

Summer Matters - Factors Affecting Somatic Cell Count on Milk

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Milk Somatic cell count (SCC) is an important indicator of dairy animals' mammary gland health and milk quality worldwide. Somatic cells are mainly made up of defense cells called leukocytes (white blood cells that pass from the blood to the udder) in response to an invading pathogen and by cells from the mammary gland epithelium (epithelial cells from alveoli and the ducts).

The SCC are generally present at low levels in milk (for a healthy cow, the accepted threshold is around 100,000 SCC/mL).

Why high SCC in milk matter?

Dairy farms need to produce high-quality milk to maintain the market. High SCC in milk is associated with decreased lactose concentrations, α -lactalbumin and fat in milk, shorter shelf life, and changes in its organoleptic characteristics (e.g., taste, odor, texture). Consequently, the presence of the somatic cell in milk above the regulatory standards will affect the subsequent production of cheese, yogurt, or other milk products.

What are the factors affecting milk SCC?

Several factors can affect the number of somatic cells present in milk, listed some of them are:

1) **Mastitis**: the increase in the number of somatic cells in milk frequently occurs in inflammation and/or infection of the mammary gland. In dairy species, if the inflammation occurs with infection, it is called mastitis. The generally accepted indicator of mastitis is 200,000 cells/mL of milk, and higher cell counts commonly are associated with severity of infection.

Mastitis reduces milk yield, alters milk composition, affects cow's fertility, and is a food safety issue. Those are some of the reasons mastitis is considered the costliest disease of dairy cattle.

2) **Lactation phase**: somatic cell count increases with the progress of lactation towards dry off. It is well known that physiological, hormonal, and metabolic changes during dry off and calving time can be involved in this physiologic immune suppression making the cow at the highest risk for becoming infected during these times.

3) **Age and breed**: somatic cell counts are low in primiparous cows, whereas it increases in older animals (e.g., parity two and higher). Some breeds/cows that have adequate shape of udder, and teats well-attached have less incidence of mastitis than those cows with pendulous-shaped udder or shorter teats with bigger diameter of teat canal.

- 4) **Milk management:** poor hygiene conditions considerably increase the likelihood of intramammary infections, resulting in elevated SCC.
- 5) **Variation on milking interval:** factors as total machine-on time (overmilking increases teat damage and risk of bacterial invasion during and after milking), more pressure on the udder when intervals are too long or flushing of pathogens from the udder when milking is more frequent.
- 6) **Season of the year:** summer tends to be the most difficult in terms of mastitis control of all seasons of the year. Typically, SCC begin to rise in late April and continue until August, when it starts to decline. Along with this increase in SCC, there is also a significant increase in clinical mastitis cases.

In the summer, high temperatures and humidity increase the risk of a lactating cow developing mastitis. Consequently, the main factors contributing to high SCC and mastitis are the increase in cow stress and the increase in the total number of bacteria present in the environment.

Like all living things, bacteria need food, water, and the proper environment (temperature and humidity) to live and grow. Bacteria need nutrients for energy, water to stay hydrated, and a place that meets their environmental preferences to grow. The ideal conditions may vary among types of bacterium, but they all include components in these three categories. If you can remove or control one of these three vital elements, you can keep them under control.

Cows are physically more stressed during the summer. Studies have shown high circulating levels of stress hormones interfere with the ability of the immune system to destroy bacterial invaders. Somatic cells enter the udder as part of the immune response¹. When cow's immune system is under the depressing effect of stress hormones, they cannot function properly to protect against mastitis organisms and may increase clinical cases of mastitis.

How to reduce SCC during summer?

A) Clean and dry bedding

Bacteria use any organic matter such as bedding material, manure, or milk as potential food to grow. Take extra caution to keep the bedded areas dry and clean to minimize the food source for the bacteria to grow. Keep an adequate animal density (no overcrowded pens) to decrease the number of cows lying in the alleys. Also, make a proper stall usage by having a proper design and size.

Bedding materials can be divided into two groups: inorganic (e.g., sand, lime, calcium carbonate) or organic (e.g., straw, sawdust, compost, recycled manure) materials. With the use of inorganic materials, you will increase your chances of prevention against bacteria growth. On the other hand, the precautions if the bed is organic, with humidity and ambient control must be redoubled since its use could result in a higher risk of

mastitis. The organic material comes from the remains of organisms such as plants and animals and their waste products in the environment, which is the energy that the bacteria need to grow. We must remember cows typically lay down for 12-14 hours in a day and the purpose of bedding for dairy cattle is to provide both cow comfort and mastitis control.

Regardless of the type of bedding is used, it requires good maintenance practices - keeping it clean is crucial- when bedding becomes wet or dirty, the manure and bedding should be scraped off and replaced with a clean new one. More importantly, the proper management to maintain lower SCC values is more important than what type of bedding is used.

B) The Environment

Cows can suffer heat stress with temperatures as low as 72°F with 50% humidity (26°C). During summer, it is crucial to offer an adequate cooling condition for the cows in all areas of the operation. It is equally important to ensure that the ventilation system works correctly in the barns and the waiting area since cows spend a significant part of their day waiting to be milked. With an adequate cool environment (the use of fans, open doors/curtains), we assure more comfort and low-stress levels while helping the immune system¹ function properly and enhancing milk production.

C) Milking procedure

During summer, cows need strong pre- and post-dipping products that contain 8-10% emollients such as glycerine or lanolin and fly repellents use during this period. The post-dipping will offer maximum protection from milking to milking while the teat plug keratin has been formed.

Milkers should take extra caution if cloth towels are used for drying the teat. Individual towels must be clean and dry.

Stripping to detect milk abnormalities such as watery milk, flakes, clots; is helpful to discover early stages of clinical mastitis. For more information on stripping as a way to control mastitis, please see https://vet.osu.edu/sites/vet.osu.edu/files/documents/extension/Stripping%20to%20control%20mastitis%20-%20what%20are%20the%20facts%20behind%20it_Final_English.pdf

D) Flies

More than annoyance and discomfort (e.g., irritation), flies carry many diseases, including mastitis-causing pathogens (*Staphylococcus aureus*, for instance). Some flies prefer to bite the teats and teat ends where the skin is thin and soft, causing irritation, damage to the teat, and prone to develop mastitis in these injured spots.

In the summer season, employees must redouble care with hygiene.

Remember also you are an essential worker, and your health during this season is also critical. Drink enough liquids (preference water) to stay hydrated.

If you need a specific protocol or guidance for sharing with your employees and colleagues, let us know. We will be glad to help. You may contact us at:

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¹The immune system is a set of elements (e.g., cells, tissues, and organs) in the human and animal body. These elements interact with each other intending to help the body fight diseases and infections by viruses, bacteria, microbes, injuries, etc.

When germs such as bacteria or viruses invade the animal body, they attack and multiply. This is called an infection. The infection causes the disease that makes the cow sick. Thus, it represents the defense of the body from the condition by fighting off the germs.