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Colostrum is "Liquid Gold" and 5Qs of Colostrum

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Feeding sufficient amounts of high-quality colostrum to calves at a young age is the single most important management factor in determining health and survival of the neonatal calf. Feeding high-quality colostrum to the calf as soon as possible after birth is the most important for calf health. Calves are born with an immature immune system which means they have little defense or immunity against disease. Unlike key nutrients, the placenta does not allow the transfer of the dam's immune cells to the unborn calf. However, the dam transfers them to colostrum, which she begins to make five weeks prior to calving. The timely ingestion of adequate amounts of high-quality colostrum allow the calf to acquire passive immunity from the dam. Passive immunity helps the calf to fight disease during the first four months of life as their immature immune system is developing.

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.

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.

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.

The five Qs of Colostrum Management

To ensure that a calf is achieving passive transfer of IgG, dairy producers should look to the five Qs of Colostrum management: Quality, quantity, quickness, quite clean and quantifying.

Quality

Stress: stress including heat stress, handling and movement stress, or even predatory issues can decrease colostrum quality. If a cow is using nutrients to fight against stressors, they will have fewer nutrients available to produce high-quality colostrum for calves. Likewise, if cows are sick, they will require nutrients to mount an inflammatory response, leading to lower-quality colostrum.

Dry period: A dry period of 45 to 60 days is recommended. Some limited data seems to indicate that if the dry period is too short, the cows will not have enough time to produce enough IgG into the colostrum. If it is too long, they may start to reabsorb IgG. Supplementing your cattle nutrition program with performance trace minerals can also improve the quality of colostrum.

Quantity

Producers need to ensure their calves are receiving enough IgG from colostrum. The amount of colostrum needed will depend on how much IgG is concentrated in the colostrum. For example, if the concentration is 50 grams of IgG per liter of colostrum, they will need at least three liters to achieve passive transfer. However, it is best to think of quantity in terms of grams of IgG and not volume of colostrum, as calves have a requirement for IgG, not liquid volume.

Quickness

The longer we wait to milk a cow, the faster the quality of her colostrum decreases. One study shows that if we wait six hours post-calving to milk the cow, the quality (IgG content) of the colostrum decreases by about 20%.

Waiting too long to feed a calf after birth reduces how efficiently the calf can absorb IgG. From the time a calf is born, it can absorb IgG from colostrum at about 50% efficiency. At six hours post-calving, that amount can be reduced to about 30% or less.

Quite clean

If feeding or heating equipment is dirty, or if you're not heat-treating or pasteurizing colostrum, bacteria content of colostrum will increase. Bacteria is antagonistic to IgG absorption, and high bacterial loads in colostrum will likely lead to sickness in calves. Closely adhering to directions (temperature, contact time, etc.) of cleaning agents used on calf-feeding equipment can help keep bacteria loads manageable.

Quantify

Roughly twenty-four hours after the feeding of colostrum, it is important to make sure passive transfer of immunity was achieved. Passive transfer of immunity has traditionally been defined as a serum level of IgG greater than 10 g of IgG/L of serum, which can be estimated on the farm using a refractometer to assess total serum protein. It is important to note that the definition of passive transfer has recently been updated and is no longer evaluated on a pass/fail basis. If passive transfer was not achieved (IgG <10 g/L), then you know something went wrong along the way and you can revisit the five Qs of colostrum management and start to troubleshoot your colostrum management practices to make improvements.

Source: University of Tennessee Institute of Agriculture, USDA