The European Reality

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onal milking systems.

The four parameters most commonly measured in the various studies were standard plate count, bulk tank somatic cell count (SCC), milk freezing point and acid degree value levels. Standard plate count is a reflection of the bacterial contamination of the milk, while SCC reflects the level of mastitis in the herd. Milk freezing point is an indication of whether water is added to the milk. High acid degree values are associated with shorter shelf-life of milk and sometimes with off flavors. Acid degree values can be high if milk is not cooled properly or if excess air gets into the milking lines or pipes.

Y. van der Vorst of the Dutch Research Institute for Animal Husbandry in Lelystad reported on results summarizing total plate count, bulk tank somatic cell count and acid degree value. Results from 154 herds using AMS since 1998 were statistically evaluated in an analysis that included data from Dutch dairy farms milking in traditional barns either twice or three times per day.

Milk quality parameters declined significantly after adopting the AMS. Before installing the AMS, however, milk quality was similar. There has been an improvement in the AMS equipment used by Dutch dairy farmers, with three generations of equipment: prototypes, widely marketed production' models and second generation, or improved, production models. Milk quality on farms using the first production models was somewhat better than from herds using the prototype equipment, but still not as good as conventional herds. Early results from the second generation production models indicate that milk quality may also be better in those herds.

Several presentations indicated that milk freezing point was affected in herds using the AMS. These systems involve long milk pipelines that require automated cleaning. Milk freezing point is used to determine if water is added to milk. The changes reported at the Symposium demonstrated that some water was getting into the milk, and it was likely that not all cleaning water was being removed. Further technical engineering improvements are required.

Denmark, and some other countries, requires dairy farmers to visually inspect the milk from each quarter at each milking for clots or other evidence of poor quality milk. This is not possible in an AMS, of course, as most milkings are unattended by the farmer. Special exclusion from this rule was provided to the farmers as an experimental milk quality program.

P. Justesen of the Danish Dairy Board described their results from their "Self-Monitoring Program" concerning milk quality. The program screened cows manually by CMT for chronic mastitis, and then to relied on the AMS to use electrical conductivity to identify cows with new mastitis infections. Electrical conductivity is a standard part of the AMS, and the milk from cows identified with chronic mastitis or with milk conductivity like that of mastitis was separated by the AMS and not put in the bulk tank.

The bulk tank somatic cell count (SCC) in herds on the program was reduced significantly, and was near the level of SCC for Danish herds milked in traditional systems. Milk standard plate count (SPC) and acid degree value (ADV) levels were not affected by the voluntary program and were also worse than those from Danish herds milked in traditional systems. These results demonstrate that mastitis doesn't have to be a problem, but that some new monitoring programs may have to be adopted by dairy producers.

The lack of improvement in SPC and ADV values was of concern. A cause for the elevations in SPC were not clearly known. Some of the suggested causes were lack of thorough cleaning of cows before milking, spread of bacteria from a dirty cow to a clean cow, who happened to be milked next and inadequate bulk tank cooling. The increase in ADV was thought to be related to either the long milk pipelines so characteristic of current AMS, increased air leakage into milk lines during milker attachment or perhaps inadequate cooling of milk in the bulk tank.

BULK TANK COOLING

Traditional bulk tanks do not work adequately with AMS. Bulk tanks are designed to cool milk quickly, and their heat transfer plates are on the bottom of the tank for efficient cooling. In traditional milking systems, the flow of milk into the bulk tank is rapid, and the plates are covered by milk up to approximately 10% of capacity, often in an hour.

When the bulk tank is emptied in an AMS, the next milk is added when a cow comes into the AMS to be milked. The milk from just that one cow is insufficient to cover the cooling plates and it may be several hours before the tank reaches the 10% capacity level that seems to be needed to prevent low levels of milk from freezing on the cooling plates.

AMS developers have added a small bulk tank that they call a 'buffer" tank. The small tank is quicker to fill, and when the total volume of milk reaches the 10% of the main bulk tank capacity, the milk is pumped from the buffer tank to the bulk tank for holding. The buffer tank is then cleaned.

G. Wolters of the Dutch Research Institute for Animal Husbandry in Lelystad reported on results of their work on milk cooling. Even using the buffer tank approach, there was an increase in bacteria levels, sometimes above the legal limit. The average for these herds with buffer milk tanks was 15,000 cfu/ml, which was similar to levels found in AMS herds, but was higher than traditional dairies. On the seven private herds using the experimental buffer tanks, the bacteria level exceeded 25,000 and 100,000 cfu/ml on average two and 0.3 times, respectively, during the 11 sampling times over a three month period. The reasons for the increased bacteria level was not apparent, but the buffer tank approach didn't seem to help that much, though it did solve milk freezing problems.

PRODUCTION RESPONSE, LABOR SAVINGS

Cows in an AMS produce significantly more milk than do cows milked twice per day in conventional systems. The amount of the increase is at least the amount of extra milk that's produced when cows are milked three times per day. Research published by R. Erdman and M. Varner at the University of Maryland demonstrated that the increase is not a percentage of previous milk production levels, as is commonly reported, but is about 7-8 lbs per cow per day regardless of the initial milk production level.

The average number of milkings per cow per day in the AMS was 2.6 to 2.8 in private dairy herds, and the production response was similar to that found in herds using 3X milking in traditional milking systems. There was limited evidence presented at the Symposium that there may actually be an increase in the amount of milk produced over 3X milking, but this observation needs to be confirmed in more studies.

Budgeting of labor was the focus of two presentations at the Symposium. Evaluation of farmers' working patterns when using the AMS was conducted by R. Kaufmann of Swiss Agricultural Research, and he demonstrated a 30% reduction in labor required to produce milk. That included all the work to maintain the AMS, feeding, cleaning and management time. C. de Koning of the Dutch Research Institute for Animal Husbandry in Lelystad reported that with just 2,500 hours of labor in one year they were able to manage with a 70 cow herd that produced 1,760,000 pounds of milk in 12 months. Again, all work was included, even maintaince of the AMS.

COW STRESS, ANIMAL WELL-BEING

Some people have postulated that cows in an AMS might be more stressed than cows in traditional systems. The results from the Symposium do not support this concern. H. Hopster from the Dutch federal agricultural research service (ID-DLO) in Lelystad reported on a study using a very sophisticated analysis of stress hormones and the response of first-calf heifers in an AMS.

All dairy farmers struggle with training of first-calf heifers in a parlor. Getting them off to the right start is the key. The Dutch study compared heifers in an AMS versus those in a traditional parlor. Their study indicated that the heifers were

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