

BASIC INFORMATION ABOUT DRINKING WATER DISINFECTION

6) How effective is **monochloramine** vs. chlorine as a **secondary disinfectant**¹?

Both chlorine and monochloramine are effective secondary disinfectants.¹

- Both chlorine and monochloramine protect the quality of treated water as water² travels through pipes.
- Both chlorine and monochloramine produce disinfection byproducts, some of which are harmful to human health.
- EPA and CDC believe the benefits of drinking water disinfection outweigh the potential risks from disinfection byproducts.

Monochloramine has several advantages over chlorine as a secondary disinfectant.

- Monochloramine is more chemically stable than chlorine.
- Monochloramine produces fewer potentially harmful *regulated* disinfection byproducts than chlorine.³
- Monochloramine is longer lasting than chlorine, making it useful for killing certain harmful organisms found in pipes such as those that cause Legionnaires' disease.⁴

The choice of which secondary disinfectant to use varies from water utility to water utility based on their needs.

- States and water utilities work together in selecting primary and secondary disinfectants.¹
- States and water utilities balance a wide range of factors in deciding which disinfectant to use.⁵
- Either chlorine or monochloramine is used as a secondary disinfectant by water utilities.

Additional Supporting Information:

1. See question 3 for a discussion of primary and secondary disinfectants. See questions 17 and 18 for advantages and disadvantages of monochloramine use.
2. See question 2 for a more information about protecting the quality of water as it travels through pipes.
3. EPA has adopted enforceable regulations to limit occurrence of disinfection byproducts in drinking water for a group of four total trihalomethanes (TTHMs): (chloroform, bromodichloromethane (BDCM), dibromochloromethane (DBCM), and bromoform);, a group of five haloacetic acids (HAA5): (monochloroacetic acid (MCA), dichloroacetic acid (DCA), trichloroacetic acid (TCA), monobromoacetic acid (MBA), and dibromoacetic acid (DBA)); , and the individual disinfection byproducts chlorite and bromate. The maximum contaminant levels for these disinfection byproducts are: TTHMs (0.080 mg/L), HAA5 (0.060 mg/L), chlorite (1.0 mg/L), bromate (0.010 mg/L). See Stage 2 Disinfection Byproducts Rule (71 FR 388, January 4, 2006) for more information on disinfection byproducts and discussion of uncertainties, at <http://www.epa.gov/fedrgstr/EPA-WATER/2006/January/Day-04/w03.pdf>.
4. For more information on Legionnaire's disease visit <http://www.cdc.gov/legionella/>.
5. Factors include the type and condition of source water, how much water needs to be treated, complexity of operation, etc. Guidance manuals are available at: <http://www.epa.gov/safewater/disinfection/stage2/compliance.html>. Hard copies are available by ordering publications through EPA's Water Resource Center (phone: 202-566-1729).