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SPECIALIST *newsletter*



Can Cows Sustain Healthy Teats in Winter Weather?

Absolutely! But, it takes a well-thought out strategy, proper implementation and consistent follow-through - because optimal teat health, particularly in winter weather, comes from proper prevention rather than treatment.

As temperatures start to drop and humidity lowers, the ideal environment for chapped teats and increased levels of hyperkeratosis also arrives. But, this year, don't excuse poor teat condition or a spike in mastitis by just blaming the weather. This year, have a plan and stick with it - because the truth is, with a proper winter teat care program, producers can maintain teat health in harsh weather.

Prevention Step #1 - Optimize the Milking System. While scheduled maintenance should be performed on a milking system regularly, it is more important than any other time of year to start off the winter season knowing equipment is functioning properly.

Although milking systems are not often the cause of poor teat health, milking machines can aggravate already existing problems. And, while operations can slide by with performance related issues during other

times of the year, the added stress of winter weather conditions can exacerbate any system flaws, and lead to an increased level of teat stress. Examples to be aware of include:

- Detacher settings with a milk flow rate that is too low, prolongs unit on-time and causes excessive compression against the teat end (due to vacuum level increases during low flow periods).
- Pulsation settings that are at too wide of a ratio may provide inadequate teat massage, which results in teat-end congestion.
- Liners must be matched to fit the herd's teat characteristics, and changed on schedule. Also, the vacuum level must be set to maximize the milking performance during peak milk flow.

Prevention Step #2 - Establish a Teat Health Benchmark. It is always important

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Understanding Teat Physiology During Weather Changes

The shift from summer weather to cool, windy and wet conditions can have a dramatic effect on teat end skin and health. Understanding teat physiology provides the opportunity to protect the teat skin and teat ends with the appropriate conditioning products and environment to maintain udder health.

Teat skin has no sweat glands, oil glands or hair follicles, which makes the skin particularly susceptible to climate change. Without hair follicles, teat ends come in direct contact with blustery wind and cold temperatures, which can cause chapping. In addition, natural skin oils can be removed by continual contact with disinfectants, meaning even the regular use of a high-quality predipping solution can leave teat skin dry and prone to chapping.



Healthy Teat End



Rough Teat End

Overdrying is also very common as the season changes, especially when there are low moisture levels in the air. The outer layer of skin loses moisture quickly, which increases susceptibility to air movement.

Research continues to show dried, chapped or cracked teat skin promotes irritation and the growth of bacteria, which may lead to a higher incidence of mastitis. All of these factors reinforce the importance of teat skin care and proper management practices to maintain milk quality and udder health - particularly in the wintertime.

to be able to track teat health trends. When January comes, and it “seems” like hyperkeratosis is an issue, wouldn’t it be nice to be able to rely on actual numbers rather than assumptions? When teat health is benchmarked before harsh weather hits, producers can establish a baseline for their herd. Then, as winter progresses, or management changes are implemented, they can be measured more accurately when a second evaluation is performed and compared to initial numbers. Teat evaluations help to determine the severity of any problems and help to validate any operational changes.

Prevention Step #3 - Provide an Optimal Housing Environment.

Managing the environment can minimize the weather’s effects on teat-end health. Reduce wind speeds with adequate wind blocks to help prevent chapping or frostbite. Provide clean, dry bedding and monitor stall usage, which may decline due to frozen bedding or clumps of frozen bedding in the stall. Frequent bedding changes reduces moisture levels needed by bacteria to thrive, and decreases mastitis risks. In addition, be sure alleys and holding pens are kept especially clean with frequent scraping. Splashing of manure onto cows’ udders as they walk, means more work in the parlor and a better chance cows are coming in contact with mastitis-causing organisms.

Prevention Step #4 - Train Operators on Proper Teat Prep.

The milking staff should be educated on the changes that might occur to teats as weather changes. First, because of the “blown-open”, flower-like characteristics of hyperkeratosis,

soil can be trapped on teat ends, making cleaning much more difficult. Operators need to wipe teats in a downward, twisting motion and be sure teat-ends are clean before attaching the unit. In addition, it is important that operators also make a second more aggressive wiping pass across teat ends with their thumb and fore-finger, to try to rub (NOT PICK) the excess keratin build-up that is ready to come off the teat. Picking at any exfoliating teat skin that is not ready to be removed can cause pain and bleeding that puts the teat at further risk of infection.

In addition, proper milking procedures must continually be stressed to employees. Teat end health relies heavily on proper udder stimulation before unit attachment. Inadequate stimulation can apply unnecessary vacuum stress on the teat without the release of milk, injuring both teat ends and teat skin. Proper milking procedures are key to teat health in winter weather.

Prevention Step #5 - Prepare Teat Skin with Proper Teat Dip.

It is possible to maintain teat health during winter when a proper teat dip is utilized that is formulated for changing and/or harsh weather conditions. Chlorine dioxide teat dips which contain lactic acid, such as Bi-Sept® from GEA Farm Technologies, have been highly recommended and very successful at exfoliating teat skin to slough-off excess keratin, preparing the teat for winter weather. Followed 3-4 weeks later with a high-emollient winter teat dip, such as Derma-Kote® or DermaSept®, teat health is protected from increased drying, chapping or frostbite when harsh winter weather arrives.





Early stages of hyperkeratosis during changing weather.



Severe hyperkeratosis due to the risk factors listed below and changing weather.



Teats that are in the healing process after using DermaSept® from GEA Farm Technologies.

What Influences Hyperkeratosis?

As producers continue to try and get more and more cows through the parlor, many times they sacrifice proper milking routines, and optimal equipment settings (i.e. higher vacuum levels), just to meet throughput goals. This combined with harsh weather conditions is a recipe for teat-end disaster - and a reason why producers are seeing more and more hyperkeratosis in their herd.

When producers identify a hyperkeratosis problem, their “knee-jerk” response is to blame the milking equipment or make a change to the liner. However, research tells us this often has minimal or no effect on the general teat condition of the herd. There are in fact, many other factors that occur which may help to over-stimulate keratin growth on the teat-ends.

- Basic response of milking action.** It is a basic physiological reaction for a callus or ring to develop at the teat end from the regular flow of milk from the teat. In fact, studies have shown that beef cows and cows that are hand-milked even show ring or callus development on their teat-ends.

- Prolonged machine on-time.** Perhaps the primary reason hyperkeratosis develops is simply the machine on-time. Some of the factors that lead to total machine on-time are just simply due to production level, stage of lactation, or age. However, the most important factors that can add to machine on-time can actually be prevented - improper pre-milking stimulation and overmilking at

Risk Factor	Reason for Increased Likelihood of Hyperkeratosis
Pointed Teats	Load applied by the closing liner acts on a smaller area of teat surface
Increasing Age	The “wrinkle” factor in all species
Higher Production	Units are on for longer time periods
Peak Lactation	Units are on for longer time periods
Poor Pre-milking	Increased period of milk flow <2.2lbs (1.0 kg)/min*
Low Threshold for ATOs	Increased period of milk flow <2.2lbs (1.0 kg)/min*
Overmilking	Increased period of milk flow <2.2 lbs (1.0 kg)/min*
Improper Vacuum Level	Increased stress on teat tissues

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***Research shows the total time per day when the milk flow rate is less than 2.2 lbs (1.0kg)/minute, is linked to a profound effect on the level of hyperkeratosis found in the herd.**

the end of milking. When cows are not stimulated properly, oxytocin does not have enough time to be released in order to stimulate milk flow when the machine is attached. This leads to a longer period of time that the machine must stay on the teats in order to milk out the cow. In addition, overmilking at the end of milking (i.e. ATOs not adjusted properly) simply causes the machine to be on the teats longer than necessary.

- Harsh weather conditions.** Cold weather can influence rough teat ends. The best way to combat winter teat-end irritation

is by implementing a winter teat dip program that starts early enough in the fall before cold weather begins and lasts well into the spring.

- Pointed teat shape.** Studies have shown that herds with a higher percentage of cows with long, pointed or rounded teat-ends also tend to see more hyperkeratosis than those with more flat teat-ends.

- Poorly functioning milking equipment.** The milking system must be optimized and properly maintained to help protect teat-ends as much as possible.

Did you know?

There is a common misconception that postdipping in extremely harsh weather unnecessarily ‘wets’ the teats - unfairly exposing them to cold and wind, increasing their chances for frostbite. But, after milking teats already have a thin, wet milk film on them, so dipping actually provides the defense teats need against mastitis-causing organisms, and helps them stay healthy year-round. Plus, modern teat dips, such as Derma-Kote® and DermaSept® are specially formulated with high levels of emollients and extremely low freezing points - allowing producers to dip without worry throughout the winter, fully protecting cows’ teats.

Winter Teat Health Strategy Q&A With Milk Quality Specialist Keith Engel

Q: What are the key practices that you see operations implement that lead to good teat health in winter weather?

A: The key to success is how operations manage the changing weather. They are prepared and have a plan! Equipment maintenance is on schedule, the system is optimized, employees are educated and they are using teat dips designed to help protect teats during changing weather.

Q: What happens when producers do nothing to prepare for winter weather?

A: The weather change alone will typically lead to a small amount of hyperkeratosis initially. Unfortunately, if producers don't stay ahead of it, teat-ends just get worse and worse throughout the winter.

Q: Do you have any tips for teat scoring?

A: It is important that you score the same groups when comparing results from different time periods. I usually choose the high production group, because they will more than likely represent a closer average for the

herd, and this is the group most of the herd's milk comes from. The goal should be to have less than 20% of the herd with moderate to severe hyperkeratosis.

Q: What is your winter teat dip "prescription" for producers?

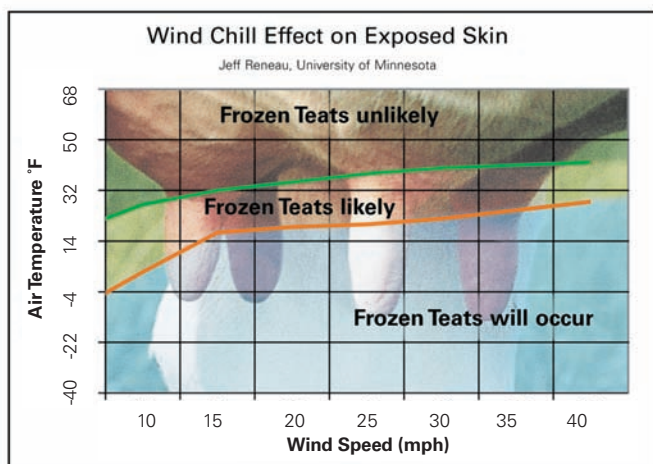
A: I have seen the most success with starting producers out on a chlorine dioxide based teat dip such as Bi-Sept® that contains lactic acid, which encourages exfoliation, and the sloughing-off of any excess keratin on the teat-end. After 3-4 weeks when temperatures really start to drop, I recommend switching to a high emollient winter teat dip like DermaSept® that keeps skin soft and pliable. In enclosed free stall operations only, I have them use winter teat dip during freezing conditions, and allow them to switch to Teat-Kote® 10/III only when the temperature will be above 40°F for at least one week at a time.

Because every operation is different, I try to get as much information as possible before I recommend any products. And, I always stress that it is not just about the products, it is

about setting up the management alongside them so that everything can perform optimally.

Q: Besides promoting optimal teat health, what else do these teat dips offer users?

A: The chlorine dioxide/chlorus acid in Bi-Sept® provides excellent kill rates on environmental pathogens, which is critical this time of year as teat-ends can be more difficult to clean with the increase in hyperkeratosis. Also, our winter teat dips, Derma-Kote® and DermaSept® have extremely low freezing points, providing an excellent warming effect on the teat skin - increasing blood circulation and helping to prevent frozen teats and frostbite. This is particularly important for fresh cows that are more susceptible to freezing weather and teat damage, because of udder edema. Properly sheltering these cows from the harsh effects of winter weather (even more than the rest of the herd) in combination with utilizing winter teat dip provides the best line of defense for udder protection - when these cows need it the most.



The combination of low temperatures and chilling winds, known as the wind chill, is the best indication of the possibility of teat skin damage such as frozen teats. Many dairymen are surprised to find that with temperatures in the 30's(°F) and wind speeds around 20-25 mph, frozen teats are likely to occur.



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