

Hand-raising a baby calf requires a commitment to providing adequate nutrition, housing, and care to give the calf the best chance to grow into a healthy, productive adult. This information is designed to help provide a better understanding of generally accepted calf management guidelines and how each recommendation benefits the calf. It is not intended to provide treatment recommendations - there is no substitute for sound advice from your veterinarian.

PROVIDE PROPER NUTRITION AND VACCINATIONS TO THE COW DURING PREGNANCY

Providing the cow with proper nutrition and vaccinations during **gestation** (pregnancy) will help her grow a healthy calf and produce high-quality colostrum. Consult with your veterinarian or nutritionist for recommendations on proper nutrition and vaccinations appropriate for your geographic area and management situation.

THE CALVING AREA SHOULD BE SPOTLESSLY CLEAN FOR THE NEWBORN CALF

Calves are born with virtually no ability to fight disease on their own, so a clean, well-bedded calving area is extremely important to give your calf a healthy start. Microscopic disease-causing organisms, called **pathogens**, are carried not only by sick animals, but also by healthy adult animals that may never become sick. When a pregnant cow carries pathogens, she can easily contaminate the calf's environment. Pathogens thrive in manure, saliva and nasal secretions, wet or dirty bedding material, on walls, even on the cow's udder. Pathogens can easily be carried from one area of the farm to another on dirty hands, boots and clothing, so good sanitation is extremely important. The **pathogen load** (the total number of organisms in a given area) can build up in the environment if the calving area is not cleaned and sanitized regularly.



Beef Cows

A well-drained grassy pasture is an excellent calving area for a beef cow as long as the weather is good. Try to observe the birth whenever possible so that you can make sure the calf nurses colostrum right away, and step in with assistance if needed. *Important – be extremely careful when handling a beef cow with a calf, as they can become dangerously protective of their newborn.* Having a head gate or chute readily available will come in handy if you need to handle the cow to milk her colostrum and bottle feed the calf. Limit the number of cows calving in one area, and rotate the pasture regularly to help prevent the buildup of manure, and keep the pathogen load low.

Dairy Cows

For dairy cows, attending the birth is much more important, because calving difficulty (called **dystocia**) is more common, and bottle calves do best if they do not nurse the cow. The ideal calving area is a dedicated, well-bedded pen that can be thoroughly cleaned and sanitized between cows. The cow can be allowed to lick the calf dry, but the two should be separated before the calf gets up to nurse. The cow should be milked immediately following calving and her colostrum fed to the calf from a bottle.

HELP PREVENT INFECTION WITH PROPER WET NAVEL CARE



Immediately after birth, the navel (umbilical cord) should be dipped in a disinfectant solution to help prevent infection. When the umbilical cord is broken during the birthing process, it quickly becomes a route for pathogens to enter the calf's body and cause infection. The navel itself can become infected, or the calf's joints can become infected from bacteria traveling through the navel into its bloodstream. A long navel cord should be trimmed to 3 or 4 inches in length before dipping. A bleeding cord should be dipped and then tied with surgical suture material. Dipping the navel cord also promotes rapid drying and the eventual breaking away of the cord from the navel.

A 7% iodine solution has been the preferred disinfectant for dipping navels. Recently, iodine sales have become tightly regulated because of its use in the manufacture of the illegal drug methamphetamine. An excellent alternative to iodine is chlorhexidine (brand name Nolvasan®), mixed at a rate of 1 part chlorhexidine to 3 parts water by volume.

WHY IS COLOSTRUM SO IMPORTANT FOR NEWBORN CALVES?

Feeding high-quality colostrum immediately after the calf is born is the single best way to help ensure the long term health of the calf. **Colostrum** is the first milk produced by the cow after giving birth. Calves are born with almost no ability to fight disease on their own, and must consume their antibodies (also commonly known as **IgG**, **immunoglobulins**, or **globulin protein**) from the cow's colostrum. The process of acquiring immunity from colostrum is called **passive transfer of immunity**. In the first day of life, the newborn calf has the ability to absorb antibodies directly into its bloodstream without digestion. Antibody absorption is most efficient immediately after birth, and steadily declines to virtually zero at 24 hours of age. For this reason, it is extremely important to feed colostrum as quickly as possible after the calf is born, and continue feeding only colostrum for the first day of life. When a calf does not receive enough antibodies from colostrum it is said to have **failure of passive transfer**, or **FPT**. In addition to providing antibodies, colostrum is a rich source of protein, fat, natural growth hormones, minerals, and vitamins for the newborn calf.

PRESERVE THE WHOLESOMENESS OF NATURAL COLOSTRUM WITH SANITARY COLLECTION

Cleanliness during colostrum collection, handling, and storage is of the utmost importance because contaminated colostrum can easily transmit disease to the newborn calf. The newborn calf's digestive system is like a sponge to allow it to absorb maternal antibodies from colostrum, but it is not selective – bacteria and other pathogens can also be absorbed directly into the bloodstream if they are present in colostrum. *Do not feed colostrum that is contaminated with blood, manure or chunky material, or if it has been allowed to stand without refrigeration for more than 30 minutes after collection - bacteria grow rapidly in fresh colostrum. Also discard colostrum from the cow if she is known to have a transmissible disease.*

MEASURE COLOSTRUM QUALITY TO HELP PREVENT FAILURE OF PASSIVE TRANSFER

When you are sure you have clean, fresh colostrum, it is recommended that you measure the quality with a **colostrometer** if possible. Colostrum quality is a measure of its antibody concentration. A colostrometer is a tool used to estimate the amount of antibodies in colostrum by measuring the specific gravity (density or weight per unit of volume) in the liquid. The colostrometer is most accurate if the colostrum sample is at room temperature, so fresh colostrum should be cooled and stored colostrum should be warmed prior to use.

STORE COLOSTRUM PROMPTLY AFTER COLLECTION TO SLOW BACTERIAL GROWTH

Contaminated or poor quality colostrum should be discarded, but good and marginal quality colostrum can be stored for future use. Once colostrum is collected, it should be placed into clean 1 to 2 quart containers that can be refrigerated or frozen. Label each container clearly with cow's name or number, the date of collection, and the quality measured by the colostrometer, if you have it. Refrigerated colostrum should be used in less than one week, whereas frozen colostrum can be stored for 6 months to one year. Avoid using a frost-free freezer for frozen colostrum if possible. If all you have is a frost-free freezer, use the frozen colostrum within 2 to 3 months. Outdated stored colostrum (refrigerated or frozen) should be discarded.

REWARM COLOSTRUM GENTLY TO PRESERVE THE FRAGILE ANTIBODIES

Storing colostrum in small volumes allows for easy thawing and re-warming for feeding. Stored colostrum should be thawed and warmed as you would a baby bottle, over a warm water bath. Using a microwave to thaw colostrum is not recommended because the antibodies can easily become damaged, reducing colostrum quality.

FEED COLOSTRUM AS SOON AS POSSIBLE AFTER BIRTH TO MAXIMIZE ANTIBODY ABSORPTION

The goal for colostrum feeding should be to feed 3 to 4 quarts for large breed dairy calves and 1-1/2 to 2-1/2 quarts for beef or small breed dairy calves, of high-quality colostrum within 2 hours after birth. Colostrum should be warm (about 100-105°F) and fed with a nipple bottle. Continue to feed only colostrum every 8-12 hours for the first day of life. If you purchase a young calf and are unsure exactly how old the calf is, the calf should still receive colostrum. Even though antibody absorption may be decreased, the calf will benefit from nutrients and antibodies in colostrum. Colostrum contains much more than just antibodies. Colostrum provides other essential proteins, fats, sugars, vitamins and minerals, as well as special growth factors and hormones that help the digestive system to develop and mature.





WHAT IF MY CALF WON'T DRINK 4 QUARTS OF COLOSTRUM?

Large calves (over 80 pounds) should receive 4 quarts of high quality colostrum at birth. You will need to adjust this amount for smaller calves. Colostrum can be fed by nipple bottle or, if necessary, by **esophageal tube feeder**, which is a long, rigid tube that connects to a sturdy plastic pouch or bottle designed to hold 2 to 4 quarts of liquid. The tube can be made of plastic or stainless steel, and has a smooth, rounded probe at the end that allows it to be safely inserted into the calf's esophagus to force feed fluids. The proper use of a tube feeder requires training and experience because incorrect use can result in injury to or death of the calf, so please consult with your veterinarian regarding its use.

Some calves may drink all 4 quarts of colostrum in one feeding, while others may only drink a portion of that. Calves that don't drink all of the first feeding can be fed the remaining colostrum with a tube feeder, or you can wait a couple of hours and try to feed the rest by bottle. If the calf refuses most of the first feeding it should be force fed with a tube feeder if possible to ensure that it receives colostrum in a timely manner. An exception to this would be a calf that is too weak to sit up unassisted – consult with your veterinarian for options to quickly address the reasons for the calf's weakness before you consider tube feeding.

WHEN DO I USE A COLOSTRUM SUPPLEMENT OR REPLACER?

If available natural colostrum is contaminated, or if it was allowed to stand without refrigeration for more than 30 minutes after collection, it should be discarded. If you don't have enough good colostrum or if the quality measured with a colostrometer is anything less than "good," then a colostrum supplement or replacer product should be used. **Colostrum supplements** typically contain 30 to 60 grams of antibodies, and can be fed alone or mixed with available maternal colostrum. If no maternal colostrum is available, you can use a colostrum supplement in 2 to 3 feedings, or colostrum replacer product in 1 to 2 feedings. **Colostrum replacers** contain higher levels of antibodies than supplement products, typically 100 to 150 grams of antibodies, and usually cost 2 to 3 times as much per feeding as supplement products. If you are replacing natural maternal colostrum completely, the goal should be to provide at least 100 grams of antibodies in the first 6 to 8 hours after birth. Antibodies in colostrum supplements and replacers can be labeled as **IgG** or **globulin protein** depending on the product and its antibody source.

THERE IS MORE THAN ONE GOOD SOURCE OF ANTIBODIES FOR SUPPLEMENTS

Natural maternal colostrum will always be the preferred source of antibodies for the newborn calf, but clean, fresh colostrum won't always be available, so it is highly recommended to have a supplement or replacer product on hand just in case. Colostrum supplements can contain antibodies from dried colostrum or dried serum, or a combination of the two, and both are effective at providing antibodies. Both receive their antibodies from exactly the same source – the bloodstream of the mother. Research shows that antibodies from serum are generally absorbed slightly more efficiently than antibodies from dried colostrum. Your veterinarian can test your calf's blood to determine if it absorbed enough antibodies to achieve successful passive transfer of immunity. Colostrum and serum used for animal feeds, including colostrum supplements, is carefully collected using pharmaceutical technology to assure that it is as safe and wholesome for your calf as the milk we drink.

ADDITIONAL RESOURCES

Your livestock veterinarian and local university extension agent are excellent resources for calf management information, as well as many online sources. Please visit the Learning and Resource Center at www.savacaf.com for some helpful online links.