

Water Sampling Method – Microbiological testing

OBJECTIVE:

To provide guidance as to sampling water for microbiological testing either conducted by a third-party laboratory or conducted using in-house testing kits or methods.

Water has many important uses through all stages of the food chain, from primary production to consumption, cleaning food before and during preparation, and cleaning and sanitizing the establishment and equipment, as an integral part of the employee hygiene activities and for fire protection and sprinkler systems. The safety and quality of water is imperative to ensuring that all food products are prepared through all stages to a safe level for consumption.

SCOPE:

The water entering the facility should meet the requirements of the official government body having jurisdiction and should be analyzed at least once per year to confirm its microbiological safety.

Water is commonly sampled to

1. assess the safety of the source water in the establishment
2. verify the effectiveness of in-house water treatments such as UV, ozone, and chlorine
3. verify that the frequency at which recirculated water, used for processing and washing, is changed and the concentration of sanitizers used are adequate

BACKGROUND CONSIDERATIONS:

1. Municipal and public water distribution systems:
 - a. Water sourced from a municipality has been treated by that municipality and is of high quality before entering the distribution system but the microbiological and chemical constituents in the water can vary.
 - b. Reasons for the water quality to potentially deteriorate include:
 - i. The water is disinfected but not sterilized
 - ii. Plumbing materials are not 100 percent inert
 - iii. Cross-connections and line breaks to the piping may occur in the distribution system or in the establishment, which can result in contamination with non-potable water
 - iv. Precipitation of compounds such as calcium carbonate and iron may occur, which may provide favourable conditions for the growth of the organisms present.
2. Internal facility water distribution systems
 - a. The integrity of the water distribution within the facility can be influenced by:
 - i. plumbing materials used
 - ii. connections and piping age
 - iii. recent changes or additions to the plumbing that may have occurred
3. Sampling locations should be based on risk assessment, i.e.

Water Sampling Method – Microbiological testing

- a. Often municipal water is tested, and the results are posted on the municipal or district website. The information is valuable but should not be the only information to use to reflect the quality and safety of the water used in the facility
- b. From #2 above, the sampling of water within the facility should be based on the location(s) that water is drawn when used as an ingredient in a product (highest risk), followed by water used for cleaning and sanitizing equipment, utensils, and counters.
- c. Part of the risk assessment must include knowledge of changes to the plumbing included repairs, any external rupture or disruption in the flow of water to the facility. These events should be recorded on Premises logs to ensure that sampling of water can be obtained to verify the continued safety and quality of the water.
- d. Monitoring the locations and dates of the sampling must be identified on the facility map and on the sampling plan for your records to cross reference when results are obtained to identify if remedial action is required as well as trends that may indicate potential risks in future.

PROCEDURE:

1. Preparation for Sampling includes the following:
 - a. Have a recent map of the facility and locate the water sources on the map.
 - b. On the map, identify the date and time of sampling and the specific location(s) where the sample is taken.
 - c. Prior to sampling ensure that the necessary sampling pre-sterilized containers / pouches, labels, and any required gloves, assistance of others, is available to ensure the sampling will not be accidentally contaminated. This will also ensure that the sample is representative of the water that is most critical to the final product food safety.
 - d. Water containing residual chlorine disinfectant should be sampled in a bottle containing dechlorinating agent (Sodium thiosulphate which neutralizes the chlorine, thus preventing further bactericidal effects on organisms in the water during transit to the third-party laboratory). [Solution = Add 0.2 mL of a 3% solution of sodium thiosulphate, Na₂S₂O₃, per 200 mL sample.] Sodium thiosulphate “pills” are available commercially and can be used in place of the solution.
 - e. Third Party Laboratories that test the samples may provide the sample containers with instructions for sampling and delivery.
2. Potable Water Samples taken from tap:
 - a. Taps used for sampling must be free of aerators, strainers, hose attachments, mixing type faucets and purification devices. Avoid leaky taps.
 - b. Always take sample from COLD water tap.
 - c. Flush tap by running water (to waste) for 2-3 minutes, this will allow for adequate flushing of the pipe between water main and tap.

Water Sampling Method – Microbiological testing

- d. If tap appears to be dirty, clean with a sodium hypochlorite solution, then allow water to run for an additional 2 to 3 minutes to rinse.

3. Aseptic Sampling Procedure:

- a. Wash hands prior to sampling
- b. Remove lid of sample container with one hand. While holding lid with one hand, fill bottle with other hand.

*Do not adjust water line or water flow rate before taking sample.

*Do not rinse bottle prior to sampling.

* Be careful not to touch sides or inside lid of bottle to anything. These measures will prevent sample from becoming contaminated.

- c. Do not overfill sample container. Make sure there is approximately 1 inch of air space at top of container to allow for adequate shaking prior to analysis.
- d. Immediately replace lid tightly.
- e. If there is any question as to whether a sample has become contaminated, discard and resample.
- f. Samples should be placed on ice/ice packs during transit to laboratory to maintain temperature below 10°C.

4. Volume of Sample Required:

- a. 100mL of sample is required for total coliform analysis, therefore, sample bottle should contain a minimum of 125mL.
- b. 100mL of sample is required for faecal coliform analysis, therefore, sample bottle should contain a minimum of 125mL.
- c. If both total and faecal coliform analysis is required, sample bottle should contain a minimum of 225mL
- d. HPC analysis requires only a few milliliters of sample. There should be sufficient sample remaining after total and faecal coliform analysis for this test.

5. Duplicate samples

- a. In the event the laboratory wishes to conduct a duplicate test of the samples it is best to either provide double the normal amount of sample or provide two separate sample

Water Sampling Method – Microbiological testing

containers. In the latter case, both bottles / containers should be labelled with the same sample identification but can be distinguished by adding “-1” and “-2” after the sample number on the two bottles / containers.

6. Labelling of Sample Container:

Prior to sampling, label sample containers with the following information:

- a. Sample identification (full description of sample source can be written on **water sample field sheet** to accompany samples – this should be representative of what description will be transcribed onto the results document.)
- b. If using a third-party laboratory for conducting the analysis, they generally have a sample requisition form to complete that generally includes the following information requirement.

Water Sample Field Sheet information:

- a. Name of Company / Organization (including direct contact information in the event questions regarding the sample arise)
- b. Type of water samples (e.g., potable, well water, repeat sample, etc.)
- c. Date of sampling
- d. Time of sampling
- e. Sample identification
- f. Description of sample source / location
- g. Analysis required
- h. Disinfection residual prior to taking sample (if applicable)
- i. Sampler identification / signature

7. Receiving Results of Water Microbiological testing:

- a. The Laboratory will provide a set of results for each of the samples submitted.
- b. In the event, the acceptable range for each test is not provided, it is prudent to contact the local District for the acceptance and/or the laboratory for the explanation of the results. The laboratory will also be able to provide details of what the individual numerical results mean in context for suitability of use.
- c. Retain these results for comparison with subsequent samples as well if previous testing has been conducted.