

**ASSEMBLING A SAMPLING KIT**

Your sampling kit should contain the following items:

- ☐ Cooler
- ☐ Ice pack(s)
- ☐ Sanitary hand wipes
- ☐ Single-use gloves (e.g., Nitrile)
- ☐ Alcohol swabs
- ☐ Permanent marker
- ☐ Sterile sample bottles



**Sterile sample bottles** can be obtained from the laboratory that will be performing the test.

**Gloves, sanitary hand wipes, alcohol swabs, and permanent markers** can be purchased from your local drug store.

**Cooler and ice packs** can be purchased at your local hardware store.

**COLLECTING A SAMPLE**

1. Label sample container with sampling location (e.g., farm/field), date, and time of collection.



2. Wash or wipe hands thoroughly with hand wipes before putting on clean gloves.
3. If sampling from a sprinkler or sample port, clean the area thoroughly with clean alcohol swabs.
  - a. Ensure you wipe both the inside and outside of the nozzle.
  - b. Allow water to run for 20 seconds before collecting the sample to ensure residual alcohol has been washed away.



4. Collect the sample:
  - a. Open the container, keeping the lid in the opposite hand to avoid contamination.
  - b. If sampling from surface water, dip the container into the water. Avoid any debris or dirt/mud.
  - c. If sampling from equipment, allow the water to flow into the container. Avoid touching the sample bottle to the equipment.



5. Fill the container to fill line. Seal the container without touching the lip or inside of the cap.
6. Place the filled container into the cooler with ice packs. The sample must remain chilled until arrival at the laboratory.
7. The sample(s) must be delivered to the laboratory within 24 hours after collection.

**RECORDS AND DATA ANALYSIS**

Growers should **keep records of sample results**. This can be done easily using Microsoft Excel. Data should include the sampling date, sampling location, and the test results.

More recent guidelines for water quality analysis (e.g., FMSA) require long-term trend analysis of results, rather than just single samples.

**SAMPLING PRECAUTIONS**

***Avoiding contamination***

Contamination of samples from outside sources may lead to **artificially high levels of indicator organisms**. To avoid contamination:

- Wash hands thoroughly before collecting the sample.
- Avoid touching the rim or inside of the sample container.
- When collecting from equipment, clean sample port or sprinkler head with clean alcohol swabs.

***Ensuring a representative sample***

Old water in pipes, weather events, and dirt and debris may also lead to **artificially high levels of indicator organisms**. To ensure an accurate sample:

- Run water for from sample ports (3 minutes) or sprinklers (15 minutes) before sample collection. This will remove all old water from the pipes.
- Avoid taking a sample after heavy rainfall or during flooding periods.
- Avoid dirt and debris in samples (as much as possible).





**SAMPLE SCHEDULE AND LOCATION**

*Schedule*

Research has shown the levels of **indicator organisms** in agricultural water to be **highly variable** over time. Long-term sampling is more indicative of the risk of pathogen presence than individual samples.

Some guidelines (e.g., FSMA) recommend maintaining a **microbial water quality profile** (MWQP) comprised of a rolling dataset of the **20 most recent samplings**; with **5 samples collected annually**.

Growers should be familiar with requirements of their respective certifying bodies on **when and how often samples should be collected**, and it is recommended that growers maintain **records of samples** as **higher-than-normal test results** can be an indication for **corrective action**.

*Location*

Samples should be taken **as close to system output as possible**. This can include either the water leaving the sprinkler, sample ports on the pump, or from the source water as close to the intake as possible.

For meaningful results, samples should always be collected from the **same location**.



**ACCREDITED LABORATORIES**

Growers are encouraged to contact their packer, local Health Protection Office, or the British Columbia Ministry of Agriculture for a list of approved laboratories.

**British Columbia Ministry of Agriculture**  
Toll-free: 1-888-221-7141  
Email: [agriservicebc@gov.bc.ca](mailto:agriservicebc@gov.bc.ca)

**RESOURCES**

**British Columbia GAP Guide:**  
<http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/food-safety/good-agricultural-practices>

**CanadaGAP agricultural water testing:**  
<http://www.canadagap.ca>

**Produce Safety Alliance (Cornell University):**  
<https://producersafetyalliance.cornell.edu/>

**Western Center for Food Safety (UC Davis):**  
<http://wcfs.ucdavis.edu/>

Produced in partnership with:



# Maintaining the Safety of Fresh Produce

## Monitoring the Microbial Quality of Agricultural Surface Waters



Ministry of Agriculture

**BACKGROUND**

*Why should I test?*

Monitoring of the **microbial quality of agricultural water** is important for ensuring the **safety of fresh produce**.

**Foodborne pathogens**, such as *Salmonella* and pathogenic *E. coli* may be **present in irrigation water** and can be **transferred to produce** where they are difficult to remove through washing.

*What are indicator organisms?*

Indicator organisms are bacteria that are associated with **increased risk of the presence of foodborne pathogens**.

Pathogens are micro-organisms that cannot be seen with the naked eye, and can cause foodborne illness when on food people eat. Testing for individual pathogens is expensive and time consuming; therefore, the microbial quality of agricultural water is determined through the testing of indicator organisms.

The most commonly used indicator organisms are **fecal coliforms**, (bacteria associated with animal manure contamination), and *E. coli*, a subset of fecal coliforms.

*How do I know if my water is acceptable?*

Various regulating bodies have different recommendations and/or guidelines for water quality. In B.C., the Ministry of Environment sets irrigation water guidelines.

If you are exporting to the USA, please be aware of the new **Food Safety Modernization Act (FSMA)**. It requires growers to regularly monitor agriculture water and has placed **strict legal requirements** on *E. coli* levels allowed in untreated water to be used for **ready-to-eat produce**.

Growers are encouraged to become familiar with requirements and guidelines put forward by their respective certifying body.