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UT Extension
W151

Tennessee Quality Milk Initiative

Factsheet

Bulk Tank Milk Quality Parameters

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Bacteria in milk, whether originating from the cow or from the environment, significantly impact the quality of dairy products and therefore consumer acceptance. Bacteria produce heat-stable enzymes that can damage milk fat and milk protein. These enzymes are not affected by pasteurization and continue to cause damage in the final dairy product. High bacteria levels in raw milk result in off-flavors, bitter flavors, rancidity and reduced shelf life. The Pasteurized Milk Ordinance specifies safety standards of Grade A milk to protect public health, not to maximize product quality and shelf life. The PMO only sets limits on somatic cell count and standard plate count. Additional tests utilized by the dairy industry have been developed and adopted to maximize quality and meet consumer demands. Processors and milk cooperatives use the following measurements to gauge product quality.

Somatic Cell Count (SCC)

- Indirect measure of milk quality
- Legal limit defined in the PMO = 750,000 cells/ml
- High SCC indicates bacterial infections in cows
- Sensory tests indicate higher consumer acceptance of low SCC milk
- Processor standards vary
- Some premium programs available
- Achievable goal: < 350,000 cells/ml

Standard Plate Count (SPC)

- Regulatory test for estimating bacterial populations
- Legal limit defined in the PMO = 100,000 colony forming units/ml
- Milk incubated at 89.6 degrees F (32 C) for 48 hours
- Disadvantages
  - Does not indicate types of bacteria present
  - Does not indicate source of contamination
  - Does not give complete count of all types of bacteria, as some bacteria do not grow well at this temperature
- Processor standards vary
- Achievable goal: < 10,000 cfu/ml

Preliminary Incubation Count (PIC)

- Not a regulatory test
- Milk 'pre-incubated' at 55 degrees F (12.7 C) for 18 hours then SPC run
- Measures psychotrophic (cold-loving) bacteria
  - Grow at low temperatures (32 to 68 degrees F)
  - Mostly comprised of Gram-negative bacteria
- A more complete and accurate measurement of bacterial population than other tests
- Disadvantages
  - Does not indicate types of bacteria present
  - Does not indicate source of contamination
  - Requires a very broad approach to problem solve

Preliminary Incubation Count (PIC), cont'd

- Processor standards vary
- Some premium programs available
- Achievable goal: < 20,000 cfu/ml

Laboratory Pasteurized Count (LPC)

- Not a regulatory test
- Importance is waning
- Milk heated to 145 degrees F (62.8 C) and held for 30 minutes (to simulate low-temperature, long-time pasteurization)
- Measures thermoduric (heat-loving) bacteria
  - Resistant environmental bacteria (Micrococcus, Microbacterium, Lactobacillus, Bacillus, Clostridium and occasional *Streptococci*)
  - Survive pasteurization
- Processor standards and use of LPC will vary
- Achievable goal: < 300 cfu/ml

Coliform Count (CC)

- Not a regulatory test
- Milk incubated on selective media at 90 degrees F (32 C) for 24 hours
- Measures coliform bacteria
- Indicator of unsanitary production practices and coliform mastitis
- Processor standards and use of CC will vary
- Achievable goal: < 50 cfu/ml

Results from bulk tank milk (BTM) analysis are typically available from the processor and/or the milk cooperative. However, in some cases, results may not available to the producer on a regular basis or in a timely manner. Producers have the option to implement their own BTM testing program to monitor and troubleshoot their milk quality. A BTM testing program can provide a view of current and potential problems in a herd. However, before implementing a testing program, producers should be aware of its limitations.

- BTM analysis will provide a comprehensive view of herd milk quality but does not provide information at the cow level. It cannot identify specific cows with specific problems, but it can alert a producer to the presence of a cow problem.
- To properly interpret results from a BTM analysis, information on herd management, mastitis prevention and control programs, sanitation and general farm hygiene is required.
- Before making any changes on the farm, multiple BTM analyses need to be performed. One analysis will not effectively shed light on specific problems. Trends over time, with proper information of the farm situation, need to be studied before making major changes.
- BTM samples cannot be frozen. They must be shipped on ice or ice packs.

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