



## Importance of Colostrum for Lambs and Kids

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Colostrum is the first milk that is secreted by the mother for the first two days after lambing or kidding, and is extremely important to the survival of newborn lambs or kids. It is typically a thick, yellow secretion that contains a high amount of protein, antibodies, and fat-soluble vitamins that help support the newborn animal. It also provides rich sources of energy in the form of fats and sugars that can be used as a source for heat production to prevent hypothermia. Colostrum also has natural laxative properties that aid in the movement of digesta through the digestive tract.

The maternal antibodies are the most crucial aspect of colostrum, as ruminant neonates are born without a functioning immune system and must naturally acquire passive immunity through the consumption of colostrum. The quantity of colostrum ingested by the newborn lamb or kid is important to ensure

that they have adequate antibodies to protect themselves before their own immune system develops. The lamb or kid must ingest colostrum within the first hours of birth and then throughout the first twelve hours of life in order for the transfer of immunity from the colostrum to the newborn to be effective. This time period is extremely important because the lamb or kid is only able to transfer antibodies from the gut to the bloodstream for about twelve to fifteen hours. The antibodies need to reach the bloodstream so that they can be carried to all areas of the body where infection may enter. In addition, passive immunity means that the lamb or kid only has immunity against microorganisms that the ewe has been exposed to and developed antibodies against. This exposure can be from natural contact with pathogens or produced as a result of a vaccination.



**Figure 1.** Colostrum. The thick texture and yellow color indicates it contains the proteins and fats needed for healthy lambs or kids.

It is extremely important to monitor the nutrition of the ewe or doe throughout pregnancy, because it affects the quantity and quality of colostrum she will produce. The mother will produce colostrum only in the last few days of pregnancy and into the first eighteen hours after lambing or kidding. The doe or ewe must be fed adequate energy, protein, minerals, and vitamins, especially in the last four weeks before lambing or kidding. Those that are inadequately fed will produce far less and a lower quality colostrum than those that have proper feeding throughout their pregnancy, with the last trimester being particularly important. The nutrition of the doe can be monitored by body condition scoring. Booster vaccinations are also known to help ewes and does produce higher-quality colostrum, and it is recommended to give the CDT toxoid vaccine about 4 weeks prior to lambing or kidding.

Once the lambs and kids are born, it is important to monitor newborns to ensure they are receiving adequate amounts of colostrum. You can check the lambs or kids by feeling their stomachs, which will be flat and empty if they haven't received colostrum; they also may be listless and vocalize. If lambs and kids do not ingest the colostrum needed on a timely basis, or the quality of colostrum is poor, the lamb or kid could become hypothermic, fail to thrive, or become more susceptible to disease, resulting in a chronically-sick animal.

The amount of colostrum a newborn lamb or kid should consume depends on the size of the animal. An average lamb or kid weighing about nine to twelve pounds should get about one liter (33.8 ounces) from the mother throughout the first eighteen hours of life. Their consumption may be hindered by poor establishment of a mother-offspring bond, competition between litter mates, or the mother producing inadequate colostrum. Lambs or kids born in colder weather, and those that are larger than the average size will need more colostrum; lambs or kids born inside in warmer weather and those that are smaller, may be able to thrive on less-than-average consumption.

If the ewe or doe does not produce enough colostrum, the best option is to collect colostrum from another ewe or doe in your flock. The optimal candidates for colostrum harvesting are the ewes or does that only have a single lamb or kid, are well-fed, and are producing large amounts of colostrum. You can milk a mother's colostrum into a container or stomach tube up to three times within the twenty-four hours; however, make sure that she is providing enough colostrum to her own offspring. Check to make sure the mother's original lamb or kid is healthy and has a full belly to make sure it is getting enough colostrum before you milk for another lamb or kid. Also, make sure the ewe or doe has been in lactation for less than eighteen hours so that the quality of her colostrum is high. Excess colostrum can be chilled in the refrigerator for up to two days or stored for twelve months in the freezer. Thaw frozen colostrum by placing the container in hot water of about 90-100 degrees Fahrenheit (32-37.8 degrees Celsius). Colostrum cannot be thawed and then refrozen, as it will damage and reduce the antibodies in the sample. Also, do not heat the frozen colostrum at too high of a temperature as it will denature the antibodies contained in it.

Another option for supplementing colostrum production is to use cow colostrum, though this is not as favorable as sheep or goat colostrum. When supplementing with cow colostrum, you should feed the lamb or kid about 30% more. The disadvantages to cow colostrum are that there are not as many specific antibodies to diseases encountered by sheep and goats, and in rare occasions, cow colostrum can cause severe anemia. Immunoglobulin G (IgG) is the most common type of antibody found in the blood of animals and is also found in colostrum. All lambs and kids need this to develop passive immunity against infection. It is important to give the lamb or kid the IgG that most closely matches its species, as it will be most effective. For a lamb, ovine IgG is the best, caprine is second best, and bovine is third best. For a kid, caprine IgG is the best, ovine is second best, and bovine is third best.

A third option for not having adequate colostrum is to use commercial colostrum replacers and supplements. Colostrum replacers should be used if colostrum from another ewe, doe, or cow cannot be obtained and are not the same as milk replacers. Colostrum replacers contain IgG and it is important to check the source of IgG when looking at the product. The majority of colostrum replacers contain bovine IgG, and therefore are as not effective; however replacers are still a viable replacement if there are no alternatives. Unlike replacers, colostrum supplements are used to enrich low-quality colostrum, but cannot replace colostrum altogether. Supplements may contain vitamins, minerals, probiotics, fats, and proteins to enrich colostrum, but if they do not contain IgG, then they have limited value.

In order to determine the quality of colostrum, you must determine the specific gravity and IgG concentration, which cannot be done by sight alone. The dairy industry has more advanced techniques than most food animal industries on determining colostrum quality, and therefore many practices used for sheep are taken from the dairy industry. High-quality colostrum is defined as IgG concentration of 50 mg/mL or higher, which can be determined by a colostrometer. This is a specific type of hydrometer that uses specific gravity to find the concentration. Room temperature colostrum is poured into a cylinder, and the colostrometer, as seen in Figure 2, is placed in the colostrum. If the green part of the cylinder can

be seen floating, the colostrum is of high quality and contains at least 50 mg/mL of IgG. Yellow indicates a concentration of 20-50 mg/mL, and red indicates a concentration of less than 20 mg/mL of IgG. A Brix refractometer, shown in Figure 3, can also be used to determine quality. A few drops of colostrum are put onto the refractometer, and it works by shining a beam of light through the sample of liquid and measuring how much light is refracted. If there are more antibodies, there will be a greater refraction level. A Brix score of 22% is the number marking high-quality colostrum; anything below 20% is poor-quality colostrum. These methods have value in selecting colostrum to save and freeze as replacement, or as an indicator of lambs and kids that might need to be fed additional higher-quality colostrum.



Figure 2. Colostrometer



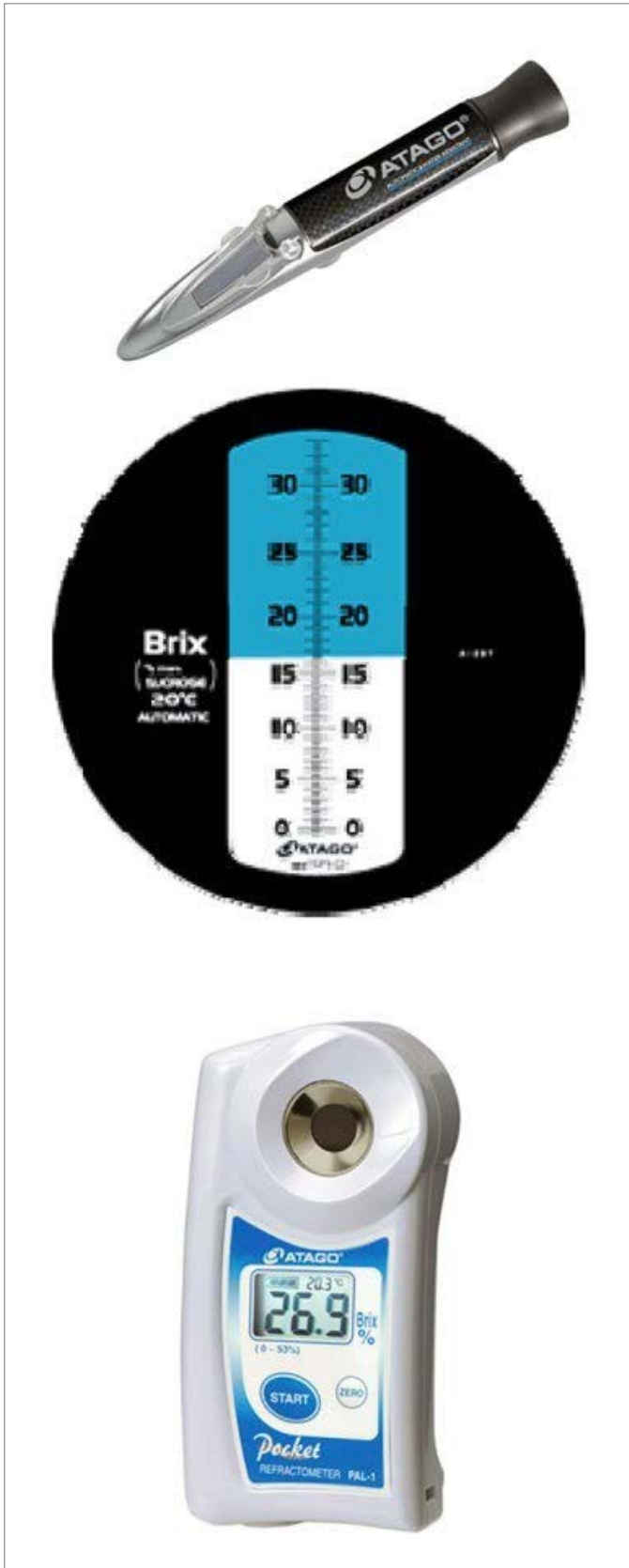


Figure 3. Brix Refractometer

If the lamb or kid will not suckle, stomach tube feeding is the best option. You should take a stomach tube, and on the outside of the lamb or kid, measure how far the tube needs to be put in. The tube must span from the mouth to halfway across the abdomen. Figure 4 demonstrates this process. Next, put the stomach tube into the animal's mouth and push slowly in without using any force. If the lamb or kid starts coughing or struggles, withdraw the tube, since it may be in the trachea. Once the tube is in, the lamb or kid will most likely chew on the tube, as seen in Figure 5. Then you should attach a syringe of colostrum to the end of the tube and empty the syringe slowly. After the syringe is empty, remove it, refill, and empty again. Once the desired amount has been given, remove the syringe and tube as a single unit in one motion. For a demonstration video of how to successfully stomach tube lambs or kids, see the Purdue University Extension Video A5-613-VW.



Figure 4. Tube Feeding of a Lamb



Figure 5. Tube Feeding of a Lamb

In conclusion, colostrum is extremely important to the survival of the lamb or kid due to the antibodies and high fats it contains. Colostrum works to help the offspring gain passive immunity, has laxative properties, and contains protein and fats that help heat production. It is critical that the lamb or kid receives appropriate quantity and quality of colostrum, which determined using a colostrometer or a Brix refractometer. After measuring quality, the producer can decide if the lamb or kid needs higher-quality colostrum. If the ewe or does not produce a high enough quantity of colostrum, there are a variety of replacements, which include high-quality colostrum from other sheep and goats, colostrum from cows, or commercial colostrum replacer. If the lamb or kid will not suckle, tube feeding can be utilized. Because colostrum can affect the quality of life for a lamb or kid, it is one of the most important components of a breeding operation.

## Sources

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