

DETERMINATION OF TRIHALOMETHANE CONTENT IN DRINKING WATER

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Background: Disinfection is the most important stage in preparation of drinking water, and the most commonly used disinfectant is chlorine. However, despite chlorine's effectiveness as a disinfectant, its oxidizing power can form disinfection byproducts, derived from oxidation reactions involving natural or artificial compounds present in water. The most common disinfection by-products are trihalomethanes (THMs), of which there are four main ones: chloroform, bromodichloromethane, dibromochloromethane and bromoform. Exposure to THMs occurs via oral, dermal and inhalation routes of exposure. After absorption, these elements tend to bioaccumulate in adipose tissue, liver, kidneys and lungs according to their concentration and mode of exposure and can cause both short-term and long-term health effects, which can lead to cancer risks and adverse reproductive outcomes.

Methods and Objectives: The aim of this work was to determine the content of THMs in drinking water and to determine whether the obtained values are in accordance with the legal regulations. Drinking water was sampled at 18 different locations in the city of Belgrade THMs were determined by GC-MS (THERMO Scientific ISQ Series single quadrupole GC-MS). A Thermo HP-MS chromatographic column 30m x 0.25mm x 0.25µm was used, and calibration was carried out using a certified reference material, AccuStandard Inc, Trihalomethanes Mix, lot 214111083.

Results: Limit of quantification (LOQ) value for each individual THM was 1 µg/L. In the examined samples, the obtained values for THMs did not exceed the maximum permissible value (100 µg/L). Chloroform content was in the range of 5-20 µg/L; dichlorobromomethane from 1-10 µg/L, dibromochloromethane from 1-5 µg/L, while bromoform was less than the LOQ.

Conclusion: From the obtained results, it is evident that chloroform (max 20 µg/L) predominates among trihalomethanes, while the content of bromoform is below LOQ. The results of testing trihalomethanes in drinking water samples sampled in the territory of the city of Belgrade are not above the maximum acceptable concentration of 100 µg/L, which indicates that the water is healthy and meets the current legal regulations.

Keywords: Drinking water, Disinfectants, Trihalomethanes, GC-MS