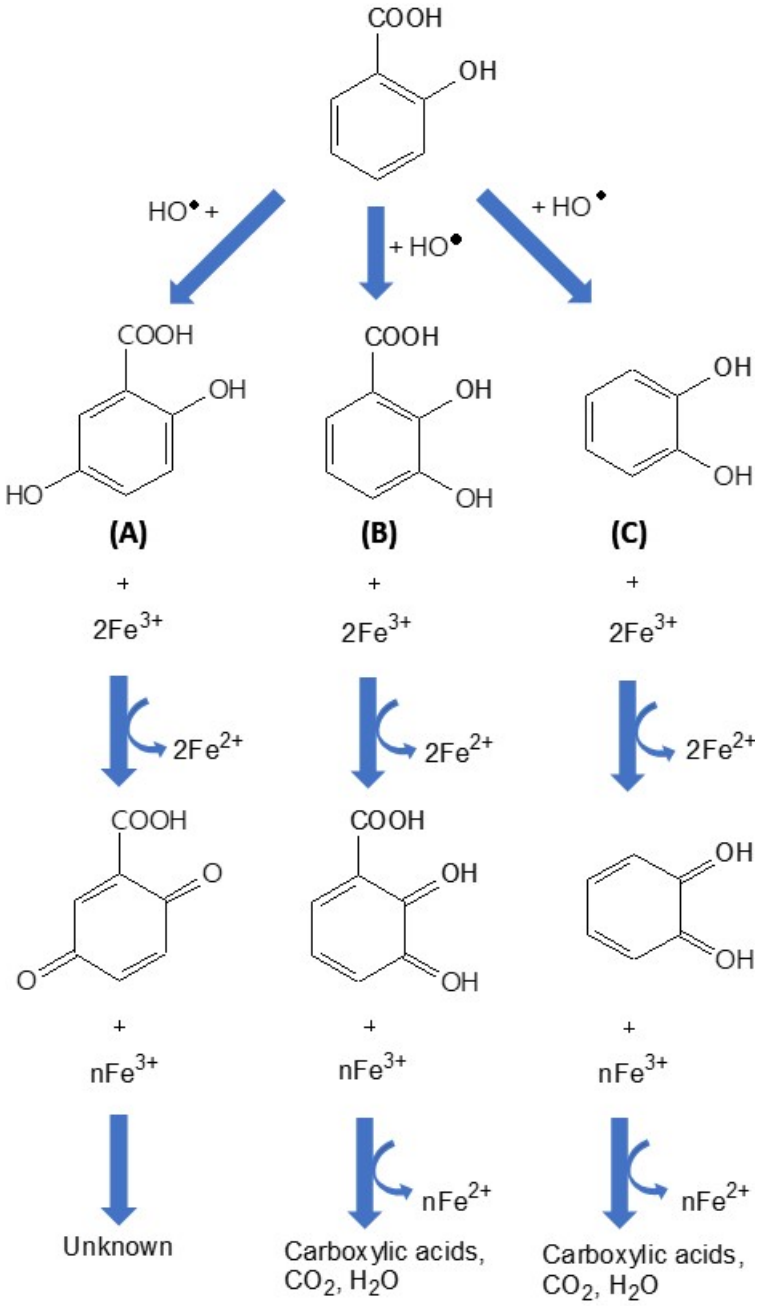

Figura S6. Fe^{3+}-reducing intermediates formed from Salicylic Acid hydroxylation [1]. (A) 2,5-dihydroxybenzoic acid, (B) 2,3-dihydroxybenzoic acid, (C) catechol; reactions between Fe^{3+} ions, intermediates and products of its oxidation (quinones, carboxylic acids, CO_2, H_2O). Adapted from [2].

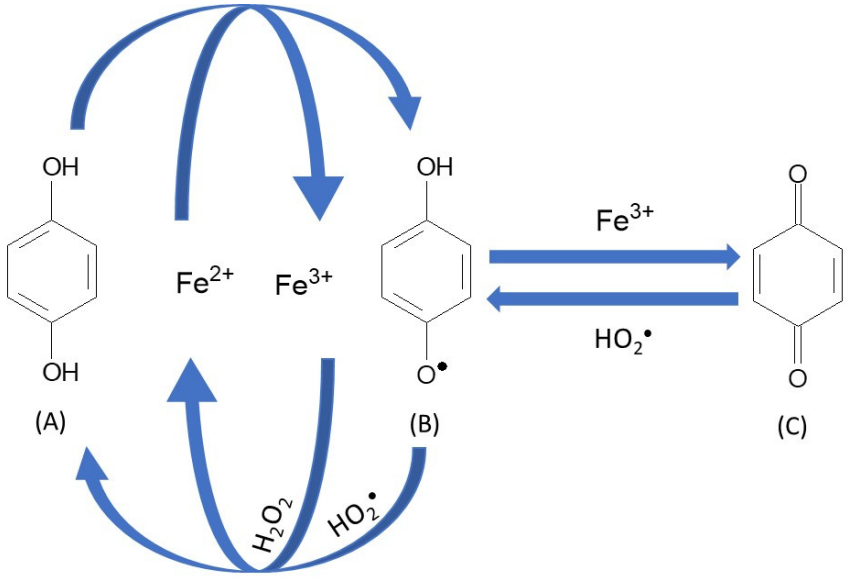

Figure S7. Reactions between Fe ions, $HO_2^{\bullet}$ radical, Hydroquinone, and its intermediates (reproduced from [3]; license number 5742010257041).

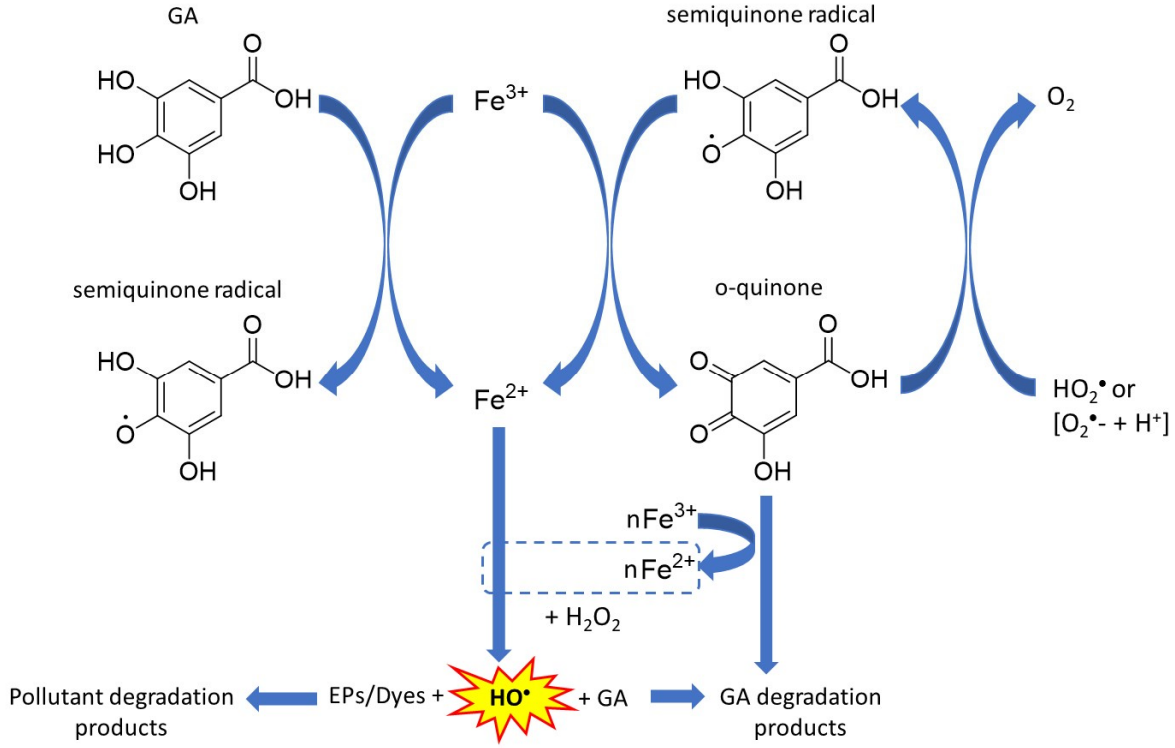

Figure S8. Reduction of Fe^{3+} ions by Gallic Acid (GA) and its oxidized intermediates. The regenerated Fe^{2+} ions can react with H_2O_2 to generate more $HO^{\bullet}$ radicals *via* Fenton reaction. Reproduced from [4]; this article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

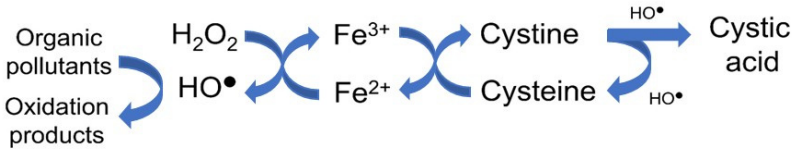

Figure S9. Reactions between Fenton reagents (Fe ions, H_2O_2), Cysteine, and their intermediates (Cystine, Cystic acid), HO• radical, and organic pollutants eventually present in the solution (reproduced from [3]; license number 5742010257041).

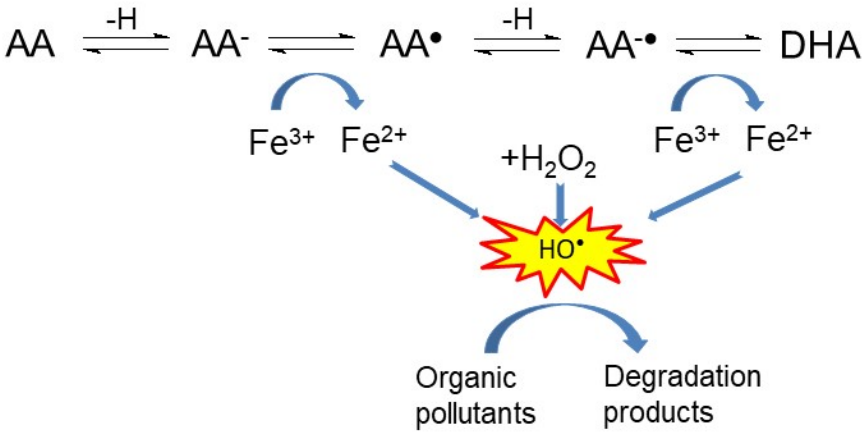

Figure S10 - Reactions between Fenton reagents (Fe ions, H_2O_2), Ascorbic Acid (AA), and their intermediates (AA^-—ascorbato monoanion; AA•—semidehydroascorbate radical; AA^{-}•—Ascorbyl radical; DHA—dehydroascorbic acid), HO• radical, and degradation of organic pollutants eventually present in the solution (reproduced from [5]; license number 5742010679697).

References

1. Chen, F.; Ma, W.; He, J.; Zhao, J. Fenton degradation of malachite green catalyzed by aromatic additives. *J. Phys. Chem. A* **2002**, *106*, 9485–9490.
2. Sousa, J.L.; Aguiar, A. Influence of aromatic additives on Bismarck Brown Y dye color removal treatment by Fenton processes. *Environ. Sci. Pollut. Res.* **2017**, 24, 26734–26743.
3. Li, T.; Zhao, Z.; Wang, Q.; Xie, P.; Ma, J. Strongly enhanced Fenton degradation of organic pollutants by cysteine: an aliphatic amino acid accelerator outweighs hydroquinone analogues. *Water Res.* **2016**, *105*, 479–486.
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5. Ramos, M.D.N.; Silva, G.L.S.; Lessa, T.L.; Aguiar, A. Study of kinetic parameters related to dyes oxidation in ascorbic acid-mediated Fenton processes. *Process Saf. Environ. Prot.* **2022**, *168*, 1131-111.