

## Agriculture



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# Colostrum: The First Meal

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The first milk produced after calving is known as colostrum. It is important for calves to consume adequate amounts of colostrum as soon as possible. This first milk is rich with many important nutrients. There are higher levels of fat and sugar in colostrum than in normal milk as well as many important vitamins and minerals. Growth factors, as well as immunoglobulins, that aid the newborn calf in developing a healthy immune system, are present in colostrum (Blomquist, 2004; Tacoma et al., 2017). All of these nutrients help the calf to have sufficient energy for growth and for developing viable immune systems.

It is imperative that calves receive colostrum as soon as possible. The digestive tract of a newborn calf is able to absorb large molecules, such as antibodies, but as the calf grows older, the gut becomes less permeable and the chance of getting the needed immunoglobulins decreases. It is recommended that colostrum be fed within 4 hours of birth. Traditionally 24 hours was recognized as the time when the gut becomes closed to immunoglobulin absorption, but new research suggests that the gut loses some of its absorptive capacity as early as 6 hours after birth (Faber et al., 2005).

As well as being fed colostrum in a timely manner, calves need to receive adequate amounts. Research suggests that calves should be given 10% or more of their body weight in colostrum (Blomquist, 2004). This means that an 80 pound calf should be fed at least 8 pounds (~4 L) of colostrum. However,

cold temperatures or inclement weather increases maintenance requirements. Additional colostrum should be fed on days that are cold or windy in order to meet nutritional needs of the calf.

In order for colostrum to have the desired benefits, it needs to be high quality; not all colostrum is created equal. Research shows that calves should receive a minimum of 200 g total of IgG in order to receive adequate immunoglobulins. Good colostrum should have an IgG concentration greater than 50 g/L (Faber et al., 2005).

Quality can be measured using several different tools. The first is a colostrometer. These are the cheaper option, but it is important to note that colostrometers are fragile and temperature sensitive. This means that colostrum must be at room temperature in order to get an accurate reading. Another option is to use a Brix refractometer. This is generally viewed as the more accurate and reliable method than colostrometers.

Excess high-quality colostrum can be frozen and stored. This helps in the event that a calf is born to a dam that is not producing colostrum of sufficient quantity and quality. The stored colostrum can then be thawed using a warm water bath and fed. High heat can destroy the beneficial proteins in the colostrum; therefore, care must be taken to not overheat the colostrum. Water temperatures of 100° to 105° F are sufficient to thaw colostrum without damaging it. Colostrum may be pasteurized at 140°C for an hour, but neither the temperature nor

the time should be exceeded (Tacoma et al., 2017). In the event that there is no high-quality colostrum available, colostrum replacers may be used. Replacers are not all the same. Read the ingredient list carefully and consult with someone to choose the proper replacer and feed the correct amount (Blomquist, 2004).

Colostrum quality can be affected by proper nutrition during gestation. A cow that is undernourished during the third trimester will not have sufficient reserves to make high quality colostrum no matter how old she is. This may explain some of the differences between parities. For example, first and second lactation cows are still putting some of their nutrition toward their own growth and development. For this reason, it is important to closely manage the nutrition of pregnant cows. In addition, having a good vaccination program will boost colostrum quality. Cows that receive the needed vaccinations will have more antibodies to pass to the calves through colostrum, which will improve calf health and survival rates (Faber et al., 2005). Colostrum quality begins before parturition.

Although the emphasis of colostrum is usually placed on calf health, components of colostrum can result in positive lifelong effects. Calves that are given sufficient colostrum have less pneumonia and scours which allows them to grow more rapidly and have fewer sickness events. Calves given 4 L of colostrum after birth versus 2 L of colostrum were much more likely to remain in the herd longer. Low blood IgG concentration is also associated with

lower milk production and poor udder health. Over the first and second lactation, cows that received adequate colostrum produced as much as 550 kg (1210 lbs) more milk than cows that did not (Faber et al., 2005).

Proper quality and delivery of colostrum is important to help calves grow quickly. Managing colostrum correctly will lower costs in the short and long term and allows the cow to reach her full productive potential. Not all of the benefits are entirely understood. There is much to be learned about this critical first milk. In fact, new areas of research are starting to show that many of the other components in colostrum have positive effects on growth and health. It is clearly understood that colostrum holds the key to getting the calf off to a good start.

## References

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