

An in-depth view into udder health: every quarter counts!

Apart from optimising feed efficiency, promoting udder health is still the main way to improve profitability on farms. Although many epidemiological studies have been conducted and treatment and mastitis control programmes have been established all over the world, mastitis still ranks number one among farmers when asked about their main concerns regarding cow health. Bulk milk somatic cell count (BMSCC) and new infection rates are the key KPIs that need monitoring.

by Dr Susanne Klimpel,
GEA Farm Technologies GmbH.
www.gea.com

In the last decade, a number of things have changed concerning udder health:

- In many countries, the epidemiology of mastitis-causing bacteria has evolved and therefore treatment protocols needed to be adapted.
- The aspect of cow well-being has grown in importance, thus contributing to a shift in treatment towards using anti-inflammatory therapy to reduce tissue damage and provide pain relief at the same time.
- Antibiotic control and reduction programmes require management practices to adapt, and the importance of preventative measures is also growing.
- Automatic milking systems are becoming more and more popular, providing more information with a higher density and at the same time requiring a different approach to management.
- Selective dry cow treatment is on the rise in a variety of countries.

Udder inflammation

While treatment expenses are obvious but overestimated costs, the main economic loss in mastitis cases is caused by reduced milk production due to udder inflammation.

An increase in somatic cell count (SCC) is the indicator for an



Fig. 1. Different stages of measuring SCC and the impact on dilution.

inflammation and the level of bulk milk SCC can be related to a loss in milk production at the herd level.

The invasion of bacteria into the udder may lead to an infection, but must not always lead to an inflammation. On the other hand, an inflammation, increase in SCC or even clinical mastitis do not necessarily mean that bacteria can be isolated.

SCC is the sign for an immune response of the udder tissue. This can be monitored on different levels: bulk tank, composite milk and on the quarter level. Whereas the first two have already been available for decades, either as information from the dairy processor, milk recording or sensors on the farm, the latter has not been available on a regular basis. Taking quarter samples has been time-intensive and costly.

Although bulk milk somatic cell count (BMSCC) can give an overview of the udder health situation on a farm, the quality of this information is limited. Clinical mastitis cases with an elevated SCC are not considered

in this KPI as the milk has to be discarded.

Therefore, a high incidence of new clinical infection may not be revealed by an increase in BMSCC. On the other hand, a high number of subclinical infections, which may often be chronic, will lead to an increase in BMSCC.

Cows that contribute to this rise cannot be identified as easily as the clinical cases. At the very least, individual cow observation and examination are needed.

As increased SCC leads to a reduction in milk production, the effect of high SCC cows is masked and may go undetected until a critical level in the bulk tank is reached or the infection becomes clinical.

The risk lies in the number of undetected cows possibly shedding bacteria and infecting other cows. This dilution effect is important when the BMSCC is used as a KPI for udder health. The SCC in the bulk tank gives an indication of the udder health of the whole herd, however

leaving out the clinical and treated cases of mastitis.

Measuring somatic cell count

The next step in analysing a herd's udder health is measuring the SCC of the individual cow. This information is either available through monthly milk recordings or taking herd samplings. In both cases, this leads to a disruption in the farm's or the herd's routine.

After laboratory analysis, the results are not available until after a few days. Based on this information, cows with an elevated cell count in the composite milk can be identified. This is extremely important for heifers and freshly lactating cows. In late lactation, this information may be used for decisions concerning the drying-off period, as in the Netherlands.

Although this already constitutes information at the level of the individual cow, there are still some aspects missing. As this is a snapshot of one or two milkings per month, it does not reveal what is happening between samplings. A subclinical mastitis could go undetected if it occurs between two control days.

This may lead to a decision for drying-off treatment which would create a risk of renewed infection in the next lactation.

Furthermore, we still face a dilution: if a cow has only one or two quarters with a high cell count and consequently reduced milk

Continued on page 12

Table 1. Cell count classes and ranges per quarter, using GEA DairyMilk M6850.

Cell count class	Cell count range (1,000 cells)
0	<250
I	250-500
II	500-1,000
III	1,000-2,000
IV	>2,000

Continued from page 11
production in the sum of the composite SCC, she can still appear 'normal'.

How can this dilemma be overcome by getting access to undiluted information from each individual quarter?

Since 2018, GEA has been providing farmers with the quarter-individual cell count sensor, DairyMilk M6850, for the automatic milking systems Monobox, DairyRobot R9500 and DairyProQ.

This sensor can measure SCC per quarter in five categories. Based on the analysis, an alarm notifies the farmer in real time and the cows can be tracked via an alarm list.

The milk is analysed during the whole milking process, from the first to the last drop, by monitoring the changes that occur during milking.

As the system does not use any consumables for the measurement, every milking can be analysed at no extra cost.

Never before has there been a more in-depth view into udder health: each individual quarter at every milking!

Monitoring individual quarter cell count offers a variety of advantages:

- Identifying acute mastitis cases (clinical and subclinical).
- Determining success or failure of following treatment.

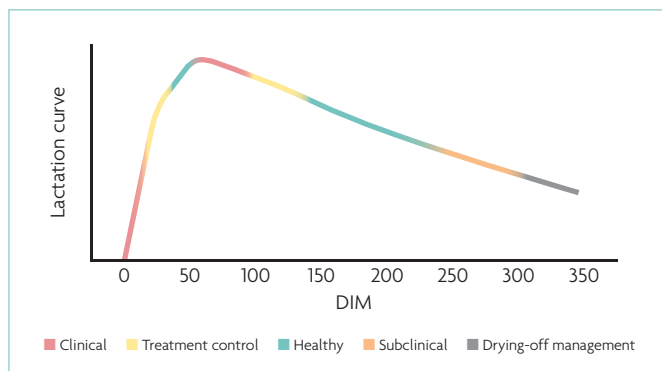


Fig. 2. Changing focus of SCC monitoring depending on the lactation stage.

- Identifying chronic mastitis cases (clinical and subclinical).

- Support in decision-making concerning drying-off management.

As milk production and mastitis risk vary throughout lactation, the way to use the information changes as well. At the beginning of lactation, the cow and udder are at risk of acute infection, often even clinical, due to the transition phase and stress impact on the immune system.

During this phase, early detection matters and does have an impact. Early intervention can lead to a reduced drop in milk yield and faster recovery. Therefore, every quarter counts at every milking.

Moreover, treatment success can be monitored. Even if the cow is treated and its milk is discarded, the cell count per quarter continues to be analysed at every milking.

Decreases in cell count class can be detected. Therefore, if treatment is unsuccessful and the cow remains at the top of the alarm list, treatment can be adapted in a timely manner.

After peak lactation, the risk of acute mastitis decreases, however the chance of subclinical infections may increase, either due to an acute mastitis becoming chronic and subclinical, or due to an infection with cow-associated bacteria. These

animals can be identified, and either treated, separated or other management decisions can be made.

Another very important area that benefits from consistent cell count tracking at the quarter level is drying-off management. In this area, a paradigm shift has been taking place for some years. Because blanket dry cow treatment has been identified as a major contributor to overuse of antibiotics in dairy cows, the approach has been changed in many countries.

The programmes differ from country to country and sometimes even within one country. It is becoming evident that an individual farm approach might be necessary to manage risks when avoiding blanket dry cow therapy. Here the opportunity of getting information in higher resolution, for example, at every milking, is a powerful tool in successfully managing udder health.

The opportunity of tracking individual quarter cell count class throughout the whole lactation period enables farmers, herd managers and veterinarians to base their decisions on sound facts instead of limited information, experience or gut feeling. ■

References are available on request from the author