



## **Photofate of Tetrabromobisphenol A (TBBPA) in Waters Under Natural and Simulated Sunlight**

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The discontinued use of polybrominated diphenyl ethers as flame retardants in consumer products has led to its replacement by other brominated compounds, such as tetrabromobiphenol A (TBBPA). TBBPA is extensively used across the globe and its detection in remote regions (e.g. Arctic inhabitants, wildlife, and vegetation) strongly suggests their potential to be globally transported. As such the widespread presence of TBBPA is of concern since it is an endocrine disruptor. The goal of this project is to evaluate the photofate of TBBPA in sunlit natural waters by investigating the effect of environmental parameters (such as polar-derived dissolved organic matter (DOM) and pH) on the reaction rates, formation of photoproducts, and degradation pathway. Photolysis experiments were performed under natural and simulated sunlight and assayed by ultra performance liquid chromatography-mass spectrometry, which was used to both quantify TBBPA and identify photoproducts. First order direct photolysis half-lives of TBBPA increased with decreasing pH (2.5 min in pH 10.5 water, 3.3 min in pH 8 water, and 26 min in pH 5.5 water), and is likely due to an increase overlap between sunlight irradiance and TBBPA absorption spectra its ionized form. Polar-derived DOM slowed the photoreactivity of TBBPA by 16 to 32%, suggesting that DOM screens the wavelengths responsible for its observed photodegradation. The quality of DOM affected the occurrence and distribution of TBBPA photoproducts.