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Colostrum & Alternatives

by Heather Smith Thomas

Colostrum is crucial for the newborn calf to help it fight off the diseases it will soon encounter. According to Geof Smith, DVM, PhD, North Carolina State University College of Veterinary Medicine, calves with failure of passive transfer — calves that don't get adequate levels of antibodies or don't receive colostrum — are most at risk for illness. They also shed pathogens into the environment at a much greater rate than calves that did receive adequate colostrum.

The best situation in a beef herd is for every calf to nurse its dam in a timely manner — preferably within the first two to four hours. Occasionally, however, a calf is unable to nurse because the dam has large teats or a first-calf heifer rejects her calf and won't let it suckle. If calving occurs during inclement weather, a newborn calf may become too chilled before it is able to get up and nurse. In these instances, the producer must either help the calf nurse its mother or

provide colostrum from a bottle or via esophageal feeder or tube or use a colostrum substitute.

There are a number of colostrum replacers on the market, but some are more effective than others. "There are only a couple of these that I think are very good," says Smith, who has tested and studied various products.

Their purpose

"Colostrum replacers are mainly used in the dairy industry and most commonly when farms are not doing a very good job with their colostrum programs and having disease problems in calves," Smith explains.

"These are also good if the producer is trying to eliminate certain diseases. In the dairy industry, Johne's disease would be the major one. In the beef industry, there's a lot less human intervention or control over the colostrum program; we are not taking the

calf away from the cow at birth and hand-feeding colostrum as we do in the dairy industry," he says.

In beef cattle, the calves are more apt to have adequate passive transfer because the colostrum from a beef cow is a lot more concentrated, with higher levels of antibodies per liter. Dairy cows normally give such a high volume of colostrum that the antibodies are more diluted. "When feeding a calf colostrum from a beef cow, we don't need to get as much volume into the calf as we do in the dairy industry," Smith says.

"There is some use of colostrum replacers in the beef industry, such as if a producer is trying to get rid of bovine leukosis virus (BLV). This would be mainly in purebred herds that do a lot of exporting to other countries. There are very few other instances in which a beef producer would use it in every calf," says Smith. The primary use of replacers in beef herds would be for the occasional calf that for some reason is unable to obtain colostrum from its mother.

"Every beef producer should have a few bags of replacer on hand, just for emergencies. This is much easier to keep and better from a bio-security standpoint than trying to get colostrum from a neighboring dairy. It's a lot easier to keep a couple bags of replacer in the cabinet than to suddenly need colostrum and have to go looking for a source," he says. "Using a powdered replacer — mixing it with warm water for immediate feeding — can be simpler and easier than milking the beef cow or even milking extra colostrum from a few cows each year to freeze."

According to Smith there is great variation in quality of products, however, and a lot of variation in price. "You usually get what you pay for," he says. "When using it in the beef industry as an emergency source and only having a couple bags on hand, to me it makes sense to buy a good quality replacer that will do a good job."

Dairy vs. beef colostrum

"In beef calves, we generally think they need a higher level of antibodies compared to dairy calves. At least that's what's been shown in research. Our goal in beef calves would be between 2,000 to 2,500 milligrams (mg) of immunoglobulin

(IgG), as opposed to dairy calves in which we think about 1,000 mg is good enough," Smith says. "This may be because we can usually only get about 1,000 mg into dairy calves, where we typically get much higher levels in beef calves. We need to use good quality replacer in beef calves," he says.

Producers should also know there is a difference between what we call colostrum replacers and colostrum supplements. Smith explains supplements are products (mainly for dairy calves) that are designed to be given with colostrum. Generally they have fairly low IgG concentrations, such as less than 50 grams.

Colostrum replacers are intended to be fed instead of regular cow colostrum and, as a rule, would be much higher in terms of their antibody concentration, at least 100 grams per dose. "In general there are two different kinds of replacers. One type is made from plasma. The company basically gets cattle blood from slaughterhouses and harvests the plasma. It's a blood-based (plasma) colostrum replacer," Smith explains. "These types of products have been on and off the market over the years because of BSE (bovine spongiform encephalopathy). For a while people thought we should ban all feeding of blood-based products, but these are considered to have zero risk for transmission of BSE because the organism that causes BSE really lives only in the brain; we don't find it in the blood.

"The colostrum replacers are an a-cellular product, meaning there's not even any cells in them; the manufacturers spin off the plasma first and use it. In terms of disease risk, it would be very low. Also, they irradiate it, which would kill any bacteria or viruses."

Radiation will kill 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. The finished product is tested periodically to make sure no pathogens are coming through, and the irradiation seems to work.

The other type of replacer is made from bovine colostrum. "They are made from colostrum that they (companies) purchase from dairies. They make sure it is high quality and dry it into a powder and irradiate it to kill any pathogens. They contract with different dairies and make sure the cows are properly vaccinated to have antibodies against all the major diseases that the calves might be exposed to," explains Smith.

What product should you buy?

If you are choosing a replacer, it's best to select one that has been tested and performs well. You can't



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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 has diminished a lot by the time he is 12 hours old.

always go by the amount of antibody it contains.

“What we found through research is that this is not always the determining factor on how effective it is,” Smith says. “We first 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 others with much higher levels of IgG (150 to 180 grams) that didn’t work as well to protect the calves. So it’s not as simple as just looking at the numbers.

“The reason may be the differences in absorption of the IgG by the calf. 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 of those products between companies. Basically what I recommend is to choose a product that has been tested, that you know has worked,” he adds.

A good replacer can be handy to grab in an emergency, as when you need to quickly revive a cold-stressed calf or get colostrum into a calf after a difficult birth. “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 out of the cow or help the producer get it on the cow. On a dairy I try to find some frozen colostrum and thaw it, which 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,” says Smith.

If the dam is a heifer that needs time to bond with the calf and you don’t want to fight her to milk out some colostrum, you can just give her calf the replacer in order to buy the pair some time. The calf will be off to a good start and can go ahead and find the udder in his own good time.

Replacers can be a great time and labor saver. “I’ve been around so many beef producers who needed colostrum in an emergency and didn’t have it and have to go look for some. It may be harder to find at midnight,” he says. It’s hard to beat fresh colostrum, but there are times you just don’t have any.

Frozen colostrum is also nice to have, and it will keep up to a year or more in the freezer. “If it’s two years old the quality may be questionable. The thing that damages it the most, however, is if you thaw it out and refreeze it, especially if you do this several times. Every time

you refreeze it you kill a little more of the antibodies. I tell people that if they thaw it out and for some reason don’t have to use it — if the calf is dead when they get back out to the barn or already up and nursing the cow — just pour it out instead of refreezing it,” he says.

Disease awareness

An important thing to remember is that there are some diseases that can come through colostrum.

“Make sure that whatever fresh or frozen colostrum you use comes from your own herd or a herd that you trust — (a herd) that has the same diseases you do or preferably does not have the diseases you don’t have,” Smith says. “It’s just like buying replacement animals; you can buy some problems that way.”

Feeding options

“In terms of volume, generally a couple quarts of beef colostrum will be adequate. With dairy colostrum, a calf may need four quarts. Generally you can give this all at once if they’ll drink that much. In dairy calves we use an esophageal feeder and force it

into them,” Smith says. “Sometimes a calf will nurse half of it from a bottle, and then we tube feed the rest of it. It just depends on your patience level and how much other work you have to do,” he says.

Another thing that’s important is to make sure the colostrum is warm enough. “It should be above body temperature and feel warm to your finger, but not burn your finger. You can warm a cold calf from the inside if the colostrum is warm enough.”

The fluid will lose some heat during the feeding, and you don’t want to feed it cool to a cold calf. If he’s nursing it from a bottle, the calf will always be more interested in it 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 has diminished a lot by the time he is 12 hours old. A cold or stressed calf loses this ability much sooner than a normal calf. “Our goal is to have colostrum in the calf during the first six hours. If you’ve found that calf and he’s cold or his mother rejected him, this should be one of the first things you do.” **HW**