

Evolving technologies for a growing dairy industry

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Every day dairy producers are presented with the task of managing an efficient, well run dairy while keeping up with consumer demands for a high quality product.

Over the past 10 years dairy cattle numbers in the United States have declined by about 0.5% each year while milk production per cow has increased almost 2% annually. Dairy herds are producing more milk on fewer farms with fewer cows to meet continually growing consumer demand.

At the same time producers are feeling heavier pressure to improve production efficiencies and milk quality while maintaining animal care, comfort and overall well being. The bottom line – dairy producers are doing more with less.

As dairy operations continue to evolve, so do the technologies utilised by dairies. While official testing and records are important resources for any dairy, daily observations such as bulk tank somatic cell count (BTSCC) and component analysis can provide insight on milk quality solutions.

Several milk quality evaluation technolo-

gies and software programs are available to help dairy producers facilitate a more complete evaluation and observation of milk quality procedures.

Automated assessments

There are many processes involved in producing high quality milk including reproduction and herd health management, milk production management and system management.

Monitoring and measuring each process becomes important to assure quality and consistency, but supervising employees around the clock to ensure procedures are properly followed is not always realistic.

As an alternative, there are many automated and web-based dairy technologies and tools available to dairy producers and consultants for monitoring and measuring milk quality and procedures on dairies.

As illustrated in Fig. 1, these tools are automated systems that allow producers to track the daily results from individual cows, milk quality testing and uploaded data from herd observations.

These can then be used to communicate



New electronic and mobile technology on the market helps to more efficiently monitor and manage the herd.

problems or inefficiencies with employees, nutritionists, veterinarians and dairy consultants.

Web-based data

Bulk tank data monitoring systems are available for tracking and analysing milk quality test results from milk testing laboratories.

The system automatically generates BTSCC and milk component control charts, as shown in Fig. 2, while providing email alerts when statistically significant changes occur in the milking system and milk quality.

The bulk tank data is analysed and generates tables and graphs used to measure milk quality components such as protein, milkfat, SCC and milk urea nitrogen (MUN).

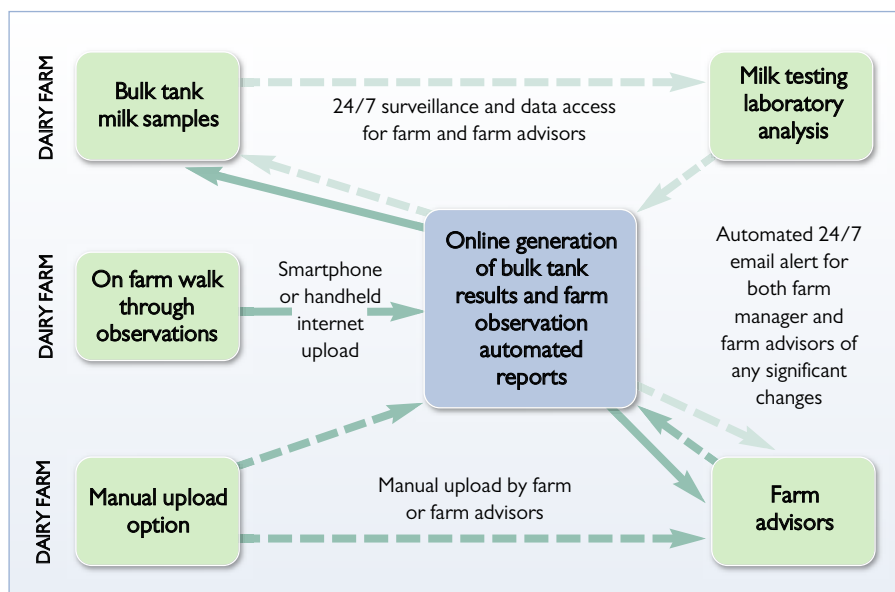
By monitoring milk quality on a daily basis, producers can identify trends for early detection of problems that could severely affect milk quality. These observations can help detect future SCC or component complications before they become costly situations.

The technology detects whether changes in a dairy's performance are normal variations or the start of true change, and a problem within the dairy.

Benchmarks that dairy producers can use

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Fig. 1. Data flow diagram of the web-based automated monitoring system.



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to analyse their dairy include: the dairy's average performance for a parameter (milkfat) and how consistent the dairy is for that parameter (variation in milkfat).

Understanding variation

Many dairy farm evaluations are based upon monthly observations and milk quality testing, but some of this information can be misleading or out-of-date compared to current observations. This can lead to confusion and frustration on the farm between owners, employees and consultants.

Applying statistical methods to analyse a dairy could potentially lead to improvement of processes and milk quality as well as personnel performance monitoring. It can also assure more frequent performance feedback to employees who are directly responsible for processes on the dairy.

Control charts such as Fig. 2 are developed online and depict the variation in components on a daily basis. If BTSCC results indicate a high sigma (variation), it is an indication that there is a problem with consistency in performance on the dairy or with the process itself.

However, a low sigma, such as 14.716 shown in Fig. 2, is an indication of good consistency in procedures on the dairy, but the mean component level should also then be assessed. Programs and worksheets are available to evaluate both the mean and sigma of each parameter.

If dairy producers find that both their mean for a parameter and sigma is high, improvement efforts should first be focused on increasing consistency in performance (milk preparation time) then on changing the process design (specific milking procedures).

Beyond the bulk tank

Although assessing SCC and milk component levels is important for milk quality assurance, there are many conditions that can have an effect on the quality of milk

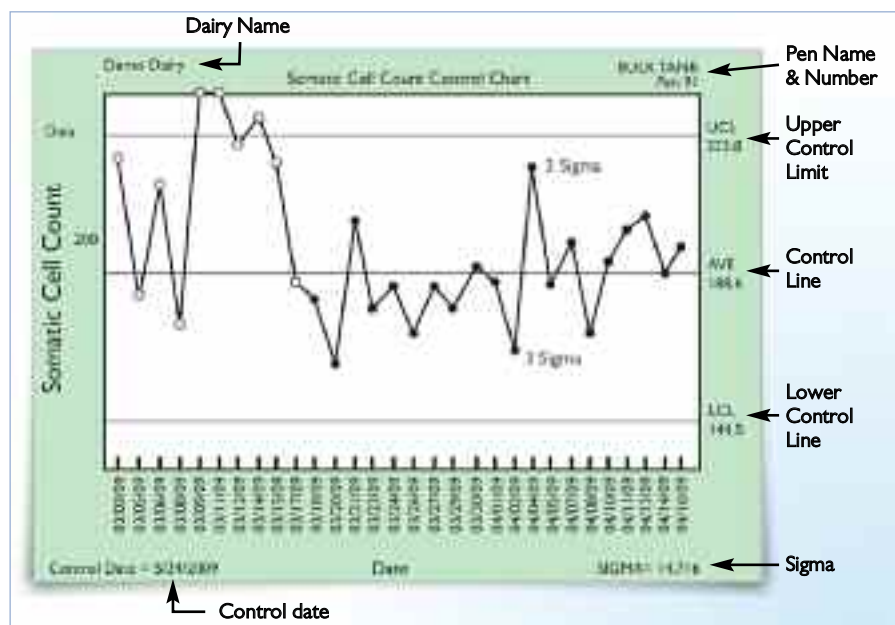


Fig. 2. Anatomy of a component control chart

being produced. Other effects on milk quality can include cow cleanliness, comfort and milking procedures.

Veterinarians, nutritionists, dairy consultants and other key assessment team members complete visual observations on dairies as part of their regular visits. During a walk-through they observe body condition scores, cow hygiene, cow comfort and many other scores as well as milking equipment evaluation, teat-end scores and milking procedures.

Gathering this information can be time-consuming and cumbersome carrying pens, papers and notebooks around.

New software innovations and applications are now available for handheld computers and smartphones that can eliminate inefficiencies and time from these evaluations. The benefits of using handheld technology for farm evaluations include:

- **No handwriting.**

The only tools needed are a handheld computer or smartphone. On-farm data is entered with dropdown menus and stylus taps on the handheld.

- **Cowside data input.**

Information can be recorded from inside the parlour or barn and uploaded for data comparisons almost instantly.

- **Automatically generated reports.**

Reports are generated on the web using industry standards and are available anytime, anywhere, providing easy access to information about individual cows or parlour performance.

- **Trend analysis capability**

Allows for producers to automatically analyse trends in the parlour as well as each pen based on a comparison of scores against the dairy's historical performance.

Efficiency and automation top concerns of dairy producers today – jobs should be done well, fast and results should be available quickly.

The web-based dairy monitoring systems or dairy management software programs can provide great resources to dairy producers and consultants, adding value to bulk tank data and on-farm evaluations to improve farm efficiencies, milk quality and production per cow. ■