

Substituting Colostrum

Replacements are not created equal.

by Heather Smith Thomas



Photo by Sara Beanblossom

Newborn calves need colostrum to help combat diseases they may face in the first weeks of life. Calves that don't get adequate levels of antibodies or receive any colostrum are most at risk, says Dr. Geof Smith, Zoetis dairy technical services veterinarian and prior longtime North Carolina State University professor of ruminant medicine. If at-risk calves get sick,

they also shed pathogens into the environment at a much greater rate than calves that received adequate colostrum.

The best scenario is for every newborn calf to nurse its dam within the first two hours after birth; however, some calves are unable to nurse because the dam has large teats or rejects her calf and won't let it suckle. In cold weather, a newborn may become

chilled before it can nurse. In these cases, producers must help the calf nurse or provide colostrum or a colostrum substitute.

Replacers or supplements

There are several colostrum replacers or substitutes, which contain lots of antibodies. Colostrum supplements are intended for calves that do receive some colostrum from their dams; they're not intended to be the sole source of antibodies. Conversely, colostrum replacers are intended to be fed to calves in place of a cow's colostrum.

Some products are more effective than others.

"Every beef producer should have a few bags of replacer for emergencies. These are much easier to keep and better from a bio-security standpoint than trying to get colostrum from a dairy (which may contain disease pathogens that are common in dairies, that you don't want to bring to your ranch). It's a lot easier to keep a couple bags of replacer in the cabinet than to go looking for some in the middle of the night," Smith says.

A powdered replacer (mixed with warm water for immediate feeding) can be simpler than milking the cow or storing extra colostrum from a few cows each year to freeze.

"There is great variation in quality of products, however, and price. You usually get what you pay for," Smith explains. "When using this as an emergency source and only needing a couple bags on

hand, it makes sense to buy a good quality replacer."

He has researched many colostrum replacers throughout his career and has found wide variation in their effectiveness.

"There is a difference between replacers and supplements. The latter are products (mainly for dairy calves) designed to be given along with colostrum. Generally, they have fairly low IgG

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(Immunoglobulin G antibodies) concentrations, such as 50 grams or less," Smith says.

Colostrum replacers, as a rule, will contain at least 150 grams of IgG per dose. There are two kinds of replacers — blood-based, made from plasma harvested from processed cattle, and colostrum-based, collected from dairies and dried into a powder. Blood-based colostrum replacers have been on and off the market because of BSE (bovine spongiform encephalopathy) concerns.

"For a while, people thought we should ban all feeding of blood-based products, but these

Check Ingredients

Colostrum alternative selection depends on the situation, according to Dr. Deborah Haines, founder of the Saskatoon Colostrum Company and University of Saskatchewan's Western College of Veterinary Medicine professor and immunologist. "We founded the company in order to use excess dairy colostrum for the benefit of beef calves. My family is involved with cattle in northern Alberta and both my brothers have beef cattle," she says.

"Colostrum products for calves are priced based on the amount of IgG. If you look at the label and it has 60 grams of IgG, or 100 grams, this is what most people judge it by," Haines says.

Products with lower amounts are considered supplements; whereas, those with higher levels of IgG are considered colostrum replacements.

"However, other components in colostrum are also important — but rarely listed on the label. The antibody is considered the key ingredient. Yet equally important are some of the other factors, and the most important of those is fat," according to Haines. Fat gives the calf energy to stay warm, move around, keep up with mom and continue to nurse.

"The minute they hit the ground, their own metabolic processes have to kick in and maintain body temperature. Otherwise, they plunge into hypothermia. A newborn calf has very little body fat for energy reserves. These calves have only a few hours' worth of fuel in fat. Very quickly they need to metabolize energy from other sources," she explains.

All newborn mammals have high levels of internal "brown" fat, mainly around the kidneys, as opposed to white fat that stores energy. "Brown fat does not store energy; it simply acts as a little furnace that can convert fat into heat," Haines says. There is a limit to how long stored body fat can supply heat, so the calf needs fat from colostrum as soon as possible to provide fuel to maintain body temperature.

"It is important when choosing a colostrum product to know that it contains fat. However, fat is not a listed ingredient on most products. Products made from blood serum do not have any fat. Some products have fat added, such as tallow or vegetable fat, but it's not nearly as good. The fat in colostrum is unique," she says.

There is a lot more fat in colostrum than in regular milk.

"Fat in colostrum is higher in quantity and quality. These fat globules are composed of different structures, with different molecules than found in other fat sources. We did a study recently with dairy heifers in California. We looked at feeding full-fat colostrum versus the same colostrum with fat removed. There was a difference in the heifers' ability to maintain body temperature, but also there were long-term differences in their productivity (body weight, feed conversion, etc.) Everything is better in the heifers that were fed full-fat colostrum versus the colostrum without fat," Haines says.

"The importance of fat in colostrum cannot be emphasized enough, not only on day one for maintaining body temperature, but also long-term for setting up the liver and other body systems for optimal metabolism," she says. **HW**

are considered to have zero risk for transmission of BSE because the organism that causes BSE lives only in the brain; we don't find it in the blood," Smith says. "Blood-based colostrum replacers don't contain any cells; the manufacturers spin off the plasma and use it. In terms of disease risk, it would be low. Also, they irradiate it, which would kill any bacteria or viruses."

The radiation kills the pathogens but does not harm the antibodies. Excessive heating is what destroys antibodies, and this is why you can't autoclave or pasteurize colostrum at high temperatures (or thaw frozen colostrum with high temperatures). Plasma-based products are tested periodically to ensure irradiation is removing all pathogens.

"A company in Canada makes most of the (dried bovine colostrum) products with colostrum purchased from dairies. They make sure it is high quality, dry it into a powder and irradiate it to kill any pathogens. They contract with dairies and make sure the cows are vaccinated to have antibodies against all the major diseases the calves might be exposed to," Smith says.

Choosing quality

When choosing a colostrum replacer, select one that performed well in tests. The amount of antibodies the product contains isn't always an indicator of its quality. "What we found through research is that this is not always the determining factor on how effective it is. We tried to figure out how much antibody should be in a colostrum replacer, but we tested some replacers that had about 100 grams of IgG and worked fairly well and tested some with much higher levels (150 to 180 grams) that didn't work as well to protect the calves. It's not as simple as just looking at the numbers," Smith says.

IgG absorption seems to be more correlated to the added protection each product offers.

"With some products the calves seem to absorb these fairly well, and others not so much. We don't know why this is, but it may be differences in the manufacturing. I recommend choosing a product that has been tested, that you know has worked," he says. "If you are considering using a new product, ask to see some data where they've actually done studies showing it works. Just saying it has enough antibodies is not what you should go by. We've seen many differences when testing these products in the same animal model. I've done four or five trials on products and see drastically different results. So, I advise using a product that's been tested or recommended or proven

to be effective. Make sure there is some existing data."

Keep it handy

Colostrum replacers can be a great time and labor saver. Frozen colostrum is nice to have, and it will keep up to a year or more in your freezer. "If it's 2 years old the quality may be questionable, but still better than no colostrum. Generally, a couple quarts of beef colostrum will be adequate," Smith says.

But thawing the colostrum takes time, and the powdered product is much faster. A good, powdered replacer can be handy to grab in an emergency.

"If I go to a farm to assist a calving, I always take a couple bags. Usually, I feel obligated to help get the calf up and going after we get it born or to help the producer get it on the cow. If we have to thaw frozen colostrum, it takes a couple hours. If I have some replacer, I can feed it to the calf and be back in my truck and gone much quicker," Smith says.

If the dam is a heifer that needs time to bond with her calf, colostrum replacer can buy the pair some time without having to fight with the new mother to milk out colostrum. Then, the calf will be off to a good start and can find the udder in its own good time.

Make sure the colostrum or replacer mix is warm enough. It should be above body temperature and feel warm to your finger, but not hot. If nursing from a bottle, the calf will always be more interested if it's warm.

The sooner you can get the colostrum into the calf, the better. A calf's ability to absorb antibodies starts to drop after birth and diminishes greatly by the time the calf is 12 hours old. A cold or stressed calf loses this ability even sooner than a normal calf.

"Our goal is to have colostrum in the calf during the first six hours and preferably the first two hours," Smith says. **HW**