

Controlling Environmental Mastitis

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There are two broad types of mastitis; contagious involving *Streptococcus agalactiae* (Strep. ag), *Staphylococcus aureus* (Staph. aureus) and mycoplasma; environmental which involves infection of the udder with Gram-positive bacteria (non-agalactiae streptococcus or non-ag streps (*Streptococcus bovis*, *uberis* and *dysgalactiae*), enterococcus or fecal streptococci and *Staphylococcus* species or Gram-negative bacteria (coliforms) primarily *E. coli*, klebsiella, and enterobacter.

Environmental mastitis is a major problem in many dairy herds resulting in increased somatic cell counts, increased incidence of mastitis and increased plate counts. All of which results in decreased profit for the dairy.

Where do environmental pathogens come from?

The primary sources of environmental bacteria that cause mastitis are from bedding materials in the close-up, pre-calving, and calving areas as well as cow stalls. Areas such as manure bedded packs tend to be frequent and prominent areas where teat ends become exposed to high numbers of bacteria. This results in teat colonization and occasionally teat canal infection. Another likely source of environmental bacteria is the cow's own skin and intestinal tract (manure).

Environmental bacteria cannot be completely eliminated from a dairy herd. Since these bacteria cannot be completely eliminated, control measures must rely on limiting the exposure of teats particularly teat ends to the various types of environmental bacteria.

Unlike the contagious agents, environmental bacteria that cause mastitis in dairy herds can survive in the environment for long periods of time. Thus, are not dependent on the mammary gland for their survival.

Normally, environmental pathogens are not considered contagious (not spread from cow to cow). Most mammary infections occur during the milking process when the uninfected gland comes in direct contact with bacteria present at teat ends. These bacteria gain access to the teat end from a variety of sources especially bedding materials. From our studies straw, sawdust, sunflower hulls and composted manure may not be the best choices of bedding materials as they support good growth of environmental pathogens. Our studies show that fine particulate organic bedding materials support the growth of environmental pathogens better than large coarse materials. Sand and large wood shavings are better choices, as environmental pathogens do not grow as well in these. However, organic bedding materials must be removed from the back one-third of the stall daily and replaced with fresh material.

Other conditions that foster increased environmental mastitis are over crowding, poor ventilation, dirty-stalls, muddy exercise lots, wet udders and poor stall length. A lack of over-all farm cleanliness and housing contribute to the problem as well. In addition, poor teat end sanitation at milking further contributes to the problem.

There has been considerable discussion regarding the possible spread of environmental bacteria, particularly non-ag streps between cows. However, the experimental evidence for this is limited. While it may be possible the occurrence is unlikely. Thus the vast majority of the exposure is from the environment.

It has been experimentally shown that there is a strong correlation between the number of organisms found on the teat skin when the milking machine is attached and the new infection rate. In this case the high numbers of organisms on the teat skin at milking time result in a higher incidence of environmental mastitis. Obviously then low numbers of bacteria on the teat skin at milking is desirable. It has been demonstrated numerous times that when the numbers of organisms is reduced the infection rate will drop dramatically.

Some signs of an environmental mastitis problem:

- Excessive numbers of dry cows that have mastitis during the early dry period.
- Excessive number of cows that have mastitis during the first 30 to 60 days after calving (greater than 20%).
- Perhaps? large numbers of cows that have mastitis in the rear quarters.
- Increase in the herd's somatic cell count.
- Increased incidence of mastitis in the absence of Staph. aureus and Strep ag.
- An increase in clinical mastitis cases even though dry cow therapy and teat dips are used.

Controlling environmental mastitis.

1. Controlling environmental mastitis is achievable. First and foremost the dairy needs a consistent environment sanitation and pre-milking cow prep. Every teat must be carefully cleaned in order to assure a low bacteria load at every milking to effectively prevent new infections. The Minnesota one-step cow preparation procedure is excellent if done correctly. Correctly, means making a special effort to target teat ends for cleaning and sanitizing as well as the sides of the teat. If this is not done they will be missed and the control program will fail.
2. Monitoring milker compliance is a critical aspect of any control program. This can be accomplished using bulk tank or inline culturing to accurately determine the effectiveness of the pre-milking teat sanitation. Excellent teat sanitation will result in very low numbers of non-ag streps and coliforms in milk samples. This procedure is probably the best means of accessing bacterial load on the teat at milking time. This monitoring/control program is very dependent on high quality laboratory results and high quality samples. Bulk tank milk samples must be taken from the top of the bulk tank and frozen immediately.
3. Clean up the environment. Keep the stalls as clean and dry as possible. Make sure your cow's environment is well ventilated. This means cleaning stalls and alleys at each milking as well as removing manure from calving and pre-calving pens. Don't over crowd animals. Clean the back one-third of the stall at least twice daily. Put fresh

bedding under the cow's udder at least once daily. Do not place the residue bedding from the front of the stall under the cow's udder, as it is likely contaminated. Use fresh and dry-bedding materials at all times. When cleaning alleys take care not to splash manure onto the back of the stalls. Prevent cows from contaminating feet by walking through deep manure etc. This will serve as a source of bacteria to contaminate the teats resulting in infection.

4. Administration of a J5 vaccination program. Vitamin E and selenium supplementation has been shown to increase the cow's immune system that will help reduce the incidence of environmental mastitis. However, they are not substitutes for good management that results in decreased exposure.

Remember, keep udders clean and dry between milkings and avoid teat contamination and dirt build up on the teat ends.

To treat or not to treat clinical mastitis.

Antibiotic treatment of Coliform (gram-negative) mastitis is generally ineffective. Cows with Coliform mastitis should be given supportive therapy such as fluids and anti-inflammatory drugs.

Antibiotic treatment of non-ag streptococci (gram-positive) is about 60% successful. Based on this response rate it is important to distinguish bacterial type before deciding to treat clinical mastitis animal. If the cow is systemically ill (i.e. fever, depressed, off feed) it may be necessary to treat the quarter with an intramammary preparation. However, before this is done it is wise to take a milk sample for culture to determine the type of bacteria causing the infection and determine which antibiotic would be most appropriate choice for therapy.

If the quarter has been infected for a longer period of time, it is probably chronically infected and will respond poorly to treatment. Therefore no antibiotic treatment would be recommended unless the cow is systemically ill.

Erroneously, high bulk tank numbers but low somatic cell counts???

There are some factors that can result in incorrect bulk tank numbers. These factors include proper taking and handling of the samples. Milk samples must be taken as carefully as possible to prevent contamination of the collection tube. All samples MUST be frozen immediately to prevent bacteria growth in the milk sample. Bulk tank cooling problems can also result in erroneously high bulk tank counts. Using a recording thermometer on the bulk tank can check this. Perhaps the milking system is not cleaning properly. This can be determined by a system cleaning analysis and using laboratory pasteurized analysis of the bulk tank milk sample. If the milking rotation lasts longer than 3-4 hours milk filter socks should be changed as bacteria can grow in the milk sock during the milking process. Change socks every 3-4 hours. Place a clean sock in place prior to starting the milking cycle.