



Water Quality Testing

Guidelines for Agricultural Water Sources

Routine water testing is an important part of a Food Safety Plan, as water can be a significant source of contamination. Water testing for the presence of bacteria is recommended according to the following schedule, depending on the water source and intended use.

If Your Farm's Water Is:	Test:
Municipal / Public	Not generally required.* Consider testing at outflow if distribution system is old, recently modified, or potentially compromised.
Well Water and Springs (drilled, dug and driven point wells)	At least one time per year <ul style="list-style-type: none"> Beginning of the season
Surface Water (ponds, streams, rivers and lakes)	At least 3x per year** <ul style="list-style-type: none"> Start of the season Peak use Prior to harvest

*The most recent water quality report is required for the Good Agricultural Practices (GAPs) audit. Some audits may require testing at outflow.

**Take at least one water test prior to harvesting early season crops. Three samples should be obtained for later season crops and crops planted in succession.

How to Collect a Water Sample

Potable water, required for drinking and washing of hands and produce, should be collected at the tap where it is used. Irrigation water should be collected from the pump discharge vent or a sample-shunt valve. If not possible, collect surface water directly from the body of water. Avoid wading and stirring up residue during collection; rather collect the sample from shore by attaching the sample bottle to a pole and submerging the bottle to the level of the intake pipe. Avoid sampling surface water after a heavy rain or during high flow, as this will over-represent usual bacterial levels. Sample under conditions during which you would normally irrigate.

*Most Probable Number (MPN) is used interchangeably with Colony Forming Units (CFU)

Information on water testing at Vermont Department of Health Laboratory (VDHL) and other local and regional laboratories certified to conduct drinking water analyses is at: healthvermont.gov/enviro/ph_lab/water_test.aspx.

To reach VDHL by phone, call 800.660.9997 or 802.863.7560.

When ordering from the VDHL, request the following kits:

NU— Provides the most probable number (MPN) of **total coliform** and **generic E. coli** per 100 ml of water. Use for **potable** water (water used for drinking and washing of produce, hands, and food-contact surfaces and other post-harvest use).

Ag — Provides the most probable number of **generic E. coli** per 100 ml of water. Use for **irrigation** water.

N3— Provides nitrate levels. Potable water for drinking or crop washing and rinsing should be tested yearly for nitrate, as high nitrate levels are common on farms and can affect human and animal health.

If using another lab order the equivalent test, making sure the results provide a **most probable number (MPN)⁺** of bacteria rather than just an indication of presence/absence.

The laboratory will provide the collection bottle and instructions on collecting, labeling, handling, and mailing or delivery to the lab.

How to Interpret Results

Total coliform and generic *E. coli* are bacterial indicator species. Their presence indicates the **potential** for contamination of the water with pathogenic bacteria. It does not necessarily mean that your water actually contains bacteria that will make people sick. Depending on the source of water, bacterial levels, and the intended use, corrective action may be necessary.

Total coliforms are bacteria commonly found in the environment; most species do not cause human disease. The presence of total coliforms typically indicates the presence of soil in water, which would be expected in surface waters. Their presence in well or municipal water means there is a pathway for soil to enter the water such as a flooded wellhead or a compromised well construction or distribution system.

E. coli are bacteria found in the intestines and feces of humans and warm-blooded animals. Their presence in water indicates recent fecal contamination, increasing the likelihood that disease-causing organisms are present. Corrective action is necessary for well and municipal systems. Surface water levels of *E. coli* can vary, as they are greatly affected by environmental factors such as animal migration or heavy rain.



*Water used for hand washing must be potable (drinkable). A water test must show 0 CFU/100 ml for both total coliform and *E. coli*.*

How to Use Water Quality Guidelines

Vermont guidelines for agricultural waters used for irrigation, frost protection, and fertilizer application are based on the Environmental Protection Agency's recommendations for recreational (swimming) water. Irrigation waters should not exceed 235 CFU/100 ml for *E. coli*. Water exceeding 235 CFU/100 ml should be retested to determine if the reading is an anomaly or if *E. coli* levels are consistently high over time. If using the water, take mitigation steps that reduce the potential for contamination of produce. Examples include preventing irrigation water from contacting the edible portion of crops through the use of drip irrigation, or terminating irrigation well in advance of harvest. If *E. coli* levels exceed 235 CFU/100 ml, contact the Produce Safety Outreach Coordinator at UVM Extension at 802.656.5459 to discuss potential mitigation options specific to your farm. **[Note: Different irrigation water thresholds may be applicable under the Food Safety Modernization Act or for particular certifications and/or buyers.]**

Water Uses	Test	Criteria
Irrigation, frost protection, chemical or fertilizer application, and pre-harvest use	<i>E. coli</i>	235 CFU / 100 ml single *
Potable water for drinking, hand washing, crop washing and rinsing, washing of food contact surfaces, and post-harvest use	Total coliform	0 CFU / 100 ml **
	<i>E. coli</i>	0 CFU / 100 ml **
	Nitrate	10 mg/L (NO ₃ -N) **

* Ambient Water Quality Criteria for Bacteria. EPA 1986

**Primary Groundwater & Drinking Water Quality Standards. VT Groundwater Protection Rule. February, 2005, and Vermont Water Supply Rule, December 2010 (Environmental Protection Rules Chapter 21)

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