

Post Rock Extension District Column

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The Importance of Colostrum

At the beginning of every calving season, we find ourselves discussing the importance of colostrum (first milk) in cow-calf herds. We discuss this topic so often; it makes one wonder if we shouldn't move on to other topics? The short answer to that question is **NO** because of the great importance of this single dietary ingredient to calf health and growth.

The bovine species is special and almost perfect in every way except the design of the placenta. Unfortunately, because of the way the placenta is structured, the dam cannot pass any of her antibodies through the placenta to the calf. Therefore, the calf is completely devoid of any antibody protection against infections at the time of birth.

To overcome the inability to pass antibodies to the calf before birth, the bovine dam secretes large amounts of antibodies into her colostrum. Colostrum contains ten times more IgG1 (one of the major antibodies) compared to milk produced during the rest of lactation. If the calf rises and suckles within the first few hours after birth, it will absorb the antibodies contained in the colostrum. Protection will be immediate upon absorption. If the calf does not nurse and absorb these antibodies, then a very important part of their ability to fight infections will be absent for several weeks.

Several factors are involved to assure colostrum antibody protection. The length of time from birth to consuming colostrum is very important. Immediately after birth, the calf's digestive system begins to lose its ability to absorb colostrum antibodies. At six hours after birth, only about 60% of the colostrum antibodies consumed will be absorbed into the calf's system and by 24 hours virtually none will be absorbed. It is very important that each calf receives colostrum as soon as possible after birth to maximize antibody absorption. Colostrum quantity is also important. The level of antibody protection provided by colostrum is dependent on the total amount of antibodies consumed by the calf. This amount is dependent on the amount of colostrum that is produced and consumed. Colostrum quantity is largely dependent on dam age and her pre-calving nutritional status. Colostrum quality is the third component of a successful colostrum management program. The term quality means the number of diseases that are represented by the colostrum antibodies. The antibodies are disease specific. For example, antibodies that target *E. coli* infections will not be the same antibodies that target Rotavirus infections. The range of disease specific antibodies produced by the dam is dependent on the variety of diseases she has been exposed to in her lifetime and the number of diseases she has been vaccinated against. A well-designed vaccination program can greatly improve colostrum quality.

The importance of colostrum in neonatal calves goes beyond antibody protection. Compared to milk, colostrum concentration of fat and protein is two to four times greater. The concentration of the major vitamins, including A, B, D, and E is also much higher in colostrum compared to milk. In addition to these nutrients, colostrum contains several enzymes that possess antimicrobial properties. These nutrients and enzymes are extremely important to the calf's ability to survive and grow during early life. For most herds there will be times when a calf is unable to rise and nurse as quickly as needed. Typical cases include a calf that has experienced dystocia and is tired or hurt or is born to a dam with poor mothering ability or born to a dam that doesn't produce enough colostrum. In these cases what are the best ways to manage the colostrum program?

In the case where the calf is hurt or the dam's mothering ability is lacking, hand-milking the dam, and collecting the colostrum is the best intervention. This should only be attempted if it can be accomplished in a facility that provides safety to both human and dam. Never use dairy colostrum or colostrum from neighboring cow-calf operations. There are several diseases, including Johne's disease and bovine leukosis, that may not be on your operation and can be passed to the calf through the colostrum. The second-best intervention would be to administer a commercial powdered-colostrum replacer. Do not use colostrum supplements as they do not contain the appropriate concentration of antibodies for protection. It is also best to choose a colostrum replacer made from bovine colostrum, not bovine plasma. Research has shown that absorption is higher in colostrum-based replacers. It is also important that electrolytes or probiotics NOT be mixed with colostrum or colostrum replacers. Research is clear that these products interfere with colostrum/replacer digestion and absorption. Does feeding method impact colostrum absorption? It is always best to use a nipple bottle. When the calf nurses, the colostrum will by-pass the rumen and will arrive in the intestinal area where absorption occurs much faster. Research indicates that by-passing the rumen is more important if feeding 1 quart or less of colostrum/replacer. An 80-pound calf needs about 2 quarts of colostrum and most commercial replacers are formulated to be fed in 2-quart amounts to all sizes of calves. In these cases, using an esophageal feeder is certainly acceptable.

Colostrum is one of the most important components in any calf-health program not only because of the antibodies but also because of the many other nutritional products that it provides. Colostrum quantity and quality, in addition to timing from birth to consumption, are important aspects of any colostrum management program.

Thanks to Gregg Hanzlicek, Kansas State Veterinarian, for sharing information related to the importance of colostrum. For further information, contact me at any Post Rock Extension District Offices in Beloit, Lincoln, Mankato, Osborne, or Smith Center.

Post Rock Extension District of K-State Research and Extension serves Jewell, Lincoln, Mitchell, Osborne, and Smith counties. Blaire may be contacted at blairet@ksu.edu or by calling Beloit 738-3597, Smith Center, 282-6823, Lincoln 524-4432, Mankato 378-3174, or Osborne 346-2521. Join us on Facebook at "Post Rock Extension" and remember our website is www.postrock.ksu.edu.