



TRIHALOMETHANES (CHLORINATED DISINFECTION BYPRODUCTS)

What are TRIHALOMETHANES?

Trihalomethanes (THMs) are liquid by-products formed when chlorine is used to disinfect water to make it safer to drink. THMs are colorless with a slight chlorine-like scent. These chemicals are called THMs because each contains three halogen molecules: chlorine, bromine or a mixture of chlorine and bromine.

Where are THMs found and how are they used?

THMs last for a long time in groundwater but vaporize quickly from surface waters. THMs break down slowly in the air. They do not build up in fish or in plants.

The main THMs present in drinking water that is disinfected with chlorine are:

1. Chloroform (CHCl₃) – also known as methane trichloride, methyl trichloride, or trichloromethane. Chloroform is the most common THM.
2. Bromodichloromethane (CHBrCl₂) – also known as dichlorobromomethane.
3. Dibromochloromethane (CHBr₂Cl) – also known as chlorodibromomethane.
4. Bromoform (CHBr₃) – also known as methane tribromide, methyl tribromide, or tribromomethane.

How can people be exposed to THMs?

You could be exposed to THMs through:

Drinking water from a public water supply. In the United States, about 70 percent of public water supplies serving populations of 10,000 or more are disinfected with chlorine.

Breathing THM vapors. Swimming in a chlorinated pool, showering or washing dishes can result in exposure.

Touching THMs when swimming in chlorinated water, such as in a swimming pool, while showering, or when washing dishes. The THMs can be absorbed through the skin, resulting in exposure.

How do THMs work and how can they affect my health?

The amount of THMs formed when drinking water is disinfected is thousands of times lower than the amount that could cause severe poisoning. The main health concern is taking in chlorine disinfection by-products in small amounts on a regular basis over many years. This is of greater concern than taking in large amounts during a brief period.

Chloroform, bromodichloromethane and bromoform are named as substances that will likely cause cancer based on animal studies. In humans, bladder and colon cancers are linked with these THMs. Exposure to higher amounts of THMs may also cause reproductive problems and birth defects.

The health risks linked with THMs in water are very small, compared to the risk of potentially deadly infectious diseases in drinking water that is not disinfected. This is especially true for water supplies in compliance with the federal Safe Drinking Water Act limit for total THMs.

How is THM poisoning treated?

Given THMs are typically found in drinking water at low levels, THM poisoning is not likely occur.

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What should I do if exposed to THMs?

The general population is exposed to low levels of THMs when drinking or contacting chlorinated water. Since the U.S. Environmental Protection Agency (EPA) regulates the concentrations of THMs, being exposed to concentrations above action levels is unlikely.

What factors limit use or exposure to THMs?

The limits set by EPA on the allowed concentrations of total THMs is lower than what we know to cause health effects, including cancer. In addition, the risk of exposure to contaminants in non-chlorinated water is greater than risk of exposure to THMs in chlorinated water.

Is there a medical test to show whether I've been exposed to THMs?

Medical tests are typically not necessary for exposure to drinking water disinfection by-products.

Technical Information for THMs

CAS Numbers: Chloroform: 67-66-3
Bromoform: 75-25-2
Dibromochloromethane: 124-48-1
Bromodichloromethane: 75-27-4

Chemical Formula: Chloroform – CHCl_3
Bromoform – CHBr_3
Dibromochloromethane – CHBr_2Cl
Bromodichloromethane – CHBrCl_2

Carcinogenicity (EPA): Chloroform, bromoform and bromodichloromethane are classified as probable human carcinogens (Class B2). Dibromochloromethane is classified as a possible human carcinogen (Class C).

MCL (Drinking Water): 80 ug/L (Total THMs)

OSHA Standards: There are no workplace standards for THMs.

NIOSH Standards: There are no workplace standards for THMs.

References and Sources

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