

MILK QUALITY AND THE BULK TANK CULTURE PROGRAM

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In previous articles in this newsletter, I have described the various "Milk Quality Report Cards" available to the dairy producer. The Bulk Tank Culture, the milk handler quality report, and DHI reports reveal the quality of the producer's milk by noting the number of somatic cells, bacteria, and other substances present in the milk. This article will revisit the Bulk Tank Culture report in detail and describe a research project that will attempt to clarify the source of certain environmental bacteria reported in the Bulk Tank Culture.

The Bulk Tank (BT) culture program was initiated in 1992 to screen herds for the presence of contagious mastitis pathogens. Herd expansion remains a fact of life for the foreseeable future, and the introduction of new animals to a dairy herd greatly increases the risk that new mastitis pathogens such as *Streptococcus agalactiae* and *Mycoplasma bovis* will be introduced as well. Since that time, BT culture has identified the presence of these two highly contagious organisms in many Colorado herds.

The discovery of *Strep. ag.* or *Mycoplasma* in bulk tank milk should be followed as soon as possible by confirmatory testing. Samples should be collected from all cows with clinical mastitis; "string" samples should be collected from all milking strings or pens, including the hospital pen; and another bulk tank sample should be collected. These samples will reveal the extent of spread of these contagious pathogens, which generally occurs in two distinct scenarios. In the first instance, the dairy producer first tests his bulk milk because a milk quality problem has previously been noted: his bulk tank cell count is high or an abnormally high incidence of clinical mastitis is apparent. Since the bulk tank had not been cultured in the past, contagious mastitis organisms responsible for abnormal milk quality have been able to spread widely without detection. The organisms will be isolated from virtually all string samples, indicating the presence of infected animals throughout the herd. It is then recommended that samples be collected from all cows in the herd. The second scenario appears in herds that have been screening BT milk routinely over several months or years. If *Strep. agalactiae* or *Mycoplasma* appear for the first time after many negative samples, it is likely that the organism has recently been introduced to the herd via an infected cow or heifer, and relatively few animals will be infected. Confirmatory testing as described above will occasionally fail to identify the infected cow(s) for the following reasons: a) the infected cow was sold after the initial positive bulk tank, often because of chronic mastitis; b) the infected cow was dried off after the positive tank; or c) the infected cow is not shedding bacteria at present. If the infected cow is still in the herd, the tank will be positive at a future test and the confirmatory testing will eventually find her.

Once the infected cows are identified after confirmatory testing, the goal is to eradicate *Streptococcus agalactiae* or *Mycoplasma* from the herd. Treatment of *Strep. ag* is very successful; commercial intramammary infusion tubes such as Cephalac, Albacillin, or Pirsue achieve 90% or higher cure rates. Treated cows should be re-tested 2-3 weeks after treatment to ensure eradication. *Mycoplasma* is not cured with antibiotic treatment; it is

recommended that infected cows be culled as soon as possible. To ensure that these two organisms are eradicated, all fresh cows and new clinical cases must be cultured for the next 3-4 months, and the bulk tank screened at least once a month (preferably on a weekly basis).

Milking procedures for the control of contagious mastitis must be reviewed and implemented. These procedures include the use of separate towels for pre-milking udder prep, wearing of latex gloves by milkers, proper milking unit adjustment to prevent liner squawks, and post-milking teat dipping with proven disinfectants. The origin of other bacteria identified by the BT culture is less clear-cut. Streptococci other than Strep. ag and coliforms cause intramammary infections, but they also originate in the environment.

Pseudomonas is an environmental contaminant commonly originating in water sources. Excessive environmental bacteria have adverse effects on milk flavor and shelf life, and milk handlers routinely test for overall bacteria levels (Standard Plate Count and Preliminary Incubation test). The milk quality bonus paid to Dairy Farmers of America producers is based in part on these bacteria tests.

It can be difficult to solve problems with elevated bacteria counts. In general, elevated coliform and environmental Strep counts are due to excessive contamination of the teats with mud and manure. However, these bacteria may originate from other sources as well. Milk from quarters with Strep intramammary infections can shed extremely high bacteria numbers and can elevate the bulk tank Strep count and SPC. Small numbers of environmental bacteria can incubate in dramatic fashion if the milk is not cooled quickly after harvest. Milking equipment that is not properly cleaned and disinfected after milking may harbor high levels of environmental bacteria. Water hoses may become contaminated with *Pseudomonas*, and use of water from these hoses to clean teats and milk-contact equipment may lead to high BT *Pseudomonas* levels and PI counts. Milk quality specialists who help dairy producers solve bacteria problems try to identify some of these potential sources of environmental bacteria. However, we are lacking a great deal of basic information and many questions are unanswered. How often do environmental intramammary infections lead to excessive BT bacteria levels? We know that *Pseudomonas* can often be cultured from hoses in herds with high BT *Pseudomonas* levels, but can this organism also be found in hoses with no BT *Pseudomonas*? How important are different methods of premilking udder preparation in preventing high BT bacteria counts? We are embarking on a research project to try to answer these questions and others. Our goal is to develop a set of observations and tests that can be used on a systematic basis to discover the cause of high BT bacteria levels. We will attempt to accomplish this goal by identifying a set of herds with high BT bacteria levels, and a set of herds with Normal BT bacteria levels, and then applying the same series of observations and tests to both sets of herds. Those abnormal observations and tests found only in the high BT bacteria set of herds will clearly be the basis of the diagnostic criteria we will need to apply when solving high BT bacteria problems in the future. We will recruit herds to enroll in this research project from among those presently enrolled in the bulk tank culture program. All of these dairies will receive a letter of introduction to the project, and a subset of these herds will be contacted by phone and invited to participate.

Once enrolled in the project, the participating dairy will receive a visit from university personnel who will administer a questionnaire; make observations of milking practices, cow cleanliness, and environmental conditions; and collect samples of milk contact surfaces and water sources. Strict confidentiality will be maintained; results will be reported to directly to the herd owner/manager, but will only be published as anonymous summary data.

If you would like to be involved in this project but have not received a letter or phone call, please call and let us know. Likewise, if you are not enrolled in the Bulk Tank Culture program and would like to have your tank milk screened on a monthly basis for these important pathogens and contaminants, call your DFA field office. Once you sign on to the program, samples are sent automatically to the CSU Diagnostic Laboratory on a routine monthly basis. You are billed \$11-12 by DFA, and you receive a monthly report on the bacterial population in your BT milk from CSU.