Chloramine Disinfection

"My water tastes (smells) like bleach (a swimming pool)" is the probably the most frequent water-quality concern expressed by residents. Why do we chlorinate the water? Why does the level vary so much? Is it safe to drink?

The addition of chlorine to drinking water has probably prevented more illness than any other single protective measure. Before chlorination became standard practice, cholera and typhoid were widespread. Now they are almost unknown in the U.S. Public water suppliers are required by law to disinfect drinking water, and to maintain a disinfectant "residual," or detectable excess, in the distribution system. The residual helps to prevent harmful organisms from growing in the water mains or home plumbing.

Beginning with the opening of the new Water Treatment Facility in 1997, Broomfield changed its drinking water disinfectant from free chlorine to chloramine. Chloramine is not a new type of disinfectant. In fact, chloramine disinfection has been used in the Denver area for more than 80 years, and is used by most area municipalities, including the Denver Water Department.

Chloramine is formed by combining chlorine with ammonia at the treatment facility. The resulting "combined" chlorine has a number of advantages over chlorine alone. Chloramine is much more stable than chlorine, thus it protects water quality in the distribution system over longer times and distances. Chloramine is also less likely to produce strong chlorine odors, and it forms fewer undesirable by-products than chlorine alone.

The Water Treatment Facility tries to maintain a disinfectant level sufficient to protect water quality, but not high enough to have a disagreeable taste or smell. Sometimes that isn't easy. Although chloramine is more stable than other forms of chlorine, it still tends to dissipate over time and distance. Therefore, enough must be added at the point of treatment to maintain effective levels at the far ends of the system. The effect is that residents who are closer to the treatment facility, or near a major water main, may experience higher levels than those farther along in the system. Factors such as temperature, water use, and water source may also affect the amount of chloramine present at any particular time or location.

Residents sometimes express concern about the health effects of drinking chlorinated water. Although chlorine is very effective at inactivating harmful bacteria, studies have shown that the toxicity to humans is quite low. The Environmental Protection Agency has set a drinking water limit for chlorine of 4.0 parts per million (ppm). This limit is based primarily on minimizing the levels of unwanted by-products, rather than on health risks from chlorine, and it is applied as an annual average concentration. The average chloramine level in Broomfield's drinking water during 2001 was about 1.1 ppm, well below the regulatory limit.

Note to aquarium owners: Chloramines, like other chemical disinfectants, are toxic to fish and other aquatic pets, and must be removed from the water. When checking chlorine levels, be sure to test for "total" rather than "free" chlorine, and use a product specifically formulated for chloramine removal. Contact your local pet supply store for additional information.

Note to dialysis patients: Dialysis patients and providers need to be aware that chloramines are present in the tap water so that they can be certain that the water treatment and testing frequency are appropriate for chloramines. Consult your doctor or dialysis technician for specific recommendations.

Environmental Services
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