CHARACTERIZATION OF PRECURSORS TO TRIHALOMETHANES IN SOURCE WATER BY FLUORESCENCE SPECTROSCOPY

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Natural organic matter (NOM) in source water is a complex mixture of various hydrocarbon structures that have attached functional groups. During disinfection process of drinking water, NOM is oxidized by chlorine and form toxic disinfection by-products e.g. Trihalomethanes (THMs) and Haloacetic acids (HAAs). However, not all organic compounds are equally reactive to THMs formation. To identify THMs precursors in the source water, NOM was isolated via resin adsorption into six fractions: Hydrophobic acid (HPOA), Hydrophobic neutral (HPON), Hydrophobic base (HPOB), Hydrophilic acid (HPIA), Hydrophilic neutral (HPIN), and Hydrophilic base (HPIB). All six fractions were incubated by chlorine at pH 7 and 25 ^{o}C in dark for seven days. THMs formation was measured using gas chromatograph coupled with electron capture detector. HPOA fraction, composing of humic and fulvic acids, was the most reactive to THMs formation and considered as the major THMs precursors. All the six fractions were also characterized by fluorescence spectroscopy to obtain three-dimension fluorescence spectra. The spectra shape and peak locations are characteristics of each organic compound and also called Spectral Fluorescence Signature (SFS). The SFS is the total sum of emission intensity of a sample at different excitation wavelengths, recorded as a matrix of fluorescent intensity in coordinates of excitation and emission wavelengths. SFS of HPOA was large and its peak intensity was high compared to those of other organic fractions. Therefore SFS could be a very promising technique to determine the amount THMs precursors in the water samples.