

Bacteria in Milkhouse Water

Introduction

The Canadian Quality Milk (CQM) program requires all water that is used for milking equipment sanitation to meet potability standards for bacteria. Under the CQM, water used for cleaning milk contact surfaces must be sampled annually and tested for bacteria.

What is Bacteria?

Total coliforms

Total coliforms include non-pathogenic bacteria that are found naturally in soil and decaying organic matter. As such, the presence of total coliforms in a water sample may be an indication of foreign matter entering the water supply.

E. coli

E. coli is a bacteria found in the intestines of warm blooded animals and in high numbers in fecal matter. Most *E. coli* found in feces are harmless, but some strains of *E. coli* are pathogenic and potentially fatal to humans. As such, the presence of *E. coli* in a water sample may be an indication of fecal matter, such as manure, entering the water supply.

How Does Bacteria Enter the Water Supply?

The most common means for bacteria to enter water supplies is via the water source. Depending on the type of water source, bacteria may enter directly from the surrounding natural environment.

Farm activities and septic systems can also contribute to bacteria in water supplies. Each can result in contaminants entering the water supply either directly or indirectly.

Water Source Type

Often bacteria in a water supply are simply the result of the type of water source being used. Water source types common to rural Nova Scotia are listed below. They are listed in order from least problematic to the most problematic for bacteria presence:

- drilled wells
- dug wells
- springs
- ponds

Drilled wells (Fig.1)

Water from a properly constructed drilled well typically does not contain bacteria. Proper construction includes the following features:

- well casing contacts bedrock;
- the use of a pitless adaptor;
- casing that is at least 15 cm (6 inches) above ground level;
- a vermin proof, vented, sealed, and tight fitting cap; and
- secure connections.



Figure 1. Drilled well water source

Even if properly constructed, some drilled wells can allow bacteria entry. Factors such as shallow well casing, artesian effects, and fractured bedrock may result in bacteria entering the well water. Sand and silt particles carrying bacteria can also enter the well water.

Repairs and maintenance to a drilled well can result in bacterial contamination. Bacteria can persist for long periods in a drilled well. Well disinfection should be performed following any such work.

Dug wells (Fig. 2)

Due to the nature of dug well construction, bacteria are commonly found in dug well water. As shallow ground water moves from the surrounding ground into the well, naturally occurring bacteria enter the water.

To minimize bacteria in dug well water, the well should include a cover that prevents the entry of vermin and insects.

Well disinfection may eliminate the bacteria in dug well water for a period of time but eventually the bacteria will return. As such, water treatment is often recommended for dug well water prior to use.



Figure 2. Dug well water source

Springs

Similar to dug wells, bacteria is commonly found in spring water. As water moves along underground seams to the ground surface, naturally occurring bacteria enter the water.

Disinfection of springs is often difficult due to the positive displacement of the water. For example, if a spring tends to overflow, disinfectant added to the spring may simply spill out. As such, water treatment is often recommended for spring water prior to use.

Ponds (Fig. 3)

Pond water typically contains high amounts of bacteria. The large exposed surface area of water allows contaminants to enter the water with ease. Decaying vegetation, wildlife and run-off can have a significant impact on pond water quality. Pond turn-over usually



Figure 3. Pond water source

occurs in the spring of the year, reducing the water quality. As such, pond water quality is quite variable throughout the year.

Treatment of pond water prior to use is recommended. Due to the variability of pond water quality, pre-treatment is often required as well.

Watercourses

Water courses include rivers, streams, brooks and creeks. Similar to ponds, watercourse water typically contains high amounts of bacteria. Water quality is highly variable due to upstream activities, run-off, wildlife, and decaying vegetation. Water treatment is recommended for watercourse water prior to use. Pre-treatment is often required due to the variability of the water quality.

Table 1. Water source characteristics

Water Source	Bacteria Presence	Treatment Required	Water Quality
Drilled Well	Uncommon	In some cases	Consistent
Dug Well	Common	In most cases	Consistent
Spring	Common	In most cases	Consistent
Pond	Very Common	In all cases	Variable
Water Course	Very Common	In all cases	Highly Variable

Farm Activities

Farm activities can also contribute to bacteria in the water supply. Care must be taken when carrying out farm operations near the water source. Farm activities and features that can potentially contribute to bacteria in the water supplies include:

- grazing livestock
- manure spreading
- proximity to manure storages
- proximity to septic systems
- manure spills
- water source and system maintenance

Table 2. Recommended separation distances from water sources

Manure Spreading (clay and/or loam soil)	Manure Spreading (sand or gravel soil)	Septic System	Manure Storage
30 m (100 ft)	60 m (200 ft)	30 m (100ft)	100 m (330 ft)

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