

Safe levels of coliform bacteria in water

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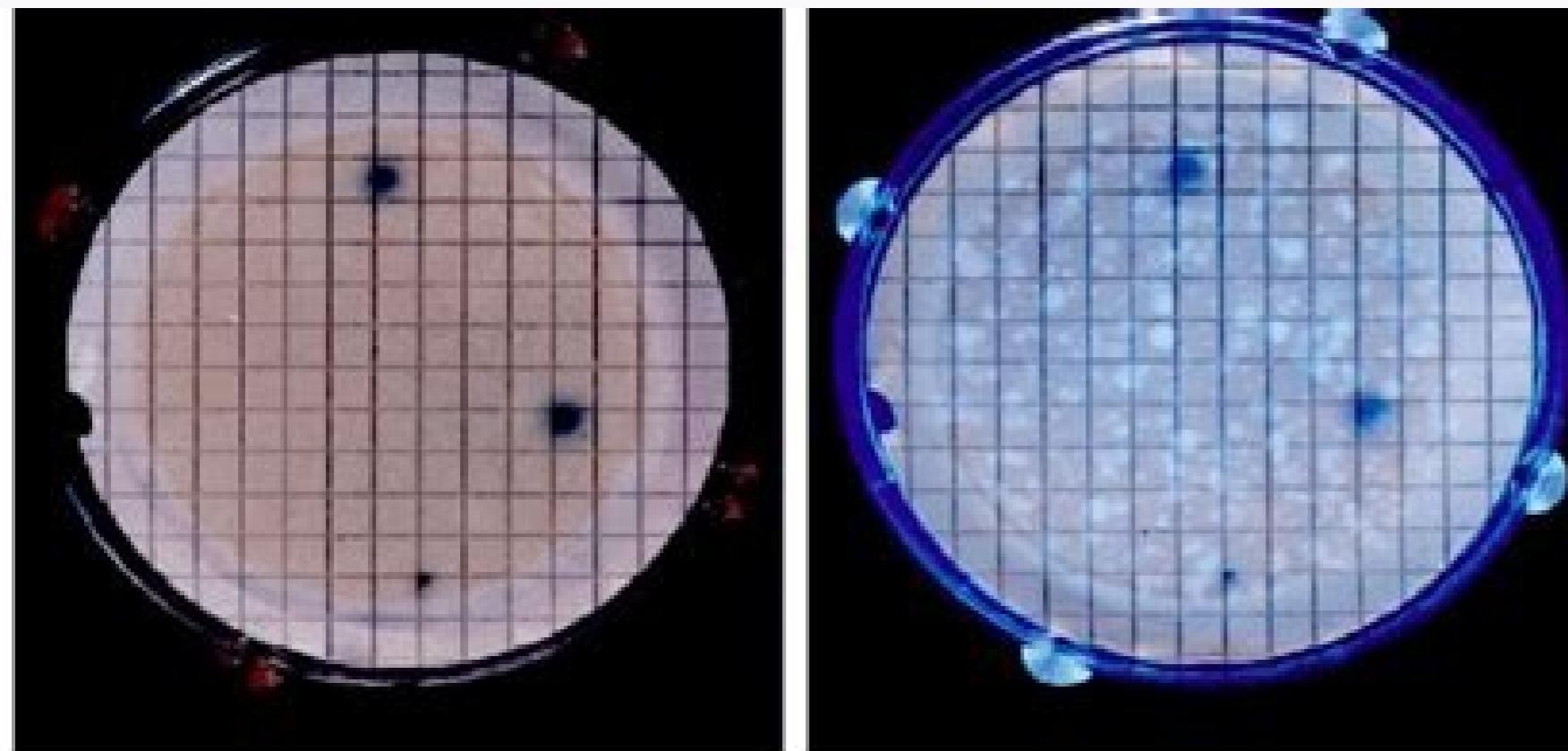
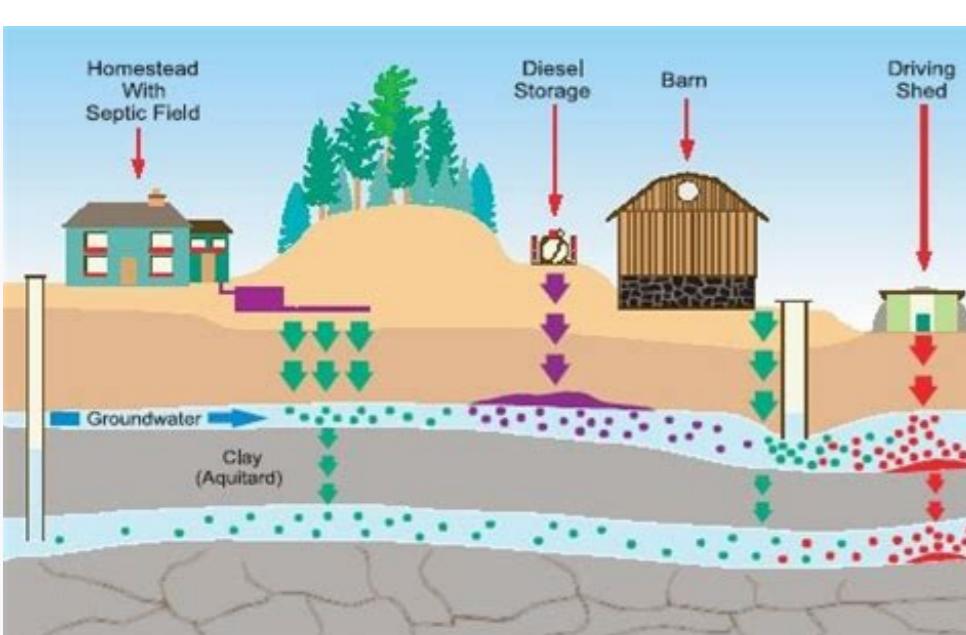
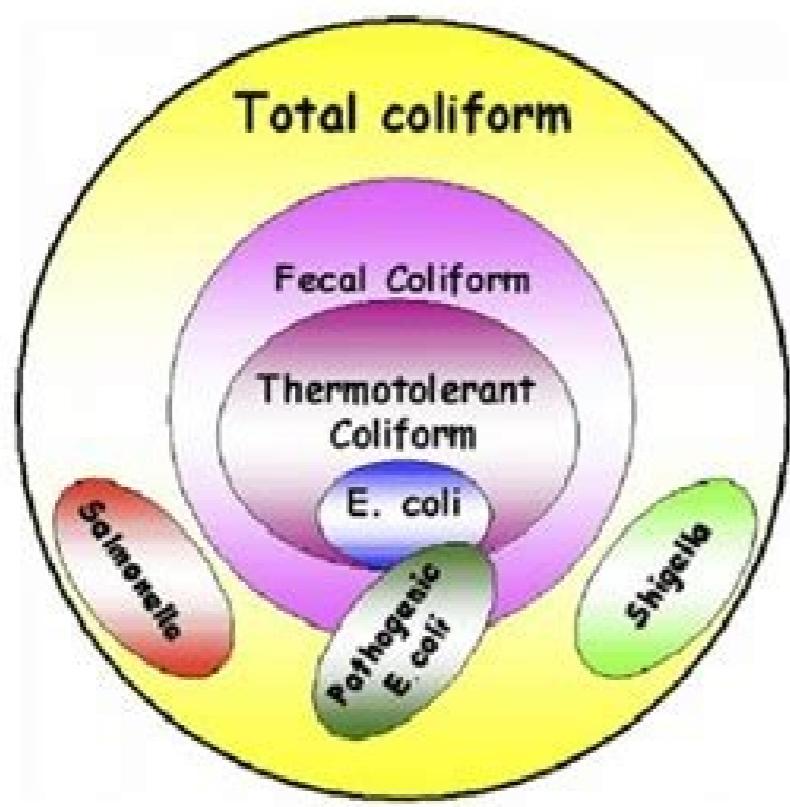


Figure 2. These photographs show *Escherichia coli* and total coliforms from cistern water on MI agar. The confluent plate was photographed under different lighting: ambient light on the left, and longwave UV light (366 nm) on the right. Under ambient light, *E. coli* are blue, and total coliforms other than *E. coli* and non-coliforms are their natural color. Under longwave UV light, all total coliforms, including *E. coli*, are fluorescent, and non-coliforms are non-fluorescent (i.e., they are not visible).

Total Coliform Bacteria

- are commonly found in the environment (e.g., soil or vegetation)
- are generally harmless
- If only total coliform bacteria are detected in drinking water, the source is probably environmental not fecal.



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Home/Environment/What Is A Safe Level Of Coliform In Well Water? Environment OliviaMarch 24, 2022 262 4 minutes read Related Articles Bacteria come in three basic shapes (there are a few exceptions) and their descriptive classification is based on those shapes: Round or Spherical [Coccus] Rod-shaped [Bacillus] (also known as Coliform Bacteria) Spiral Shaped - The spiral-shaped bacteria are subdivided into: comma-shaped, or curved rods [Vibrio], a long, thin, flexible corkscrew shape [Spirochete], and a more rigid corkscrew shape [Spirillum]. The table below includes some examples of the various bacteria types and diseases they might cause (not all of them cause disease in humans nor are they in water) Staphylococcus aureus [Coccus] 'Staph' infections Escherichia coli [Bacillus] Common in our intestines and feces, pronounced 'escherichia' and usually abbreviated as E. coli Bacillus anthrax [Bacillus] Anthrax Vibrio cholerae [Vibrio] Cholera (no surprise here) Helicobacter pylori [Spirochete] Salmonella Typhimurium [Spirochete] Syphilis Borrelia burgdorferi [Spirochete] Lyme disease Legionella Legionnaires' disease Vibrio cholerae Cholera Salmonella bongori & Salmonella enterica Salmonellosis Salmonella typhi Typhoid Fever Campylobacter jejuni Campylobacteriosis Shigella Dysentery A specific variety of E. Coli (not most E. Coli) Verocytotoxigenic E. Coli There are other bacteria that do not cause disease but which can affect the water quality, one good example being Crenothrix. Crenothrix is one of a group of Iron-Reducing Bacteria which get energy by converting iron compounds in the ground when there is very little oxygen present (an anaerobic or reducing environment) into a form of iron (ferrous iron, Fe²⁺) which is soluble in water, in the process producing hydrogen sulfide gas (H₂S). The result is that the groundwater becomes saturated with dissolved iron (iron water) and smells like rotten eggs (the hydrogen sulfide gas - sulfur water). When pumped out of a well and exposed to the oxygen of the air (an aerobic or oxidizing environment), the ferrous iron quickly oxidizes to the much less soluble ferric iron (Fe³⁺) which promptly precipitates, creating bright reddish-orange stains [ferric hydroxide, Fe(OH)₃] all over your plumbing and, if you were washing laundry, all over your clothes. Crenothrix and its colleagues like to make a protective slime (biofilm) that can block the movement of water into a well, thereby affecting not only the water quality but its quantity too. Did You Know? For the Garden Warriors - "A gram of soil typically contains about 40 million bacterial cells." For the Weekend Backpackers - "A milliliter of fresh water usually holds about one million bacterial cells." How Do Bacteria Become a Problem? Bacteria can be a problem in humans because it can make you sick. From the introduction, bacteria can cause disease, i.e., be pathogenic. Waterborne disease causing bacteria can include E. coli, Leptospirosis, Vibrio cholerae (Cholera), Salmonella typhi (Typhoid) and many more. In some cases, bacteria that may not normally be associated with a disease may become opportunistic for an individual or an animal, such as: dog, cat, horse, or cattle, that has a compromised immune system or under significant stress. The presence of these organisms can suggest that other waterborne pathogens are present or if the water was treated the treatment process was not effective. Bacteria can also cause nuisances, such as: odors, slimy coatings, films, corrosion, i.e., MIC - Microbiologically Induced Corrosion, failures or poor performance of water related and other equipment. What are the Standards for Bacteria? Primary standards are based on health considerations, and are designed to protect people from three classes of toxic pollutants: pathogens, radioactive elements, and toxic chemicals. Bacterial contamination falls under the category of pathogens. Testing for all individual pathogens is impractical and expensive. Instead, the EPA has designated total coliform bacteria as a standard to determine bacterial safety of the water. Coliform Bacteria originate in the intestinal tract of warm-blooded animals and can be found in their wastes. Coliform bacteria are relatively simple to identify and are present in much larger numbers than more dangerous pathogens. Coliform bacteria are in the natural environment and are treated in a manner similar to other pathogens. By monitoring coliform bacteria, the increase or decrease of many pathogenic bacteria can be estimated. Bacteria are regulated as a potential health concern. Regarding the primary drinking water standards or health based standards, the concentration of total coliform bacteria and E. coli should be Absent, Negative, or <1 colony-forming unit per 100 mls (cfu/100 ml). Bacteria can also be associated with nuisance issues and corrosion that may exceed primary or secondary drinking water standards. A water sample with an elevated level of bacteria may cause the water to have an aesthetic issue that impacts the taste, odor, appearance, or use of the water and if the bacteria cause corrosion, the bacterial coating may impact the level of Copper, Lead, Iron, Arsenic, and other trace metal content of the water. For this reason, we may recommend additional testing for standard plate count or heterotrophic bacteria or Nuisance Bacteria like Iron Bacteria, Sulfate Bacteria, or Slime Bacteria. No specific sanitary significance for health standards have been indicated for non-pathogenic non-coliform bacteria other than a total heterotrophic bacteria count or standard plate count of < 500 colonies per ml. For the nuisance related bacteria, the bacteria should be present at a level that does not cause or promote a nuisance. In Flint, Michigan, as many as 12,000 children were exposed to drinking water contaminated with high levels of lead that may cause any of many serious health problems. In addition, the drinking water may be the reason for an outbreak of Legionnaires' disease in the county that killed 10 people and affected another 77. In this article, we look at water quality issues, how to test your drinking water, typical contaminants, and more. It includes a link to our unbiased Water Filters Buying Guide. Do Not Count On the Law For the public's protection, Congress enacted the Clean Water Drinking Act in 1974 and strengthened it in 1986, setting minimum water quality standards for most homeowners. Unfortunately, there is no guarantee that all water utilities comply with the regulations, all testing isn't necessarily accurate, and not all known contaminants are on the list. Your water may look clean—but that's only half the story. Geoffrey Whiteway | FreeRangeStock Enforcement is difficult on national, state, and local levels. And, because of decreases in the budget of the EPA's drinking water office and state drinking water budgets since 2006, protection of public health are at risk. Theoretically, our biggest water suppliers—large metropolitan systems—have the best drinking water because they have the equipment and resources for frequent, mandated testing (the frequency of testing depends on the number of people served). Also, with major utilities, when something goes wrong, they are required to notify their customers. Unfortunately, this didn't happen in Flint. Well water is another story. Systems that serve fewer than 25 people or 15 service connections are regulated only by state and local laws or by their owners. Testing Your Drinking Water Unless issued by your local health department, "free home water testing" offers are usually a come-on to get you to buy water-treatment devices after a couple of carefully staged tests. Independent lab testing. The best way to tell if your water does or doesn't have harmful pollutants is to have it tested by an independent lab (see below). You must test for each type of pollutant separately. If you get your water from a municipal utility, quality can change daily, so most tests are of marginal value (and usually unnecessary). Nevertheless, it may be a good idea to check for lead because lead can leach into the water from old lead-based plumbing—that's what happened in Flint, Michigan. You can buy a water test kit online for under \$20. If you have a well, get the well water test kit instead. Water SafeGet on the phone. You can also discover plenty of information without testing. Call your health department or water supplier and request copies of water-treatment reports and note any violations. Find out the frequency and scope of the tests. Ask whether your area is known for any particular hazards, especially those that might enter water between the treatment plant and your tap. If you have a well, at the very least check it once for mineral content, lead, and radon (where radon is a threat) and once or twice a year for bacteria and nitrates. If you have concerns about contaminants in well water, contact your local health department for a recommended course of action. It may handle certain tests, such as bacterial testing. A partial chemical test that will detect magnesium, calcium, sodium, iron, fluoride, chloride, and nitrates is usually relatively affordable. To test for chemicals such as solvents, pesticides, and petroleum products can be very expensive because each requires its own test. How to get an independent lab test. Find an independent testing lab by asking your water utility or your state health department for a recommendation or checking "Laboratories" in the telephone directory or on the Internet. Or, buy a water test kit online. This will include proper supplies and instructions for collecting a sample, which you mail to the testing lab. If you have a well, be sure to get a well water test kit. Another more comprehensive option is to contact an affordably priced water analysis company, such as National Testing Labs (800-458-3330) or Suburban Water Testing (800-433-6595). A lead-only test costs about \$35; a comprehensive test for bacteria, organics, and inorganics runs \$137 to \$167. Some filter makers offer this service, too. For example, you can call the GE Answer Center (800-626-2000) and request a water test kit and information on GE's SmartWater line of filters and treatment devices. Once you have reports or test results, compare them with the EPA's maximum allowable contaminant levels. For a free copy of these listings, go to www.epa.gov or call the EPA's National Safe Drinking Water Hotline at 800-426-4791. Note any pollutants that exceed federal standards. Record these, and then use this list to select an appropriate water-treatment device. When you compare results, note any pollutants that exceed federal standards. Record these and then use this list to select an appropriate water treatment device. What Might Be In The Water? Aesthetic water problems come from otherwise harmless contaminants that affect the color, odor, and taste of water. Such substances are chlorine, sulfur, iron, and manganese. These problems are usually easy to deal with using conventional activated carbon filters. But if your drinking water contains dangerous levels of other pollutants, you'll need to choose a water-treatment technology that is appropriate for eliminating the toxins. For the sake of discussion, it's easiest to group toxic pollutants into four categories: organic chemicals, inorganic chemicals, radionuclides, and microbial organisms. Organic chemicals include solvents, pesticides, synthetics, resins, and other manmade chemicals known as volatile organic chemicals (VOCs). VOCs are often linked to cancer and/or nervous system, liver, and kidney disorders. A particularly nasty compound, trihalomethane (THM), can be created after water has left a treatment plant and the chlorine reacts with decaying animal and plant matter, creating chloroform, a suspected carcinogen. Inorganic chemicals include nitrates and nitrites, asbestos, fluoride, and metals such as arsenic, mercury, and—the most notorious—lead. Many of these occur as natural mineral deposits. Some, such as copper and lead, leach into water as it travels through pipes and treatment by your water utility doesn't remove them. Nitrates and nitrites are produced by industry or farming. Inorganic chemicals are linked to a variety of health problems. Lead is known to cause brain damage and is particularly toxic to infants and pregnant women. Pre-1930s plumbing in some areas utilized lead pipes, and some used to join copper piping in homes before 1986 has a lead content of about 50%. Radon gas, the most common radionuclide, occurs naturally in a number of regions, including Western mountain states and parts of the Northeast. The EPA estimates that up to 17 million people may have water with excessive levels of radon, which can enter the air through showers and steam. Microbiological contaminants, including protozoa, bacteria, and viruses, are normally killed by chlorination and treatment. Cysts, such as cryptosporidium and giardia, are more resistant to municipal treatment. Normally, bacterial pollution problems occur only when water treatment breaks down or if a home's water supply is tainted by waste. Cyst problems tend to occur during times of heavy storm runoff. NEXT SEE: Water Filters Buying Guide Featured Resource: Find a Local Water Treatment Installation Pros Call for free estimates from local water treatment pros now: 1-866-342-3263 Tagged drinking water filterwater filterwater purifierwater testwell water

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