Monitoring Bulk Tank Milk
Dr. Donald E. Pritchard
Extension Dairy Specialist, NCSU

A report in the October 2004 issue of the Journal of Dairy Science by an extension veterinarian group from the Department of Veterinary Science at Pennsylvania State University presented some interesting findings on the relationship between bulk tank milk somatic cell and bacteria counts. Additionally, the correlations between the various laboratory methods used to measure the bacteria counts in milk, as well as the correlations of the lab methods and the somatic cell counts were determined.

To conduct the study, bulk tank milk (BTM) samples from 126 dairy herds ranging in size from < 50 to >200 cows were sampled twice a month for two months. The somatic cell counts of all the milk samples (BTSCC) were measured. Bacteriological analysis of the milk samples were examined for standard plate count (SPC), preliminary incubation count (PIC), laboratory pasteurization count (LPC), coagulase-negative staphylococci (CNS) count, environmental streptococci (ES) count, coliform count (CC), gram-negative noncoliform (NC) count, and contagious mastitis pathogens (SA staphylococcus aureaus, SAG streptococcus agalactiae, and Mycoplasma). The effect of herd size and numerous management practices on somatic cell and bacterial counts were also examined.

A brief summary of the main findings is listed below.

- The paired correlation analyses between BTSCC and the different bacterial count methods listed above were all low (<0.37), suggesting that BTSCC can’t be estimated by just looking at the bacterial analyses results from a bulk tank milk sample.
- The correlations from paired analyses between SPC and ES, PIC, CNS, and LPC were all >0.5, suggesting a fairly good relationship between the results from SPC when compared individually with each of the other test methods in measuring bacteria in milk.
- There was a low correlation (<0.5) between bacteria counts (CNS, ES, CC, and NC).
- The SPC and ES counts were significantly lower in BTM when cows received both pre- and post milking teat dipping.
- The BTSCC, SPC and PIC counts in BTM were significantly higher when teat dip was applied as a spray compared to when a dip cup was used.
- None of the management practices examined had any significant effect on the LPC in BTM.
- The CNS counts were significantly lower in BTM when cows were milked using automatic milk detachers, perhaps because those cows had less subclinical mastitis.
- BTSCC were the lowest in herds >100 cows.
- In most cases an increase in the SPC was associated with unclean udders before milking, poor teat and teat-end sanitation, improper cleaning and sanitation of the milking equipment, and improper cooling of milk.
- Herds that used sand as bedding had significantly lower BTSCC compared with herds using organic bedding.
Pre- and postmilking teat dipping reduced the number of environmental mastitis pathogens (CNS, ES), the number of thermoduric bacteria (measured by LPC), and the number of psychrotrophic bacteria (measured by PIC).

The isolation rates in BTM of SA and SAG increased as the BTSCC values increased, and also as the number of times the BTM milk was sampled and examined for bacteria content. This suggests that caution must be used in interpreting the bacteria findings of BTM analysis when only one or two samples are taken.

This study supports previous studies that show the importance of sanitation and cleanliness in keeping BTSCC and bacteria counts low. As more attention is given to the practices that promote high quality milk, lower BTSCC and bacteria count milk is produced. Dairy producers should contact their Extension agent, milk handler field representative, veterinarian, or other competent consultant for herd specific suggestions for producing higher quality milk.