

Trihalomethanes in Municipal Drinking Water Supplies in Saskatchewan

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The disinfection of drinking water supplies is routinely carried out in order to prevent the occurrence of waterborne diseases. Unfortunately most traditional disinfection processes have been found to create another potential health risk, the formation of toxic by-products. Free chlorine reacts with dissolved organic matter and bromide to produce a series of halogenated organic compounds such as trihalomethanes (THMs) and haloacetic acids. Most of the studies carried out on the formation and presence of disinfection by-products in treated drinking water have been focussed on four THMs. These disinfection by-products have been shown to be carcinogenic in animal studies and are suspected to be human carcinogens based on epidemiological data.

As a requirement of the licensing of municipal drinking water treatment plants, the final product must be tested quarterly for THMs. The current Canadian drinking water quality guideline has been established at 100 µg/L, based on an annual average of seasonal testing. In Saskatchewan, approximately 125 municipal drinking water supplies that utilize surface water as a source of raw water are subject to the testing requirements.

THM levels are known to be influenced by numerous factors including the concentration of free chlorine, bromide and dissolved organic matter as well as the pH and temperature of the water. For some supplies, considerable variation is seen in the THM concentrations from one season to another. In general, THM levels are highest during the spring (April to June) and summer (July to September) seasons.

Based on recent data obtained for 74 supplies where all four seasonal samples were submitted, almost one-third were found to exceed the guideline based on an annual average of quarterly test results. In fact 44 of the 74 supplies were found to exceed the guideline in one or more of the quarterly tests. Chloroform, the most frequently detected THM, was found in 95% of all samples tested. The total THM concentration was found to range anywhere from non-detectable (less than 5 µg/L) up to 746 µg/L. The average and median total THM concentrations were determined to be 100 and 63 µg/L, respectively.