



# Bulk Tank Milk Culture

## Interpreting the Results

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The primary goal of the Bulk Tank Milk Culture (BTMC) is to determine what types of bacteria are in milk to assess its quality. Identifying these types can be helpful in developing and maintaining a complete dairy herd health program. Bacteria originate from three sources - udder tissue infected with a contagious bacteria, the cow's environment, including milk equipment, and bacterial flora that reside on the teat or skin of the udder.

The following chart is a tool to analyze and adjust your management practices. To reduce bacteria counts you must control the source or modify the environment so they cannot survive. Your veterinarian, field representative, sanitarian or extension dairy resources can help. It should be part of your comprehensive plan to control mastitis in the dairy herd.

The final result is a higher quality, more consumer acceptable milk in your bulk tank and higher producing, more profitable cows free of udder infection.

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Mastitis Organism	Origin and Means of Spreading
<b>Contagious</b> <i>Staphylococcus aureus</i>	From the udders of infected cows. Spread cow to cow via milking machine during milking, also contaminated hands, reused towels and sponges, reusable cannulas, and infected quarters.
<i>Streptococcus agalactiae</i>	Sole reservoir is milk of infected udders. Easily passed from cow to cow via milking machine during milking and by contaminated hands, reused towels and sponges, reusable cannulas, and infected quarters.
<i>Mycoplasma</i>	Passed cow to cow via milking machine during milking, and by contaminated hands, reused towels and sponges, reusable cannula, and infected quarters.
<i>Corynebacterium bovis</i>	Spreads cow to cow via milking machine during milking, and by contaminated hands, reused towels and sponges, reusable cannulas, and infected quarters.
<b>Environmental</b> <i>Escherichia coli</i>	Fecal origin from manure and water. Milking udders/teats wet from excessive use of water or drop hose, and udders/teats not dried thoroughly. Milking machine applied to teats not free of manure/bedding.
Other Coliform <i>Enterobacter species</i>	Fecal origin from manure and water. Milking udders/teats wet from excessive use of sprinkler pen or drop hose, and udders/teats not dried thoroughly. Milking machine applied to teats not free of manure/bedding.
Other Coliform <i>Klebsiella species</i>	Found in wet or fresh sawdust bedding, soil, some vegetation and some by-product feeds. Milking wet udders/teats. Milking teats not thoroughly cleaned.
Other Streptococci (alpha-hemolysis) <i>Streptococcus bovis</i> <i>Streptococcus dysgalactiae</i> <i>Streptococcus uberis</i>	Found in soil, wet bedding, water supplies, cow's mouth, udder, teats and reproductive tract. Milking wet udders/teats. Milking teats not thoroughly cleaned.
<b>Opportunistic</b> Coagulase negative staphylococci <i>Staphylococcus epidermis</i> <i>Staphylococcus hyicus</i> <i>Staphylococcus xylosus</i>	Often the most frequently isolated bacteria in the herd. Normally found on the healthy teat skin and on milker's hands. Considered a minor pathogen. Infections with these organisms are usually mild and elicit only a slight increase in somatic cell count. Typically the result of milking teats not thoroughly cleaned and sanitized.
<b>Other Bacteria</b> <i>Serratia marcescens</i> <i>Nordicardia asteroides</i> <i>Prototheca zopfi</i> <i>Candida species (yeasts)</i> <i>Pseudomonas aeruginosa</i> <i>Bacillus species</i> <i>Actinomyces pyogenes</i>	Widely distributed in the cow's environment. Found in contaminated water supplies, deteriorating rubber lines, milk hoses, rubber drop hoses, and poorly cleaned pipelines/milk tank. Can cause high preliminary incubation counts.



Basic Prevention	Basic Treatment
See milking procedure. Eliminate cross contamination between quarters during milking by using the proper liner and reducing liner slips. Sanitize milking machine by backflushing. Post-dip teats.	Identify positive quarters or cows by culture. Segregate positive cows from non-infected herd and milk last. Dry treatment does not usually eliminate established infections.
See milking procedure. Eliminate cross contamination by using the proper liner and eliminating liner slips. Sanitize milking machine by backflushing. Post-dip teats. Culture all herd replacements.	Identify with microbiologic culture. Dry cow treatments usually effective. The only microorganisms that respond well to therapy in lactation. Most preparations, especially penicillin, can eliminate organism. <b>Be sure to clearly identify treated cows.</b>
See milking procedure. Eliminate cross contamination between quarters during milking by using the proper liner and reducing liner slips. Sanitize milking machine by back flushing. Post-dip teats.	Routine bulk tank milk culture analysis if this is a closed herd. Culturing all new cows entering herd from unknown origin may be used. Cull positively infected cows.
See milking procedure. Sanitize milking machine by backflushing. Very common in the absence of post-milking teat dipping.	Routine dry cow treatment at dry-off.
See milking procedure. Keep environment clean and dry. Don't milk a wet udder. Change bedding source. Keep cows standing for one hour after milking. Rake manure from free stalls more often. Pre-dip.	<p>Environmental counts in a BTMC mean a breakdown in equipment cleaning or milking procedure. Upon udder tissue infection in individual cows, systemic and supportive therapy may be necessary. Environmental bacteria are opportunists: they exist in the environment of the cow but do not cause udder infection and subsequent mastitis unless they gain entry into the cistern via the teat canal. Once they have gained entry, these bacteria rapidly overwhelm the cow's defenses, produce severe toxins, and cause clinical or severe mastitis.</p> <p>The purpose of the BTMC is to point out the types of environmental bacteria that are found in milk as the result of inadequate equipment cleaning or a breakdown of good milking procedure.</p> <p>Dry cow treatment is helpful in eliminating current infections, but cows can become re-infected late in the dry period.</p>
See milking procedure. Excellent environment and milking is necessary for control. Change bedding source. Remove manure from free stalls by raking more often. Reduce teat-end exposure. Pre-dip.	
See milking procedure. Use kiln-dried shavings or other type of bedding material, such as chopped straw, sand, and use hydrated lime. Reduce teat-end exposure.	
See milking procedure. Provide clean calving area by changing bedding between each calving. Reduce teat-end exposure. Pre-dip.	
See milking procedure. Effective pre-milking hygiene especially helpful. Apply machines to teats that are clean and dry. Post-dip teats with an effective product and use routine dry cow therapy.	
See milking procedure. Keep environment clean and dry. Sanitize milking equipment before each milking. Sanitize treatment materials. Routinely clean milking machines, pipelines and bulk tank.	Identify source and eliminate. High counts are associated with a contaminated water source or in the breakdown of rubber from various hoses. Reducing these bacteria will help lower preliminary incubation counts.



## Milking Procedure

1. Remove manure and bedding debris from teats. If a drop hose is used in the parlor, wet teats only. If you are dry-wiping teats, check to see that manure and bedding are actually being removed.
2. Strip each teat to remove milk in teat cistern. (This step may be done first or together with the above procedure.) This accomplishes three steps:
  - a) Stimulates the cow via the nervous and hormonal systems to initiate contraction of the udder tissue smooth muscles for milk let-down.
  - b) Provides a quick check for mastitic milk or abnormalities. (Never strip into the hand).
  - c) Removes high bacteria milk that has accumulated in the teat cistern between milkings.
3. Pre-dip with an approved pre-dip product for at least 20-30 seconds contact time on the teat surface. This step is especially helpful in killing bacteria found on the teat surface that could possibly get through the teat opening during milking. (Although optional, this step is effective and recommended when environmental bacteria are identified in the herd.)
4. Thoroughly wipe excess pre-dip from teats. Use single service paper or individual laundered cloth towels. Beware, the use of cloth towels in herds with highly infectious bacteria is discouraged.
5. Apply milking machine within one minute after step 2. Reduce liner slips by repositioning machine and by using the correct inflations.
6. Remove the teat cups after completely shutting off the vacuum. Failure to do so may cause machine-induced infections from milk droplet impact against the teat end. This can propel milk with mastitis-causing microorganisms back into the teat canal.
7. Post-dip teats with an effective, approved teat dip. This step effectively kills bacteria left on the teat surface after milking and establishes a surface barrier of protective chemical to further inhibit the bacteria contacted between milkings.
8. Backflush claw/teat-cups and allow to drain. An air blast for drying is recommended. This step prepares a "clean" machine for the next cow and rinses any existing bacteria left by the previous cow from the machine. An alternative to backflushing is to dip teat cups, two at a time, to allow full contact of liners. Dipping steps include plain water, disinfectant solution, and another plain water rinse. Caution, dipping all four lines together does not permit the disinfectant solution to come in contact with the full length of the liners due to an air block.

## Herd Considerations

1. Screen fresh cows and replacements whether they are heifers raised on the farm, purchased heifers or mature cows. Identify infected tissue using the California Mastitis Test (CMT) or ask to see the seller's DHI-SCC reports. Swollen, hard, inflamed quarters can be found by palpating the udder with your hand to confirm this first sign of udder infection. A quick screening test of fresh cows using the CMT will find infected quarters that need treatment before the milk is put in the bulk tank. While some producers report good results from treating mastitis based on high cell count observations, research shows it to be no more effective than treating only the obvious clinical cases. Dry cow therapy and culling is the most effective approach to mastitis problems.
2. Clearly identify treated cows and use antibiotic screening tests. Segregating treated cows into a separate string and positively marking them is crucial in keeping antibiotics out of the bulk tank. Consider using an appropriate commercial drug screening test on each treated cow before returning her to the herd and on the bulk tank milk before each pick up. A contaminated load of milk is expensive and the responsibility of the producer.
3. Diet appears to play a role in the cow's ability to resist udder infection. There is no substitute for a healthy cow. Analyze your feeds and check frequently for a balanced diet. With a sound nutritional philosophy, the dietary supplementation of certain essential nutrients can enhance the disease fighting ability of an animal that has poor resistance due to dietary deficiencies.

