

Is a colostrum replacer right for you?

Colostrum, colostrum, colostrum. The virtues of this life-promoting substance have been thoroughly researched and communicated in the dairy industry for many years.

Various studies have shown that successful passive transfer of immunity from colostrum is linked with reduced disease treatment and mortality rates; improved growth rates and feed efficiency; decreased age at first calving; and increased first- and second-lactation milk production.

But recognizing the importance of maternal colostrum, and delivering a clean dose -- at the correct time, volume, temperature, and IgG level -- are separate issues on most dairies. Could there be an easier and more consistent way to support newborn calf health and immunity?

Colostrum complexities

The Dairy Calf and Heifer Association's "Gold Standards" for newborn dairy calves recommend that colostrum should be:

- Fed at a volume equaling 10% of body weight in the first 4 hours of life. [For example, a 90-lb. calf should receive 4 quarts of colostrum].
- Free of blood, debris and mastitis.
- Disease-free.
- Tested for quality with a colostrum tester or IgG test.

The Gold Standards go on to suggest that target bacteria count (also known as standard plate count) should <100,000 CFU/mL. Calves that receive adequate amounts of high quality maternal colostrum in a timely manner should have serum total protein equal to or greater than 5.2 g/dL or serum IgG of ≥ 10.0 g/L.

Research performed to evaluate the on-farm success of colostrum harvest and delivery indicates that optimal colostrum management may be easier said than done. A study of 55 Pennsylvania dairy farms showed that colostral IgG concentrations varied from 14.5 to 94.8 g/L. A similar study on a single, Minnesota dairy showed a range of 14.5 to 132.7 g/L. The "green zone" on a colostrometer -- signifying quality colostrum -- starts at 50.0 g/L.

Thus, the colostrum of many individual cows does not provide adequate IgG levels, even if the calf is fed colostrum at the correct time and volume. Routine monitoring and quality control measures are necessary to ensure quality colostrum, and some colostrum may need to be discarded in the process.

Harvest timing of colostrum relative to calving may be one contributor to low IgG levels. A study that specifically looked at IgG levels in the hours immediately post-calving showed that IgG levels decreased by 20 to 40% in the first 6 hours post-calving.

That's part of the reason why the industry standard of harvesting colostrum in the first 4 hours has been established, even though it may be difficult to execute with every birth. Calves also rapidly lose the ability to absorb the antibodies in colostrum in the first 24 hours of life, which is the other reason why early collection and delivery is so important.

Keeping colostrum clean and free of bacterial contamination is another on-farm challenge. High levels of bacteria in colostrum -- especially fecal bacteria from adult manure contamination -- can result in fecal-oral transfer of critical disease-causing pathogens like *Mycobacterium paratuberculosis*, *Salmonella dublin*, *Cryptosporidium parvum* and other scours-causing organisms.⁸ High bacteria levels in colostrum also have been shown to interfere with IgG absorption.

University of Wisconsin researcher and calf expert Sheila McGuirk, DVM, PhD, notes the following potential sources of bacterial contamination in colostrum:

- Inadequate cow preparation.
- Improper sanitation or malfunction of fresh-cow milking equipment.
- Contaminated colostrum-collection pails or containers.
- Inadequate cooling and storage of colostrum.
- Mastitis from the dam.
- Dirty feeding bottles, nipples and/or esophageal feeders.

Colostrum can be heat-treated to reduce bacteria levels, but this requires additional equipment, quality control measures and storage protocols.

A clean, convenient, consistent alternative

Clearly, harvesting and administering high-quality colostrum requires diligence, regular decision-making, and ongoing training for everyone involved in the process on a dairy. In the course of every freshening, there are multiple opportunities to damage the integrity of colostrum before it reaches the calf. Today, a viable alternative to maternal colostrum is available via colostrum replacer products.

Colostrum replacers derived from maternal colostrum provide IgG at levels comparable to those in excellent-quality colostrum, as well as protein, vitamins and minerals needed by the newborn calf.

Compared to colostrum, colostrum replacer is highly convenient, and provides consistent:

- **Quality** – The same amount of IgG is fed every time, to every calf.
- **Quantity** – Correct volume can be delivered to every calf, regardless of how much the dam produces.
- **Quickness** – Replacer simply needs to be opened, mixed and fed, increasing the likelihood that it will be delivered in the critical 4-hour window after birth.
- **Cleanliness** – Sanitary packaging and immediate mixing and feeding reduces the potential for bacterial contamination.
- **Biosecurity** – The likelihood of spreading vertically transmitted diseases like Johne's, BLV, *Mycoplasma*, *Salmonella* and *Cryptosporidium* is greatly reduced.

Rather than proceeding through the complicated series of steps and decisions required to manage maternal colostrum, using colostrum replacer simply requires one to open the package; add powder to clean, warm water; mix thoroughly with a whisk; fill a clean nipple bottle and feed; and clean feeding equipment afterward.

Colostrum replacer products contain 150 g/L of IgG, and have demonstrated the ability to establish immunity comparable to that of maternal colostrum. One study comparing the health and performance of calves that received the same amount of IgG from colostrum or colostrum replacer showed no difference between the calves in their IgG levels; efficiency of IgG absorption; incidence of scours; or growth rate during the first month of life.

Likewise, a University of Minnesota study that followed 497 calves from birth through 54 months of age revealed no difference in the risk of death or culling; milk production; or reproductive performance of cows fed either maternal colostrum or colostrum replacer at birth. All herds in the Minnesota trial were Johne's-positive. Another finding of the study was that calves fed colostrum replacer were less likely to be infected with Johne's than those fed colostrum.

When selecting a colostrum replacer, it is important to choose one that is derived from maternal colostrum versus serum, because colostrum-based products will more closely mimic actual colostrum in antibody composition and nutrients. Additionally, multiple recent studies have identified key maternal factors in maternal colostrum that are of proven physiological benefit to the calf which are present in maternal colostrum derived colostrum replacers, unlike serum.

Cost is definitely a consideration when choosing to forego colostrum in favor of colostrum replacer. But saving the life of just one calf – and supporting the health and productivity of *every* calf – more than pays for the investment.

Colostrum replacers first were developed to take the place of maternal colostrum when a dam was lost, ill or did not produce enough colostrum. But today, routinely using a colostrum replacer may be a strategic decision to promote on-farm efficiency and consistency, while ensuring passive transfer of immunity for every calf.