

# Monochloramines: Questions and Answers

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## **General Questions**

### ***What is drinking water disinfection?***

Disinfection is the inactivation of disease-causing organisms in water. Disinfection uses either a chemical or physical process that kills microorganisms like bacteria, viruses and protozoa. Commonly used chemical disinfectants include chlorine, monochloramine and ozone. Ultraviolet light is a physical process. There are two types of disinfection, primary disinfection and secondary disinfection.

### ***What are primary disinfection and secondary disinfection?***

Primary disinfection first inactivates or kills microorganisms. Secondary disinfection maintains a disinfectant level in the pipelines to kill any organisms that may recover from primary treatment or be introduced into the distribution system through main breaks, leaks or backflow.

### ***Why is disinfection important?***

Disinfection of drinking water is vital to protect public health from waterborne diseases. The practice of disinfecting drinking water has made many once-common diseases, like typhoid and cholera, a thing of the past in the United States, Canada and other developed countries. In fact, drinking water disinfection's control of infectious diseases is considered one of the top 10 public health achievements of the 20<sup>th</sup> Century by the Centers for Disease Control and Prevention (CDC).

### ***Why is my drinking water provider changing to monochloramine?***

The Town of Exeter Water Department is changing to monochloramine as a secondary disinfectant to meet the United States Environmental Protection Agency's (US EPA) rules to reduce the levels of certain regulated disinfection byproducts in drinking water.

### ***Why are disinfection byproducts a public health concern?***

Some disinfection byproducts are regulated by the US EPA because they pose a potential health risk if consumed at certain levels over many years. New rules reduce disinfection byproduct exposure and related potential health risks. Specifically, the Stage 2 Disinfection Byproducts Rule has more stringent standards and monitoring requirements for two groups of disinfection byproducts, which are suspected carcinogens: trihalomethanes (TTHM) and haloacetic acids (HAA5).

### ***What is monochloramine?***

Monochloramine is a chemical compound of chlorine and ammonia, commonly used as a diluted solution to disinfect drinking water before it is delivered to homes. Monochloramine is formed using low chemical concentrations in a controlled environment. Monochloramine (NH<sub>2</sub>Cl) should not be confused with dichloramines (NHCl<sub>2</sub>) or trichloramines (NCl<sub>3</sub>), two chemically distinct and separate compounds.

### ***How long has monochloramine been used as a drinking water disinfectant? How many people receive drinking water that is treated with monochloramine?***

Monochloramine has been safely and successfully used by water utilities for more than 90 years. More than one in five Americans use drinking water treated with monochloramine. Boston, Dallas, Houston, San Diego, San Francisco, Tampa Bay, Miami, Denver, Philadelphia, Minneapolis and many other cities are all successfully using

monochloramine to treat drinking water. In New Hampshire Concord, Manchester, Salem, & Hillsborough all use monochloramine.

***What other treatment options did the utility examine before deciding on monochloramine?***

The Town of Exeter Water Department looked at a number of options before deciding on monochloramine. In our decision-making process we examined five different treatment options and/or a combination of multi-treatment options, the cost of the options, and the constructability of the upgrades to fit the existing treatment facilities.

***Why did the utility select monochloramine over other options?***

Monochloramine was selected for the Town of Exeter Water Department because it forms fewer disinfection byproducts. It is also more stable and longer lasting than free chlorine. The Town of Exeter Water Department also selected monochloramine because:

- Produces lower levels of regulated disinfection byproducts
- Lower costs than the other treatment options
- Ease of construction

***Will I notice a change in the taste or odor of my water?***

Utilities that use monochloramine often experience fewer taste odor complaints than utilities using free chlorine.

***Will there be any noticeable changes to my water as you make the conversion?***

Some temporary impacts may be noticed in isolated areas as the monochloramine-treated water is introduced into the distribution system. Some customers may notice a temporary variation in water color, as well as possible sediment in the water. These temporary impacts to water quality are similar to those experienced when a water main is replaced or routine maintenance is performed on the water distribution system. As the system stabilizes, these temporary impacts will diminish.

***What should I do if I notice sediment in my water?***

The sediment may be the result of flushing the pipeline to purge the chlorinated water and make way for the new monochloramine-treated water. If you do experience some discoloration or sediment, try running cold water in your sink or bathtub for three to five minutes. If that doesn't clear up the problem, contact the Town of Exeter Water Department at (603) 773-6157.

***How will the monochloramine treatment process be monitored?***

The Town of Exeter Water Department will use accurate and reliable equipment to ensure monochloramine in our system meets all regulatory standards.

***When will the change to monochloramine take place?***

The Town of Exeter Water Department expects to make the change late March/early April 2019. It is difficult to pinpoint an exact date as a number of operational changes must be made and permits obtained before the conversion.

***Where I can get more information?***

- Stage 2 DBP Rule - [www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules](http://www.epa.gov/dwreginfo/stage-1-and-stage-2-disinfectants-and-disinfection-byproducts-rules)

- Chloramines in Drinking Water - [www.epa.gov/dwreginfo/chloramines-drinking-water](http://www.epa.gov/dwreginfo/chloramines-drinking-water)
- US EPA's Questions and Answers Public Water Systems, Disinfections Byproducts, and the Use of Monochloramine - [www.epa.gov/dwreginfo/public-water-systems-disinfection-byproducts-and-use-monochloramine](http://www.epa.gov/dwreginfo/public-water-systems-disinfection-byproducts-and-use-monochloramine)
- US EPA's Common Health Questions - [www.epa.gov/dwreginfo/common-health-questions-related-monochloramine-0](http://www.epa.gov/dwreginfo/common-health-questions-related-monochloramine-0)
- San Francisco Public Utilities Commission  
<http://www.sfwater.org/modules/showdocument.aspx?documentid=963>
- NSF Certified Drinking Water Treatment Product Listings - <http://www.nsf.org/certified/dwtu/>

## **Health-Related Questions**

### ***Is monochloramine safe?***

US EPA research and experience to-date indicates monochloramine is safe and beneficial at levels typically used to treat drinking water. In fact, the World Health Organization and the US EPA consider monochloramine a safe, effective treatment method of reducing the potential health risk from regulated disinfection byproducts. The US EPA evaluated monochloramine safety and set the standard for monochloramine use at a level where no human health effects are expected to occur.

### ***Can I drink and cook with monochloramine-treated water?***

Yes. Monochloramine-treated water will meet or surpass all local, state and federal guidelines for drinking water quality. You can safely drink the water, cook with it and bathe in it. However, like chlorine, monochloramine-treated water must be conditioned or filtered before using it for fish and other aquatic life, and dialysis centers must also take special precautions.

### ***What precautions must dialysis providers make?***

Kidney dialysis patients can safely drink, cook and bathe in water disinfected with monochloramine. The digestive process neutralizes monochloramine before it enters the bloodstream. But, like chlorine, monochloramine must be removed from water to be used in kidney dialysis machines. The Town of Exeter Water & Sewer Department is working with representatives of local hospitals and dialysis treatment centers to educate them about this change. If you are a dialysis patient or have questions, call your physician or the dialysis center nearest you.

### ***Is it safe to wash an open wound with monochloramine-treated water?***

Yes. When cleaning an open wound, virtually no water can enter the bloodstream.

### ***I've heard that some people have experienced rashes or breathing problems. Is monochloramine to blame?***

In recent years, a small percentage of consumers have expressed concern over health symptoms they believe are connected to monochloramine. Among the reported symptoms are respiratory problems, skin irritation and digestive problems. While the actual causes of the reported symptoms are undetermined, it is possible that some individuals may be sensitive to monochloramine, just as some individuals are sensitive to chlorine.

Additionally, if water contains monochloramine that exceeds regulatory limits due to improper operation, irritation to the eyes, nose and stomach can occur. The Town of Exeter Water Department will use accurate and reliable equipment to ensure monochloramine in our system meets all regulatory standards.

If consumers experience symptoms believed to be connected to monochloramine, please immediately contact your physician, NH Department of Environmental Services, and the Town of Exeter Water Department.

### ***What do the experts say about the reported problems?***

Studies conducted to-date by the US EPA and CDC do not conclude monochloramine use has negative health effects at levels used in drinking water.

Dr. Jeffrey K. Griffiths of the Tufts University School of Medicine rendered an April 19, 2007 opinion regarding monochloramine use in San Francisco Public Utilities. In the letter, Dr. Griffith writes, "There is no scientific literature to support the contention that chloramine or ammonia exposures of any significance occur because of respiration. The levels of ammonia found in chlorinated water do not act as a skin irritant given their very low levels, and the levels of ammonia found in chloraminated water are dwarfed by the amounts of ammonia found in foodstuffs."

However, it may be possible that some individuals are sensitive to monochloramine. Any citizen with a health concern is encouraged to contact his or her physician.

***Will monochloraminated water interact with my medications?***

There are no known interactions between monochloramine-treated water and any kind of medication. People on medication should not experience any interactions caused by drinking monochloramine-treated water. If you have a specific concern, please contact your physician.

**Other Household Questions**

***Will I have to change the way I treat my swimming pool water?***

No additional treatment should be necessary. However, you might find that there is a slight increase in chlorine demand. That means that you may have to add a little more chlorine than usual to get to the level you typically maintain in the pool after you top it off with tap water.

***Will chloramine irritate my skin or lungs while swimming in a pool?***

Improper pool maintenance can lead to the formation of trichloramine, a chemical related to monochloramine, that has been linked to breathing problems. Trichloramine forms in swimming pools when ammonia from sweat and urine reacts with chlorine.

Inadequate chlorine addition or improper pH levels can contribute to trichloramine formation. Maintaining a pH level of 7.2 to 7.8 is necessary to control trichloramine.

***Will my home filtration system be affected?***

You may find that you have to replace filters (particularly activated charcoal filters) more often than before, though the difference should be negligible. Be sure to follow manufacturer's recommendations. Check with the manufacturer if you are interested in finding out if your granular activated filter removes chlorine and monochloramine.

***Will my plants be affected?***

No. Plants, vegetables, fruit and nut trees are not affected by monochloramine-treated water.

***Will the switch to monochloramine increase lead levels in my drinking water?***

While monochloramine is not more corrosive toward metals than chlorine, it does change the chemistry of drinking water. In certain cases this may cause lead from pipes or home plumbing to dissolve into the water. However, with water quality testing and monitoring, a utility can evaluate and optimize its corrosion control treatment to reduce the possibility of this occurring. Find out more about lead in drinking water at ([link to lead fact sheets](#)).

### **Pets, Aquatic Life, Environmental Questions**

#### ***Is monochloramine safe for my salt and freshwater fish?***

Chlorine and monochloramine are both toxic to fish and aquatic life. Monochloramine is harmful to fish and amphibians when it enters the bloodstream from water that passes through their gills. Therefore, like chlorine, monochloramine must be removed from water used for keeping live fish, amphibians and other aquatic animals. This includes Koi fish, lobster, shrimp, frogs, turtles, snails, clams and live coral.

To protect fish and amphibians, use treatment products to remove monochloramine from tap water. These products are readily available at most pet supply stores and aquarium dealers. Leaving water to sit for several days is not an effective method for removing monochloramine.

#### ***Can I let my tap water sit a few days to remove monochloramine? That works with chlorine.***

Monochloramine is longer lasting than chlorine and will not dissipate from tap water like chlorine. You must use drops, tablets or granular activated carbon filters that are specifically designed to remove monochloramine.

#### ***Is monochloramine-treated water safe for my dog, cat, ferret, monkey, parrot, parakeet, etc.***

Yes.

#### ***If I water the lawn, will the runoff harm the environment?***

If you use tap water to water your lawn, the small amount of monochloramine in the water will be neutralized by the soil. Lawn watering is not expected to have an adverse effect on plants or nearby marine life.

#### ***If cows drink monochloramine-treated water, will monochloramine be in their milk?***

No. Monochloramine is broken down by the digestive process and would not enter cows' milk.