

Milk Culture Screening Programs for Detection of Contagious Mastitis

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In this age of dairy expansion, producers must implement screening procedures to detect contagious mastitis organisms (*Strep. agalactiae*, *Staph. aureus*, and *Mycoplasma*) before they spread from introduced animals to the existing herd.

Bulk Tank Culture

The bulk tank (BT) is an accessible source of commingled milk that theoretically represents all lactating cows in the herd. Contagious mastitis pathogens found in BT samples are assumed to be causing intramammary infections in the herd. As such, cultures of BT milk are used to screen herds while avoiding the expense of culturing all individual cows in a herd. However, milk from cows being treated with antibiotics (e.g., cows with clinical mastitis!!) is not included in the BT milk. Furthermore, the BT culture may be negative if only a small proportion of the herd is infected with contagious mastitis. Larger herds (>300 cows) should not rely on monthly BT cultures alone to screen for contagious mastitis: BT samples should be collected weekly or biweekly, and routine string sampling should be adopted.

String Sampling

String sampling refers to the collection of a “drip” sample of milk during milking of a particular pen of cows. As successive strings or pens of cows enter the parlor, new collection vials are filled and labeled. Since pens seldom hold more than 250 cows, string samples are much more sensitive than BT samples in large herds. Furthermore, string sampling allows the dairy producer to focus on a particular high-risk group, such as a sick pen or a fresh pen, again without culturing each individual.

Individual Cow Sampling

Collecting milk samples aseptically from individual cows can be very time consuming and costly on a large scale. Care must be taken to ensure that the sample is collected in a sterile fashion and is free of extraneous dirt and hair. However, control of an outbreak of contagious mastitis requires that the dairy producer manage individual cows based on their infection status. Sampling of individual cows can be used in these situations:

1. Sample all animals to be introduced to a herd. Ideally, these animals would be sampled before leaving the source farm, and those with contagious mastitis would not be purchased. If not possible, lactating cows should be sampled immediately on arrival and dry heifers and cows should be sampled within 2 days of calving.

2. Sample all lactating cows in the herd. This drastic measure may be necessary in small herds or when contagious pathogens have become widely distributed throughout the herd.

3. Sample all cows in particular strings or pens. Whole herd string sampling may reveal the presence of contagious mastitis in one or two pens. All cows in the culture-positive pens should be sampled.

4. Sample all heifers and cows as they calve; sample clinical mastitis cases.

Standard Operating Procedures: Milk Sample Collection

The phrase “garbage in, garbage out” applies perfectly when collecting milk to screen for contagious mastitis pathogens. Samples must be collected so as to avoid contamination with environmental bacteria which can obscure other bacteria; they must be a true representation of the desired cow or group of cows; and they must be handled carefully after collection to prevent overgrowth of undesirable bacteria.

I. Sampling the bulk tank

- A. Be sure the tank is representative of the herd; all milking cows must be included (minus the sick pen, of course).
- B. Tank must be agitated for at least 15 minutes.
- C. Disinfect sample collection ladle before and after use.
- D. Whirl pac bags can be used, but are not recommended since they tend to leak. Hard plastic sterile vials, such as the ones used by DFA drivers, are ideal.
- E. For best results, collect samples for 3-4 days and then combine into one vial.
- F. Small closed herds (<300 cows) can sample once per month, but larger herds and those importing cows should sample the tank and high risk groups (sick and fresh pen; individual mastitis cows) at least twice per month.

II. String sampling

- A. Collect the sample from the “positive pressure” side of the milking system, between the milk transfer pump and the bulk tank. Some examples of sampling systems:
 1. A sampling petcock can be installed in a section of pipe that can be replaced between sampling periods. All new parlor installations or upgrades should include a sampling petcock.
 2. A “drip” sample can be collected by loosening one of the many gasketed clamped pipe junctions downstream from the transfer pump. Adjust the clamp to permit a steady leakage of milk each time the pump turns on.
 3. A kit is available from California DHIA which consists of a Teflon gasket and a double-ended needle. A pipe junction is dismantled and the existing gasket is replaced with the Teflon gasket. The needle is inserted through the gasket, and the clamp is replaced.
 4. Most milking systems have a clamped “cleanout” T junction immediately adjacent to the milk transfer pump. An adaptor can be fabricated to clamp onto this cleanout.
- B. Hang a sample collection vessel of sufficient volume to collect a drip of milk during milking of an entire pen.
- C. Avoid cross-contamination from one pen to the next:
 1. Switch sample collection vessels when cows from new pen go on-line!!
 2. Be sure milk from previous pen is evacuated from the milklines and receiver jar before beginning to collect from new pen. Allow receiver jar to be emptied 3-4 times to flush out milk from old pen.
- D. Be sure to obtain an accurate pen inventory at the time of the sampling!

III. Individual cow sampling

- A. Teats and udders must be clean and dry before attempting to collect sterile samples.
- B. Grasp teat with one hand, and vigorously scrub teat end with gauze or cotton moistened with alcohol.
- C. Loosen cap of sterile labeled vial and hold it at an angle under udder.
- D. Discard 2-3 streams of milk onto floor.
- E. Carefully open vial and direct 2-3 streams of milk into vial. It is not necessary to fill vial!
- F. Do not allow teat end or fingers to come in contact with open end of vial or inside of cap.
- G. Replace cap and refrigerate sample.
- H. Quarter sampling vs composite sampling:
 1. Quarter samples (1 quarter per vial) are collected from quarters affected with clinical mastitis.
 2. Composite samples (all 4 quarters in the same vial) are collected when screening cows for contagious mastitis.
- I. Collecting composite samples
 1. Disinfect all 4 teats. Begin with teat furthest away under the cow, and work toward the near side of the cow.
 2. Sample all 4 teats, beginning with those on the near side of the cow.

IV. Storage and transport

- A. Write your farm name, the date(s) of collection, and the source of the sample (BT vs individual cow vs string sample).
- B. If samples are to be hand delivered within 2 days, refrigerate the samples and transport in a cooler. If not, freeze the samples and use an overnight delivery method. Mail in an insulated box with ice packs enclosed.