

Chloramines

Chloramines in Drinking Water

Chloramines are one of the disinfectants used in drinking water. They are used to control bacterial growth and taste and odour problems in drinking water. Chloramines help to deliver safe drinking water, with the lowest possible levels of trihalomethanes (THMs). THMs are "disinfection by-products" of the water treatment process. They are formed when naturally occurring organic substances found in raw water, react with chlorine used to treat the water. THMs can have negative health consequences if consumed at high levels for many years.

What are Chloramines

The maximum acceptable concentration (MAC) for chloramines in drinking water in Ontario is 3.0 mg/L (Ontario Drinking Water Quality Standards, Ontario Regulation 169/03). Chloramines are produced when ammonia is added to chlorinated water during the disinfection process. Chloramine is a very weak disinfectant that is most suited for use as a stable distribution system disinfectant. Chloramination usually results in the production of lower levels of trihalomethanes and other chlorination by-products in the drinking water.

What are the Health Risks

Although Chloramines are nontoxic to healthy people, they can have a weakening effect on individuals with kidney disease who must undergo **dialysis**. Chloramines must be removed from the water used in dialysis treatments. Please ask your physician or dialysis centre for further information if you have any concerns.

Also, Chloramines can be deadly for **fish**. They can cross the gill tissue and enter the blood stream to bind with red blood cells preventing oxygen from being carried through the blood stream. This causes a sudden and severe disorder which may be lethal. For this reason all Chloramine compounds must be removed from the water prior to any contact with fish. Please call your local pet aquatics store for assistance.

Why use Chloramines instead of Chlorine?

Surface water contains organic matter. When organic matter combines with chlorine Trihalomethane, a by-product is formed. Trihalomethanes may be linked to a slightly increased risk of some types of cancer. When organic matter is combined with Chloramines, the forming of the by-product Trihalomethanes will be reduced in the range of 40 – 80%. The maximum acceptable concentration for Trihalomethanes in Ontario is 0.1 mg/L.

If chlorine and ammonia are toxic to mix, why is it safe to drink chlorine and ammonia in the form of chloramines?

Household chemical cleaners such as chlorine bleach and ammonia are highly concentrated solutions; the hazardous mixture of these chemicals is due to their high concentrations. In comparison, the concentrations of chlorine and ammonia added to drinking water for disinfection are very low, so low that concentrations are expressed in "parts per million" or ppm. The maximum acceptable concentration (MAC) for chloramines in drinking water in Ontario is 3.0 mg/L or 3 ppm. As an analogy, one ppm represents about 5 tablespoons in a 20,000 gallon swimming pool.

Should I stop drinking the water?

No, it is very important to maintain fluid intake of approximately 2 liters per day. Everyone can drink water that contains chloramines.

What are my options to reduce the Chloramines in my water?

If you want to reduce the amount of Chloramines in your water, a granular activated carbon filter or ascorbic acid can be used to reduce Chloramine residuals. Home filtration systems may reduce residuals as well.

References:

Procedure for Disinfection of Drinking Water in Ontario, PIBS 4448e01, Second revision: June 4, 2006.
Ontario Regulation 169/03, Ontario Drinking Water Quality Standards,
Priority Substances List Assessment Report for Inorganic Chloramines, Environment Canada and Health Canada, 2001, ISBN: 0-662-29361-4,
Domestic Water Disinfection Using Chloramines, Stanford University