

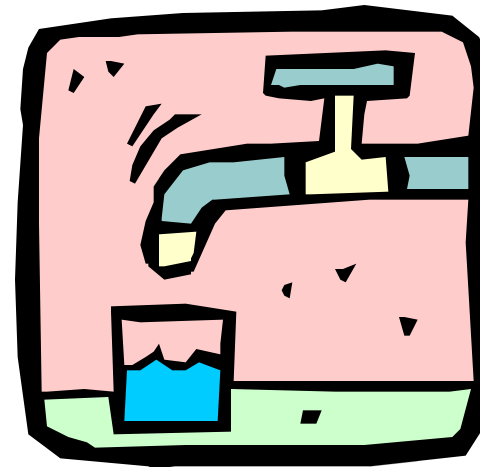
Table 1. Common Drinking Water Problems and Causes

PROBLEM	SYMPTOM	CAUSE
Hardness	Soap curd & lime scum in bath, white scale in pipes	Excessive magnesium & calcium salts
Grittiness	Feels abrasive when washing, Leaves residual in bath	Silt passing through well screen
Odor	Grassy or musty	Organic matter
	Chlorine	Excessive chlorination
	Rotten egg	Hydrogen sulfide, Sulfate bacteria
	Chemical (phenol)	Industrial waste seeping into water supply
Taste	Salty or brackish	High sodium or magnesium content
	Metallic	Low pH, High iron content
Stainless steel corrosion	Blackening or pitting of sinks and dishwashers	Excessive chloride content
Turbidity	Mud, silt & clay	Suspended matter in water supply
Acid water	Green stains on plumbing fixtures	Low pH reacting with copper & brass piping or fittings
Red water	Stains dishes and laundry	Dissolved iron
	Red sediment when water is left standing	Precipitated iron
	Red color even after standing for 24 hours	Colloidal iron
Milky water	Cloudiness when drawn	Entrained air from faulty pump,
		Sludge pickup in hot water heater,
		Methane gas
Excess fluorides	Yellowish, mottled teeth in children	Excessive fluorides
Heavy metals	No color, taste or odor signs. Possible health effects	Industrial pollution, Corrosion products
Nitrates	No color, taste or odor signs. May be a health hazard for infants	Human or animal waste and fertilizers seeping into water supply
Pesticides & herbicides	Chemical taste	Excessive agricultural spray applications
Radioactive contaminants	No color, taste or odor signs. May be a health risk	Natural radium radioactivity, Atmospheric fallout, Nuclear waste, Radon gas

Source: Condensed from Water Processing for Home, Farm & Business, pgs. 61-68, Water Quality Association, 1988.

This fact sheet has been created for the H.E.L.P. for Kids Project

Information contained in this document has been derived from "Household Drinking Water Protection and Treatment" with permission. For more information, or to order a copy of the complete publication, contact MSU Extension Service, 111 Taylor Hall, Bozeman, MT 59717, or call 406-994-3451.



DRINKING WATER

All of us expect good water to drink. However, contaminated drinking water may cause health problems such as kidney, liver, nervous system, circulatory or reproductive effects or cancer. Sometimes water contamination occurs naturally; however, serious contamination is usually the result of human activities on the land surface. Some agricultural activities add nitrate nitrogen and pesticides to groundwater. Residential areas with septic systems can add nitrate nitrogen, bacteria, viruses and synthetic organics used in household cleaning products and septic tank cleaners. Industrial activities add organic chemicals and metals. Gasoline storage areas (including service stations) may have leaks and spills of petroleum products. Roadways contribute petroleum pollutants leaked from vehicles and metals from exhaust

fumes. Concentrated impact may come from older sanitary landfills, where leachate can contain many chemicals at relatively high concentrations.

SHOULD MY WATER BE TESTED?

If your water comes from a public or municipal water system, your water is regularly tested for contaminants as required by federal and state standards. However, some public water supplies may have water quality problems caused by inadequate municipal water treatment facilities or distribution systems. Some rural water supply districts do not have enough money to hire trained specialists or to immediately comply with expanding government requirements. In addition, corrosive water or deteriorating pipes in your home may add contaminants to municipal drinking water after it enters your home.

For drinking water from wells, routine testing for a few of the most common contaminants (described below) is highly recommended. Even if you currently have a safe, pure water supply, regular testing can be valuable because it establishes a record of water quality. This record can be helpful in solving any future problems and in obtaining compensation if someone damages your water supply.

TYPES OF WATER TESTS

Water tests may be conducted to evaluate basic water chemistry and to determine if the water meets the minimum criteria for bacterial and chemical content. There is no one simple test for all water problems. It is recommended that you consult a water quality specialist before performing extensive tests.

Bacteriological Test. A bacteriological test can determine if your water is free from disease-causing bacteria. Usually, only a test for total coliform bacteria is run. Because coliform bacteria commonly inhabits the gastrointestinal tract of warm-blooded animals, they serve as indicators of fecal contamination and as a marker for other, possibly pathogenic, microorganisms. If the test is coliform positive, then you should take immediate steps to determine and eliminate the source of contamination and/or disinfect the water before use (seek professional assistance if necessary).

Mineral Test. A mineral analysis indicates the extent of mineral impurities in the water. Large amounts of minerals and other impurities may pose a health hazard and affect the appearance and use characteristics of the water. A typical mineral analysis will give the content in parts per million of mineral elements such as calcium, magnesium, manganese, iron, copper and zinc. It will also determine the acidity or pH of the water and the hardness, expressed in parts per million or grains per gallon. It may also give the concentration of nitrate, sulfates and other chemical compounds.

Chemical Test. There are many man-made chemicals which can contaminate a water supply and impair its usability and/or create a health hazard. Examples include petroleum products, agricultural pesticides and industrial chemicals. It is not routine and can be very expensive to test for the presence of unspecified chemical contaminants; however, if a particular

chemical is suspected, a test can usually be performed at minimal cost.

WHEN TO TEST

Whether you have a public or private water supply, if a problem or symptom described in Table 1 is observed, then it is recommended that, after consulting with a professional, the water be tested for the associated contaminant(s). You should also test if:

- You or your children have recurrent incidents of gastrointestinal illness -- test for coliform bacteria, nitrate and sulfate.
- Plumbing contains lead pipes, fittings or solder joints -- test for pH, corrosion index, lead, copper, cadmium and zinc.
- Water supply equipment (pump, chlorinators, etc) wears rapidly-- test for pH, corrosion index, sand and silt.

Private Water Supplies

For non-public supplies, it is important that certain routine tests be conducted periodically for a few of the most important contaminants. In addition to these routine tests, there are specific water tests that are required because of special situations.

Routine Tests. You should seek professional advice on performing water quality testing; consequently, the following are only general guidelines. Test more often if you suspect that there is a problem with the quality of your drinking water.

- Once each year test for coliform bacteria, nitrate, pH and total dissolved solids (TDS). Test for



these contaminants during the spring or summer following a rainy period. Conduct these tests after repairing or replacing an old well or pipe and after installing a new well or pump.

Every 3 years, test for sulfate, chloride, iron, manganese, lead, hardness and corrosion index.

Special Situations.

- If there are infants in the home less than 6 months in age, or when someone may be pregnant -- test for nitrates more frequently.
- If your well is in an area of intensive agricultural use -- test for pesticides commonly used in the area, coliform bacteria, nitrate, pH and TDS.
- If your well is near a gas-drilling operation -- test for chloride, sodium, barium and strontium.
- If your water smells like gasoline or fuel oil and your well is located near an operational or abandoned gas station or buried fuel storage tanks - - test for fuel components or volatile organic compounds (VOCs).
- If your well is near a dump, junkyard, landfill, factory, or dry-cleaning operation -- test for volatile organic compounds (fuel components and cleaning solvents), pH, TDS, chloride, sulfate and metals.
- If your well is near sea water and you detect a salty taste or notice signs of corrosion on pipes test for chloride, TDS and sodium.

HOW IS WATER TESTING CONDUCTED?

To assess the year-round safety of your drinking water, samples should be collected when contaminants are most likely to be present. For example, coliform bacteria and nitrates are most likely to be found during wet weather, while pesticides are more likely to be present just after they are applied.

It is a good idea to consult with a professional and/or have a professional perform the testing. Sometimes a testing laboratory will send a trained technician to collect and/or analyze the sample in your home. In some cases, self-sampling may not be as accurate.

If you have decided to collect the samples yourself, contact the laboratory or agency which will perform the analysis. It should provide you with a set of instructions and a sample bottle. Use the containers provided, and carefully follow the instructions, that can vary depending upon the type of test being conducted.

Keep a record of all your water test results as a reference for future testing. Even slight changes in contaminant concentrations may be indicators of new water problems you may not detect yourself. By comparing recent test results with original results, you may discover that a change in treatment is needed or that a treatment device is not working as it should.