



The Importance of Increasing Milk Quality by Decreasing the Somatic Cell Count (SCC)

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Mastitis is an infection of the mammary gland and occurs when bacteria enters the udder through the teat end. Mastitis has been studied for decades to determine ways to prevent and treat this disease as quickly and efficiently as possible. As SCC scores increase, milk production per cow decreases. This can be seen on a national level where milk per cow

has increased while SCC has decreased (Figure 1). The dairy industry has made great improvements in reducing SCC but still have room for improvement. (Figure 2; the higher the number means fewer cows have a problem; see also Figure 1). There is also a seasonal element where SCC is higher during the summer and winter (Figure 3).

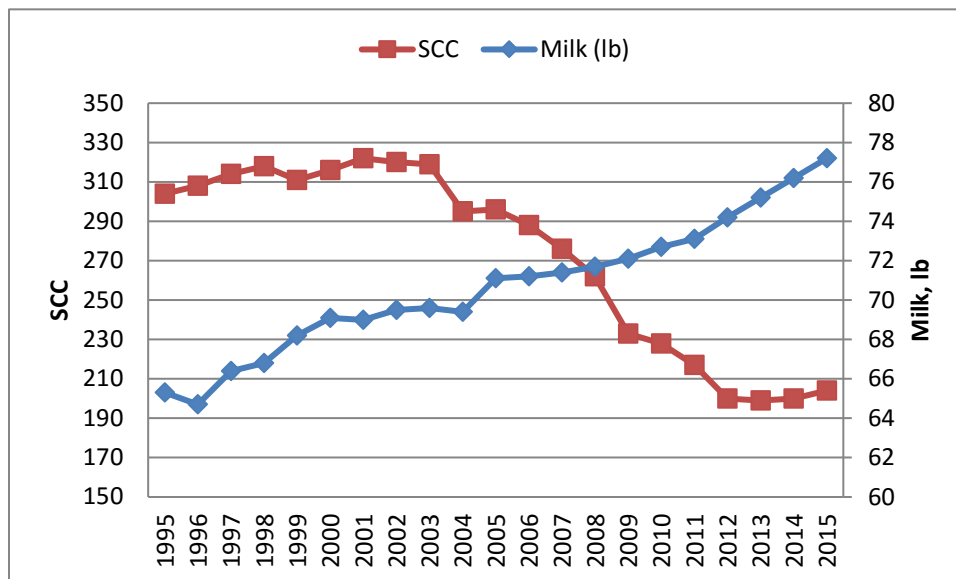


Figure 1. National averages for test-day milk yield and somatic cell count (SCC) from Dairy Herd Improvement herds by year (Norman et al., 2016).

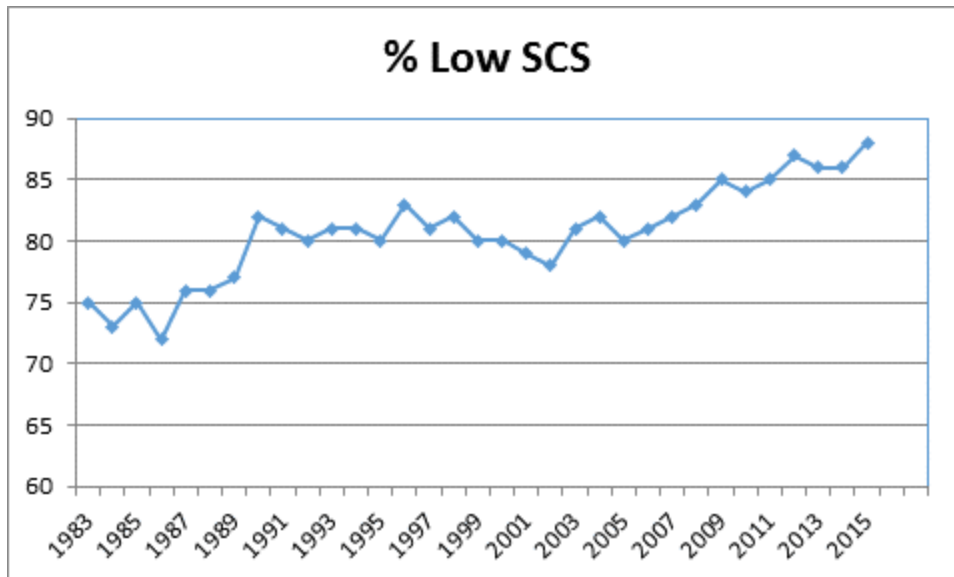


Figure 2. Annual average changes in % low SCS for herds in the Rocky Mountain DHIA affiliate from 1983 to 2015. The line represents the average percent of cows within a herd that have a somatic cell count of below 283,000 cells per ml. The higher the percentage, the fewer cows have elevated counts.

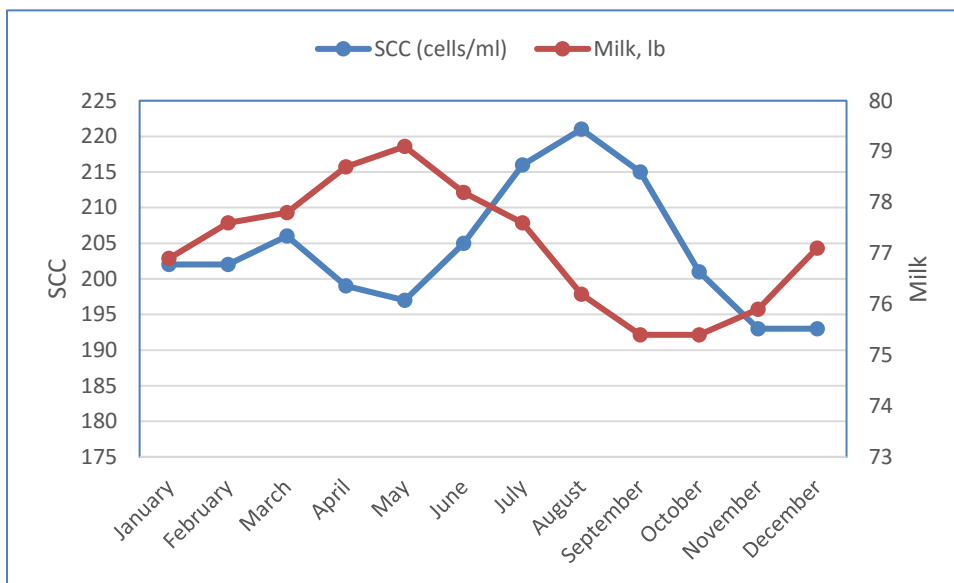


Figure 3. Average test-day milk yield and somatic cell count (SCC) from Dairy Herd Improvement herds during 2015 by month (Norman et al., 2016).

Best Management Practices

Prevention of mastitis is always preferable to treating the problem after it has occurred. The following are some best management practices that can be used to help prevent the disease.

Sanitation and Bedding

Keep corrals, alleyways, parlors and holding pens clean. At a minimum, daily cleaning is required, but may be needed more often to keep manure from

collecting on the feet and udders of cows. This reduces chances for bacterial infection.

When deciding what bedding to use, cow comfort, producer convenience, and economics are major factors to consider. Cows should spend from 12-14 hours a day lying down; therefore, it is very important for bedding to remain clean, comfortable and bacteria free. When lying down the teats are most exposed to bacteria and have an increased chance to become infected. There are many

different resources to use for bedding, but the most common choices are sand and straw/shavings.

Sand

Sand beds minimize bacteria growth and providing maximum cow comfort and should be free from rocks and debris. Sand depth should be at least 6-8 inches in a free stall barn. Clean sand will not promote growth of pathogens, but when mixed with manure, soiled sand will support pathogen growth. It is important to rake the sand in the stalls at least twice a day to keep the bedding clean and dry. Sand also reduces swelling in the hocks and the number of knee injuries, conforms to the shape of the cow, and provides adequate cushioning.

Straw/shavings

Straw and shavings can be used for bedding dairy cows. These products are usually readily available, relatively inexpensive, and easy to scatter. They also compost well. Straw and shavings have some disadvantages. When mixed with manure and urine, pathogens can increase quickly. Wet particles stick to the outside of the teat thus increasing chances for mastitis.

No matter what bedding is used, it needs to be kept dry, readily available, cost effective and easily disposed of when soiled. It is essential to keep the cows clean and dry at all times so the teat surfaces do not harbor bacteria.

Control Flies

Flies can be controlled in several ways and it should be a priority in dairies. Flies are vectors and can carry bacteria from animal to animal. Horn flies are commonly found on the backs of dairy animals, but will also attack the teats. Flies reduce net profits due to increased mastitis, decreased milk production, elevated SCC, and loss of quality premiums.

Milking Procedures

Correct milking procedures are an essential part of reducing mastitis on a dairy. It is important that the milking routine has consistency and cleanliness. This includes milking at regularly scheduled times each day and wearing latex gloves to reduce bacterial spread by the person doing the milking. When implementing milking protocols studies have shown that attitude is everything. When dairy producers consistently train their employees, results

are beneficial. Training usually results in a significantly lower SCC in the bulk tank. One suggested milking routine is as follows:

- Strip two or three squirts from each teat to stimulate milk let down and check for any abnormal milk.
- Dip the teat with an approved product and let set for 30 seconds.
- Wipe off the dip.
- Apply the milking units.
- Carefully remove milking units at the completion of the milking.
- Apply the post dip over the whole teat (in cold weather, partially dry to prevent frost bite).

When dairy producers decrease the amount of time cows spend standing in holding pens or parlors, the health of cows increases. It is also recommended that cows with high SCC be removed from the herd; especially those that do not respond to therapy. When milk prices are low, it is never economical to keep high SCC cows. Remember, culling cows is a short-term solution to the mastitis problem, but can quickly reduce SCC in the milk tank.

Dry cows are often overlooked, but it is very important to eliminate and prevent bacteria from entering the udder during the dry period. Dry cows need adequate space, ventilation and clean bedding. It is recommended that all the quarters of the cows are treated at dry-off with an approved intramammary antibiotic, or only treat those quarters that are infected as a way to reduce antibiotic use. Teat sealers can also be an effective way to improve udder health during the dry period.

Milking Equipment

The one consistent element of milking is that each cow comes into contact with the milking equipment each time she is milked. Therefore, it is important that it is working correctly. Some equipment needs to be maintained monthly while other parts of the system require, biannual or annual service.

The three key areas of concern are the liner, pulsator, and regulator functions. The liner is the piece of equipment that touches the teat of the cow so it needs to be maintained and cleaned regularly. It is also important to replace liners before they become cracked or worn out or according to manufacturer recommendations. The pulsator alternates between applying vacuum at the teatcups

and admitting air at atmospheric pressure. This function extracts the milk out of the teat. If the milk phase and the rest phase are out of sync this could cause damage to the teat end. The vacuum regulator is designed to keep the vacuum at a predetermined level. It is important to maintain good milking practices and keep milking equipment working properly. Successful managers always make sure the parlor and milking equipment are well cleaned and sanitized by cleaning them consistently and properly per manufacturer's suggestions and regulatory requirements. Routine maintenance should be done quarterly.

It is also wise to check for stray voltage, especially in older parlors. "Stray voltage is damaging electricity from many sources in milking parlors that can be grounded through a cow. A small voltage can cause production of epinephrine, which blocks the effect of oxytocin that is required for milk let down. Incomplete removal of milk may contribute to mastitis due to bacterial growth in the mammary gland. Some common causes are 120-volt motors, static electricity, off-farm voltage leak and ungrounded motors." (Looper, n.d.). Hire a licensed electrician to check for stray voltage if SCC is unreasonably high and there are no other obvious problems.

Nutrition

Nutrition is a key factor in maintaining immunity and helping the cow fight off the bacteria that gets into the udder. A balanced ration improves the ability of the cow to remain healthy. A good practice is to provide cows with fresh feed immediately following milking. This gives the teat sphincter time to close before the cow lies down and has direct contact with the environment. When a cow has an unhealthy immune system, and begins to be sick, milk production is affected first, then body maintenance, reproduction, and growth.

"Ask your nutritionist to check your rations to be sure your cows are receiving adequate levels of vitamins A and E, and selenium. These nutrients help promote a strong functioning immune system

which is needed to combat udder invading bacteria and elevating SCC values." (Pritchard, 2016). Cows that have adequate energy, protein, minerals and vitamins not only produce well, but also have a strong immune system. "Calcium metabolism also plays roles in immune function, both through its involvement in muscle contraction (reducing the risk of pathogen entry into the udder via proper teat sphincter function) and roles in immune cell activation and response" (Bass, 2012).

Conclusion

Reducing SCC will increase milk production, increase milk quality, decrease antibiotic use and increase cow health. An on-going study of Midwest dairies has found that for every 100,000 cell increase in SCC, milk production decreased 5.2 lb (Dickrell, 2016). Many factors go into a milk quality program, but a holistic approach using these best management suggestions is best.

References

- Bass, R.T. 2012. Remember, nutrition can impact udder health and SCC too. Accessed July 8, 2016.
<http://www.progressivedairy.com/topics/feed-nutrition/remember-nutrition-can-impact-udder-health-and-scc-too>
- Dickrell, J. 2016. Six degrees of separation. Dairy Herd Magazine (December), p. 14-16.
- Looper, M. n.d. Reducing somatic cell count in dairy cattle. Accessed July 8, 2016.
<http://www.uaex.edu/publications/PDF/FSA-4002.pdf>
- Norman, H.D., L.M. Walton, and J. Durr. 2016. Somatic cell counts of milk from Dairy Herd Improvement herds during 2015. CDCB Research Report SCC17 (2-16). Accessed August 1, 2016.
<https://www.uscdcb.com/publish/dhi/dhi16/scrpt.htm>
- Pritchard, D.E. 2016. Combating the summer rise in SCC. Accessed July 8, 2016.
https://www.cals.ncsu.edu/an_sci/extension/dairy/newsletters/0605nlet.pdf