

Photosensitized Degradation of Bisphenol A by Dissolved Organic Matter

Supporting Information

Photodegradation of Trimethylphenol Promoted by Suwannee River Fulvic Acid

We conducted four control experiments to investigate the factors that contributed to the rapid photodegradation of TMP in the SRFA solutions. A solution of TMP ($\sim 4 \mu\text{M}$) and SRFA was irradiated in the solar simulator, incubated in the dark, and spiked with MeOH (20 mM). In an additional experiment, a solution of TMP ($\sim 4 \mu\text{M}$) only (no SRFA) was also irradiated. For a given experiment, the concentration TMP was measured using HPLC, and the decay kinetics were fit to the pseudo-first order model using least squares regression (Microsoft Excel) to determine the value of k_{obs} , the pseudo-first order rate coefficient. This parameter was used to gauge the reactivity of TMP in a given experiment.

The results are presented below (Figure S1). For the dark reaction, k_{obs} was not statistically different from zero, and as expected, TMP did not react with SRFA in the dark. We observed no statistical difference between the observed rate coefficients measured for TMP degradation in the absence and presence of methanol which suggested that trimethylphenol (TMP) did not degrade via a hydroxyl radical mediated pathway in the SRFA solutions. The control experiment (SRFA absent) revealed that direct photolysis of TMP could account for, *at most*, 30% of the reaction in the light.

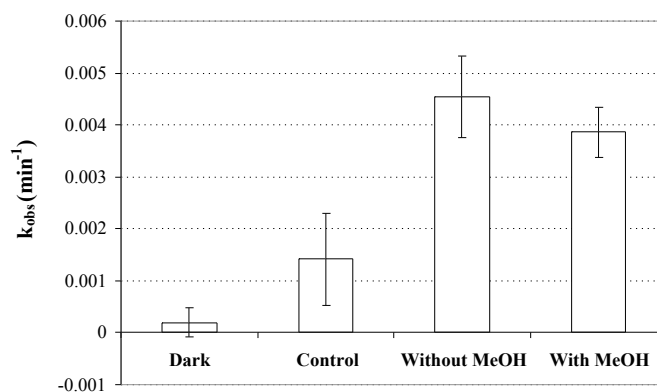


Figure S1. Pseudo-first order rate coefficients (k_{obs}) measured for the degradation of trimethylphenol under various reaction conditions (as explained in the text). The error bars represent one standard deviation determined from the linear fit of the first-order decay data ($\ln[\text{TMP}]$ versus time).

Effect of Irradiation on the Molar Extinction Coefficient of SRFA at 336 nm

We observed that the molar extinction coefficient (ϵ) at 336 nm for the SRFA solution consistently decreased during irradiation with our solar simulator (Figure S2). This observation suggested that photobleaching changed the composition of the chromophores in the SRFA solution.

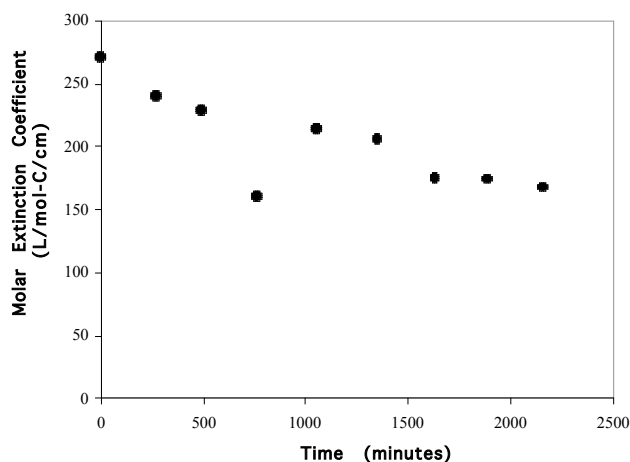


Figure S2. Carbon-normalized molar extinction coefficient (ϵ) (L/mol-C/cm) at 336 nm measured for the SRFA solution. For each data point, UV-Vis absorbance and carbon concentration were measured via TOC (Shimadzu TOC-5000) and the Varian Cary 1 UV-Vis, respectively.