Monitoring emerging chlorination by-products in drinking water using UV-absorbance and fluorescence indexes

Paolo Roccaro*, Federico G.A. Vagliasindi

Department of Civil and Environmental Engineering, University of Catania, Viale A. Doria 6, 95125, Catania, Italy
Tel. +39 095 7382729; email: proccaro@dica.unict.it

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**Abstract**

Recent studies have shown that emerging disinfection by-products (DBPs), such as haloacetonitriles (HANs), are much more toxic than regulated DBPs (e.g., trihalomethanes, THMs). Thus, this study explored the use of spectroscopic indexes to monitor the formation of unregulated emerging DBPs in chlorinated raw or treated water from the Ancipa Water Treatment Plant in Sicily (Italy). Specific attention was given to the formation of DBPs in treated water in order to evaluate the application of this approach for real time monitoring of DBPs in water distribution systems. In this study, it was found that total haloacetonitriles (THAN) occurs in chlorinated drinking waters at lower concentration than that of total trihalomethanes (TTHM), while total haloacetic acids (THAA) occurs at the highest concentration. Obtained results have shown that changes in UV-absorbance and fluorescence of natural organic matter (NOM) observed in chlorinated treated water are quantifiable as well as in raw waters. Very strong correlations were found between concentrations of emerging and unregulated DBPs (e.g., HANs) and UV-absorbance or fluorescence indexes. These correlations are very strong even for treated water containing very low concentrations of some DBPs species. Therefore, the examined spectroscopic indexes can be used to monitor the formation of emerging DBPs in practically important situations.

**Keywords:** Chlorination; Disinfection by-Products; Natural organic matter; Real time monitoring; Spectroscopy

* Corresponding author.