

FORMATION STUDIES ON N-NITROSODIMETHYLAMINE (NDMA) IN NATURAL WATERS

Xianghua Luo

Dr. Thomas E. Clevenger, Dissertation Supervisor

ABSTRACT

N-nitrosodimethylamine (NDMA) is a chloramines disinfection by-product and probable carcinogen to human. The California state established a 10 ng/L action level for NDMA in drinking water.

Analytical method of NDMA in waters at the trace level was developed using gas chromatography/mass spectrum with chemical ionization in the mode of selected ion storage coupled with solid phase extraction.

It was found that 4 utilities in Missouri using monochloramine as disinfectant had NDMA higher than 10 ng/L in drinking water.

Natural organic matter (NOM), especially the hydrophilic fraction of the NOM, was found to be a predominant NDMA precursors. Basic conditions and bromide ions favor NDMA formation in natural waters.

The findings reported in this dissertation provide data on NDMA occurrences in drinking water and natural waters in Missouri. The results provide valuable information about NDMA precursors in natural waters and this information could be used in the further study of mitigating NDMA formation or removing NDMA precursors in drinking water utilities. The results on factors affecting on NDMA formation provide more information for water utilities to determine operation conditions to reduce and control NDMA formation.