

THE IMPORTANCE OF COLOSTRUM

Clay Kesterson, Graduate Student
Lew Strickland, Assistant Professor
Elizabeth Eckelkamp, Assistant Professor
Peter Krawczel, Associate Professor
Department of Animal Science

This fact sheet is the first in a series of four explaining proper colostrum management techniques. The objective of this publication is to discuss the importance of colostrum and some of its functions. Other publications in this series will highlight the most recent colostrum management recommendations.

COLOSTRUM IS “LIQUID GOLD”

Colostrum, or the first milk, is the product of the first milking following calving. Ruminants have a unique, thicker placenta that does not allow antibodies to cross into the fetus. Due to this anatomical difference, calves must consume colostrum from the dam to receive an initial protective immunity. Removal of calves from the dam (less than 6 hours) requires feeding of colostrum as soon as possible. In addition to feeding colostrum quickly, it is also important for producers to provide good quality colostrum (greater than 50 mg/mL).

COLOSTRUM COMPOSITION

- Colostrum is composed of nutritional and immune components critical for calf development.
 - Concentrations of antibodies and vitamins A, D and E in colostrum are five times higher than in saleable milk.
 - Immunoglobulin antibodies, (Ig's) are absorbed at a high rate soon after birth.
 - A higher concentration of antibodies circulating in the blood have a direct influence on reducing disease outbreaks and deaths.

WHAT ARE ANTIBODIES?

- Antibodies are blood proteins produced to fight off multiple pathogens.
- There are different Ig types, which are IgG, IgE and IgA. Bovine colostrum is rich in IgG immunoglobulins.
- Antibodies are essential for calf survival; lack of antibodies is typically fatal.

HOW DOES COLOSTRUM WORK?

Once a calf consumes colostrum, antibodies and nutrients are absorbed in the gastrointestinal tract. Approximately 6 hours after birth, the calf's ability to absorb colostrum begins to diminish. Colostrum fed after 6 hours can weaken the calf's immunity. Antibodies travel from the gut to the bloodstream, developing an initial immunity for the calf for the first 14 days after birth. Maternal antibodies are found in the calf's blood for up to 4 months of age.

MATERNAL COLOSTRUM VS. COLOSTRUM REPLACER

- Maternal colostrum is a natural, important line of defense for calves.
 - Maternal colostrum provides specific antibodies and nutrients to benefit each calf in its environment.
 - Typically, maternal colostrum provides a higher concentration of antibodies in the blood relative to colostrum replacer.
 - Bacterial counts may be a concern with maternal colostrum, especially in cows with mastitis.
 - Bacteria counts should be less than 100,000 cfu/mL.
 - Coliform counts should be less than 10,000 cfu/mL.
 - In a survey recently conducted by the University of Wisconsin Extension, only 39 percent of producers met industry bacterial count standards.
- Colostrum replacer is an alternative manner of feeding colostrum.
 - Colostrum replacer powder contains bovine or other species Ig antibodies, and it must be reconstituted in water.
 - Colostrum replacer should be used as backup if maternal colostrum is running low, is poor quality, or if there is a history of Johne's, bovine leukosis virus, brucellosis and *Staphylococcus aureus* in the herd.
- A study in Tulare, California, found that IgG absorption was similar between maternal and colostrum replacer.
 - However, colostrum replacer calves had lower total protein counts in the blood and slower growth rates.
- Consult with your veterinarian on which colostrum-feeding options are best for your calves.

COLOSTRUM: A WIN-WIN OUTCOME

- Adequate quality and quantity of colostrum fed to calves in a timely manner leads to higher performance, immune success, and less economic loss (Figure 1).
- Researchers from British Columbia and the University of Arizona found improved outcomes in calf performance and passive transfer when:
 - Giving greater than or equal to 4 liters of colostrum equaled ADG increase by greater than or equal to 1/2 pound per day.
 - The percent of calves with failure of passive transfer decreased from 21 percent to 11 percent.
- Poland researchers confirmed calves with higher passive transfer of antibodies had higher pregnancy success relative to those that had low passive transfer.



Figure 1. Estimated financial loss to a producer of calves fed low quality or amounts of colostrum. These numbers and figures are modified from the Saskatoon Colostrum Company (SCCL).

NEGATIVE IMPACTS OF NOT PROVIDING COLOSTRUM

- Poor colostrum management negatively affects calf development and future production.
 - Mergerison and Downey in 2005 found when calves received the first feeding of colostrum greater than 6 hours post calving, death rates increased.
 - Calves fed first colostrum 2 to 6 hours post calving had a 5 percent death rate.
 - Calves fed first colostrum 25 to 48 hours after birth had a 20 percent death rate.
 - Calves are two times more likely to succumb to infection without colostrum.
 - The Saskatoon Colostrum Company reports inadequate amounts of colostrum can lead to higher incidence of respiratory diseases.
- Heifers fed inadequate amounts or low-quality colostrum will result in poor replacements.
 - The University of Florida found heifers provided poor colostrum required more services per pregnancy.

CONCLUSIONS

- Colostrum management can make a meaningful difference in calf development.
- Feed maternal colostrum as the primary source of colostrum and rely on colostrum replacer as a backup or as needed.
- Not feeding colostrum or poor feeding methods will decrease calf health and increase death rates.



AG.TENNESSEE.EDU

W 660-A 18-0300 07/18 Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.