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# Interpreting Bulk Tank Milk Culture

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The primary goal of a Bulk Tank Milk Culture (BTMC) is to determine what types of bacteria are in milk. Bacteria originate from three sources: udder tissue infected with a contagious bacteria, cow's environment, including milking equipment, and bacteria flora that reside on the teat or udder skin.

Use this chart to change your management towards reducing bacteria counts. You can reduce or control the source of bacteria, or modify the environment so it cannot survive. Your veterinarian, sanitarian, or Extension dairy agent can help you.

The final result is higher quality milk in your bulk tank and higher producing cows free of udder infection.

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Mastitis Organism	Origin and Means of Spreading	Basic Prevention	Basic Treatment
<b>Contagious</b> <i>Staphylococcus aureus</i>	Cow to cow via milking machine during milking. Contaminated hands, reused towels and sponges, reusable cannulas, and infected quarters.	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 with culture or an ELISA test. Segregate positive cows from non-infected herd and milk last. Dry treatment does not usually eliminate established infections.
<i>Streptococcus agalactiae</i> <i>(beta-hemolysis)</i>	Cow to cow via milking machine during milking. Contaminated hands, reused towels and sponges, reusable cannulas, and infected quarters.	See milking procedure. Eliminate cross contamination between quarters during milking by using the proper liner and eliminating liner slips. Sanitize milking machine by backflushing. Post-dip teats.	Identify with culture. Lactating and dry cow treatments usually effective.
<i>Mycoplasma</i>	Cow to cow via milking machine during milking. Contaminated hands, reused towels and sponges, reusable cannulas, and infected quarters.	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.	Routine bulk tank milk culture analysis if herd is closed. Culturing all new cows entering herd from unknown origin may be used. Cull positively infected cows.
<b>Environmental</b> <i>Escherichia Coli</i>	Fecal origin from manure and water. Milking wet udders/teats 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.	See milking procedure. Keep environment clean and dry. Do not milk a wet udder. Change bedding source. Keep cows standing for one hour after milking. Rake manure from free stalls more often. Pre-dip.	Environmental counts in a BTMC (bulk tank milk culture) 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 teat via the teat end. Once they have gained entry, these bacteria rapidly overwhelm the cows defenses, produce severe toxins, and clinical or severe mastitis results.  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.  Dry cow treatment is helpful in eliminating current infections, but cows can become re-infected late in the dry period.
Other Coliform <i>Enterobacter spp.</i>	Fecal origin from manure and water. Milking wet udders/teats 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.	See milking procedure. Keep environment clean and dry. Do not milk a wet udder. Change bedding source. Remove manure from free stalls by raking more often. Reduce teat-end exposure. Pre-dip.	
Other Coliform <i>Klebsiella spp.</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.	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.	
Other Streptococcus (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.	See milking procedure. Provide clean calving area by changing bedding between each calving. Reduce teat-end exposure. Pre-dip.	
<b>Teat skin flora</b> Coagulase negative Staphylococcus (CNS) <i>Staphylococcus epidermis</i> <i>Staphylococcus hyicus</i> <i>Staphylococcus xylosum</i>	Found on the teat skin of all cows. Considered a minor pathogen. Poor milking procedures such as teats not thoroughly cleaned and sanitized.	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.	CNS (coagulase negative Staphylococcus) bacteria are not usually the cause of udder infection. High counts are associated with milking hygiene.
<b>Other bacteria</b> Pseudomonads spp. Bacillus spp. Corynebacterium spp.	Widely distributed in the cow's environment. Found in contaminated water supplies, deteriorating rubber liners, milk hoses, rubber drop hoses, and poorly cleaned pipelines/milk tank. Can cause high preliminary incubation counts.	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. Reducing these bacteria will help lower preliminary incubation counts.

Milking Procedure
<ol style="list-style-type: none"> <li>Remove manure and bedding debris from teats. If a sprinkler pen is used, allow time to drip dry (15-30 minutes). 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.</li> <li>Strip each teat to remove milk in teat cistern (this step may be done first or together with step one). This accomplishes three steps: <ol style="list-style-type: none"> <li>stimulates the cow via the nervous and hormonal systems to contract udder tissue smooth muscles for milk let-down.</li> <li>a quick check for mastitic milk or abnormalities.</li> <li>removal of high bacteria milk that has accumulated in the teat cistern between milkings. This milk does not enter the milk supply.</li> </ol> </li> <li>Pre-dip with effective dip for at least 30 seconds contact time on the teat surface (optional; this step recommended when environmental bacteria are identified in the herd). This step is especially helpful in killing bacteria found on the teat surface that could possibly get through the teat opening during milking.</li> <li>Wipe pre-dip and moisture off teats, thoroughly. Use individual paper or laundered cloth towels. The use of cloth towels in highly infected contagious herds is discouraged.</li> <li>Apply milking machine one minute after step 2. Reduce liner slips by repositioning machine and by using the correct inflations.</li> <li>Remove machine by cutting off vacuum fully. Removing machine under vacuum may cause backflooding of milk against the teat end. This can propel milk and bacteria back into the teat.</li> <li>Post-dip teat with an effective teat dip. This step kills bacteria left after milking on the teat surface, as well as applying a surface barrier of protective chemical for further bacterial contact after milking.</li> <li>Backflush claw and teat-cups and allow to drain. This step prepares a "clean" machine for the next cow, and rinses possible bacteria out of the machine from the last cow.</li> </ol>
<b>Herd considerations</b>
<ol style="list-style-type: none"> <li>Screen fresh cows and identify inflamed tissue using the California Mastitis Test (CMT) and udder palpation. Swollen, hard, inflamed quarters can be found by palpating the udder with your hand. This is one of the first signs of udder infection. The CMT measures somatic cells, the end result 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. Some producers report good results when treating based on a high cell count. Research shows it to be no more effective than treating only clinical cases.</li> <li>Properly 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 and on the bulk tank milk before each pickup.</li> </ol>

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## Prácticas de Ordeño

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1. Limpiar la suciedad o estiércol que pueda haber quedado en los pezones. Secar las ubres y los pezones con toallas de papel individuales. El ordeño de las ubres mojadas aumenta al riesgo de la mastitis. El uso de esponjas para secar las ubres puede causar el paso de la mastitis de una vaca a otra.
2. Determinar si la vaca tiene mastitis sacando dos o tres chorros de leche de cada pezón. Si la vaca tiene mastitis, aplicar el tratamiento según las instrucciones del administrador.
3. El ordeñador debe saber que sus manos pueden propagar la mastitis de una vaca a otra. El ordeñador debe lavarse las manos frecuentemente durante el ordeño.
4. Para reducir las heridas de los pezones es importante aplicar las pezoneras después de la bajada de la leche.
5. Las pezoneras deben ser colocadas en los pezones con el menor escape de aire posible. Dicho escape puede producir el retroceso de la leche e introducir aire en la ubra. Esto puede propagar las posibles bacterias presentes y causar mastitis.
6. Ajustar la máquina y las mangueras para que haya el menor escape de aire posible alrededor de los pezones. Este escape de aire puede provocar mastitis y debe ser eliminado rápidamente.
7. Cuando cesa el flujo de la leche, revisar todos los cuartos de la ubre para ver si ha salido toda la leche. Cerrar el vacío de la máquina de ordeño antes de quitar las pezoneras. Esto se hace cerrando la válvula de vacío. Los separadores automáticos cumplen esta función en lugar del ordeñador, pero deben revisarse regularmente para comprobar su buen funcionamiento.
8. Todos los pezones deben ser sumergidos o rociados completamente con un producto aprobado. Éste es el paso más importante para la prevención de la mastitis.
9. Si no se usa un reflujó automático, inyecte agua o soluciones desinfectantes en la máquina después de ordeñar vacas con signos de mastitis. Esto ayudará a prevenir la propagación de bacterias causantes de mastitis de una vaca a otra. Tome precauciones para que no entre agua ni soluciones desinfectantes en la leche.

### Observaciones generales

1. Antes, durante y después del ordeño es importante observar atentamente el comportamiento de las vacas y el perfecto funcionamiento del equipo para solucionar a tiempo cualquier problema.
2. Los ordeñadores deben lavarse y desinfectarse las manos frecuentemente para evitar la propagación de la mastitis. La forma de mastitis más grave no se ve ni puede ser detectada por el ordeñador. Ésta es la llamada mastitis subclínica. El administrador puede usar la Prueba de California para la Mastitis (CMT) o el Recuento de Células Somáticas (SCC) para determinar el nivel de mastitis subclínica en el hato. Un recuento bajo indica bajo nivel de mastitis en el hato. El ordeñador debe seguir las prácticas de ordeño apropiadas resumidas en este folleto para ayudar a mantener un bajo nivel de mastitis.

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