ALABAMA A&M AND AUBURN UNIVERSITIES

ANR-790-2.3.1

Typical Contaminants And Problems

Bacterial Contaminants

The most common type of health-threatening contamination of water is biological. Through improved treatment and supply systems, public water systems have virtually eliminated the transmission of bacterial-caused illness in drinking water. For those people with public water, mineral and chemical problems are usually a more frequent concern than bacteria. But most private water supplies receive no disinfection treatment; therefore, biological contamination still presents the greatest health risk to these supplies.

Some common waterborne diseases include gastroenteritis, typhoid, dysentery, hepatitis, giardiasis, and cryptosporidiosis. The organism which causes giardiasis is now the most commonly identified organism associated with waterborne disease in this country. The disease giardiasis involves diarrhea, nausea, and severe dehydration. The organism that causes cryptosporidiosis was unknown 10 years ago. It is a protozoan similar to the one that causes giardiasis. Cryptosporidiosis produces symptoms similar to giardiasis, but much more serious. So far, outbreaks of the disease have been rare.

Sources Of Bacterial Contaminants

The many sources of bacterial pollution include septic tanks, sewage plants, and runoff from woodlands, pastures, and feedlots.

Almost all surface waters contain some bacteria. Most coliform bacteria enter streams through runoff from areas with high concentrations of animals or human beings. Groundwater is generally free of bacteria unless it is directly contaminated by a waste source or an improperly constructed water well.

Private water supplies (wells) can be contaminated by bacteria from many sources. Bacterial problems are most common in shallow wells and areas with coarse textured soils and fractured bedrock or limestone. The major source of contamination is septic tanks or sewage lines located too close to the well. Runoff or leaching from livestock operations can also contaminate wells. There is a chance of bacterial contamination any time a pump is removed from a well and replaced.

Treatment Of Bacterial Contaminants

When To Treat. The main indicator of the sanitary quality of drinking water is the coliform bacteria count. The presence of coliform bacteria, which can be found in the feces of human beings and animals, indicates a high probability of other pathogenic organisms (disease germs) being present. Public water systems should not detect total coliform bacteria in more than one sample each month to meet the Maximum Contaminant Level for coliform bacteria.

When water is contaminated with surface drainage, noncoliform bacteria may also be present in large numbers. This type of contamination may not be harmful since there is only a small probability that drainage water contains pathogenic organisms. However, if the count of noncoliform bacteria is more than 200 per 100 ml, water is also considered to be poor quality.

How To Treat. Coliform bacteria can be controlled through waste treatment and disposal methods that reduce bacterial survival. Bacteria can also be controlled through urban and rural stormwater management systems which reduce runoff rates and volumes and maximize natural filtering processes. If all waste and runoff were controlled and returned to the land in the proper manner, bacterial contamination of surface water and groundwater would be significantly reduced.

In municipal sewage plants, bacteria in wastewater are controlled through chemical or ultraviolet treatment. In private water systems, bacterial contamination can be controlled by properly siting wells and septic systems. Proper siting prevents bacteria from entering the water system and allows bacteria to be filtered in the soil.

If bacteria are contaminating an established water system, locate the source of contamination and eliminate the problem there. The most common source of bacterial contamination is surface water entering the well. This problem can usually be eliminated by extending the well casing above ground level and

sealing around it with tight clay or concrete. The top of the casing should also be sealed. All surface water should be diverted away from the well area.

Once you have located the source of contamination and eliminated it, shock chlorinate the well and distribution system to kill the remaining bacteria. Shock chlorinate by introducing a strong chlorine solution directly into the well and washing down the inside of the well if possible. Then circulate the chlorinated water throughout the plumbing and allow it to stand overnight. Finally, flush the lines until the chlorine odor is no longer evident.

If you cannot eliminate the source of contamination, consider alternate sources of water. If this option is not available, you may have to resort to continuous disinfection of the water supply.

Various household water disinfection methods include continuous chlorination (by a chemical feed pump), ultraviolet radiation, and distillation. Chlorine may react with organic matter (dead bacteria) in the water to form hazardous chlorinated hydrocarbons. An activated carbon filter can be used to remove free chlorine and chlorination by-products.

Bacterial Contaminants At A Glance

Symptoms: Intestinal illnesses; changes in water color, taste, or odor; tests showing bacterial contamination.

Causes Of The Problem: Bacteria from surface water or wastes seeping into groundwater, wells, or plumbing.

Suggested Treatments: Chlorination (chemical feed pump) followed by activated carbon filter; distillation or ultraviolet radiation.

Prevention: Properly install well and check it for leaks. Chlorinate the well and household plumbing.

References

Bodie, Herbert L. 1989. Coliform Bacteria—A Measure Of Water Pollution. Water Resources 17. Maryland Cooperative Extension Service. The University of Maryland. College Park, MD.

Haman, Dorota Z., and Del B. Bottcher. 1986. Home Water Quality And Safety. Circular 703. Florida Cooperative Extension Service. University of Florida. Gainesville, FL.

Shaw, Byron H., and James O. Peterson. 1990. Improving Your Drinking Water Quality. G3378. Wisconsin Cooperative Extension Service. University of Wisconsin. Madison, WI.

Tyson, Anthony, and Kerry Harrison. 1990. Water Quality For Private Water Systems. Bulletin 939. Georgia Cooperative Extension Service. The University of Georgia. Athens, GA.

U.S. Environmental Protection Agency. 1990. Environmental Pollution Control Alternatives: Drinking Water Treatment For Small Communities. U.S. Government Printing Office. Washington, DC.

The following articles in the Water Quality series may be helpful:

Possible Treatments

Chemical Feed Pumps

Water Supply Wells

Disinfecting Well Water By Chlorination

This publication, supported in part by a grant from the Alabama Department of Environmental Management and the Tennessee Valley Authority, was prepared by James E. Hairston, *Extension Water Quality Scientist,* assisted by Leigh Stribling, *Technical Writer.*

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

Issued in furtherance of Cooperative Extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, and other related acts, in cooperation with the U.S. Department of Agriculture. The Alabama Cooperative Extension System (Alabama A&M University and Auburn University) offers educational programs, materials, and equal opportunity employment to all people without regard to race, color, national origin, religion, sex, age, veteran status, or disability.

UPS, **New June 1995,** Water Quality 2.3.1

ALABAMA COOPERATIVE Extension SYSTEM

ANR-790-2.3.1