

# testing for bacteria

By Marianne Metzger

*B*acteria tests are crucial to run, especially for private well owners but also for those using city water due to the declining state of infrastructure. The presence of bacteria in well water can indicate a septic tank failure or problems with the well such as a cracked casing or an improper seal. In public water supplies, bacteria can show up due to failed disinfection processes or failing infrastructure such as bursting or leaking pipes.

## Running bacteria samples in-house



Bacteria are dangerous because they can cause immediate illness, especially in those who are more susceptible such as infants, the elderly and those with compromised immune systems. Running a simple presence and absence bacteria test can be a big step in determining water safety.

### Testing Media

There are many different types of media used to run a simple test for the presence of bacteria. Typically, when testing for bacteria we look for coliform. It is considered an indicator bacteria, meaning its presence can indicate a possible presence of other disease-causing bacteria or viruses. There are several U.S. Environmental Protection Agency-approved testing methods including the Total Coliform Fermentation Technique, Total Coliform Membrane Filtration Technique, Colisure Test, Ecolite Test, m-Colibblue24 Test and ReadyCult. While the fermentation and membrane filtration techniques can be more involved to run, some newer color-change methods are less complicated to complete.

These color-change methods are made to be quicker and easier than previous methods. The reagent usually comes in a snap pack, which is added to the sample size of 100 to 125 mL,

but instructions should be checked for the specific method being used. A sample should be collected in a sterilized container containing the preservative sodium thiosulfate. The preservative is a dechlorinating agent that stops any further disinfection, especially if dealing with public water supplies that are using chlorine.

When adding the reagent to the sample, you will need to take care not to touch the opening, which may cause contamination. It is a good practice to wear gloves when adding reagents as a precautionary quality control measure.

Once the reagent is added, the sample should be placed in an incubator at 35° to 37°C for 18 to 24 hours. Depending on the reagent, there will be a color change if coliform is present. Different reagents will produce different colors, typically yellow or blue. If coliform is present, you should check for the presence of *E.coli*. If you place the positive coliform sample under ultraviolet light and the sample fluoresces, this indicates the presence of *E.coli*.

It is good practice to confirm any positive bacteria test to make sure the sample was not somehow contaminated by the collection or testing procedures. Any positive bacteria result should be taken seriously. Steps need to be taken to

inform anyone who may be drinking the water, from boil water alerts to a phone call to the owner of a private well. A disinfection step should be taken whether it is simple chlorination or a more permanent means such as ultraviolet light. Further testing should be done to confirm the disinfection process has gotten rid of the bacteria and the water is safe.

### Meeting Requirements

You may even want to consider pursuing state certification, especially if you intend to run samples to meet the requirements of the Safe Drinking Water Act (SDWA) or Clean Water Act (CWA). The SDWA requires any public or privately owned water system serving the public to meet annual, quarterly, monthly, weekly and daily testing requirements. The testing must be performed by a laboratory that is certified by the state in which that public water system exists, or an alternate accreditation that is acceptable to the certifying agency.

The CWA requires testing on water being discharged into sewer systems and natural waterways such as lakes, rivers and oceans. When businesses use water in their processes and then discharge into the sewer systems, they have to meet certain water quality requirements and may have to make adjustments in pH and total dissolved solids by chemical addition or filtration.

Depending on the potential contaminants, additional testing may be required to ensure they are meeting the established discharge levels. This testing must also be done by a certified laboratory. Every state has its own regulation with regard to certifying environmental laboratories, and the regulations can vary significantly between states.

The National Environmental Laboratory Association Program (NELAP) was developed as an accreditation program that would represent state and federal regulations for environmental laboratories. It is a voluntary accreditation program in which 11 states participate. The program was intended to make lab accreditation easier when applying to multiple states, as it would provide a single set of standards rather than 50 different standards. In theory this sounds like a good thing; however, all regulations are open to the regulator's interpretation and that can vary dramatically.

Running simple bacteria samples in-house can be a cost-effective way to assure safe water for your clients. Running a bacteria sample in-house can be significantly more economical, especially if you have to drop off samples at a lab or ship them out. Taking into consideration gasoline charges and your employees' time to drop off samples, you can be paying significantly less. Additionally, running samples in-house will allow you better control of when samples are run. Thus, you receive sample results first so you can alert clients promptly. Being able to run a bacteria test and report back to your potential client within a day gives you an edge against your competition. Having in-house water-testing capabilities can be a powerful marketing tool, especially for those in areas with well water.

You may want to consider adding additional analysis to help troubleshoot or size equipment. When sizing equipment for big jobs, you may want to run some tests on a bench top because some field testing can be inaccurate for many reasons, including poorly calibrated meters, dirty meters and exposure to possible contamination within the environment. You may also want to do each analysis more than once at different intervals as water contaminates can naturally fluctuate.

It is good to know the worst-case scenario so that you are completely prepared before recommending the appropriate equipment. Having accurate analysis upfront will save you time and money in return service calls. *wqp*

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