



Dairy Briefs

The Latest Information on Dairy Cattle Nutrition



Feeding Calves Right

Laura Martin, M.Sc

Raising calves on a dairy farm can be a tricky business. Like most young animals, calves have a weak immune system following birth and can suffer from a host of health problems, from scours to respiratory issues. Calves that survive health challenges have been shown to have poorer growth and lower future milk production than their healthy herd mates. With beef prices now it's worth spending time getting bull calves off to a good start.

Setting calves up for success really starts with the dry cow program. Of course nutrition is important for the whole gestation; however the majority of fetal calf growth occurs within the two months prior to calving. If the cow is not fed properly during this period the calf will be affected, reducing its potential for future growth. Trace mineral and vitamin levels in the dry cow feed are important. Deficiencies of these nutrients can impact the immune system of the calf and make it more susceptible to disease. Kenpal's gemSTART dry cow premixes have been

specially formulated to provide all of the trace minerals and vitamins required by both far off and close up cows. Both minerals contain high levels of vitamin E, which may reduce retained placentas and contribute to the quality of colostrum produced by the cow. Kenpal's Close Up Dry Cow premix also contains yeast cultures that may help maintain dry matter intake during the transition phase, and added niacin, which may help prevent ketosis. Overfeeding dry cows, especially energy, causes problems as well. Over conditioned cows are more likely to have difficulty calving than cows in proper




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Feeding Calves Right

By: Laura Martin, M. Sc, Nutritionist



Get your calves off to the right start with firstSTART[®]C Calf Milk Replacer!

- firstSTART[®]C milk replacer has excellent palatability and mixing characteristics.
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- 100% milk protein ensures consistent and steady growth and development of the calves.
- Producers are finding healthy calves with shiny coats.



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condition. Calves resulting from difficult births have higher mortality rates and lower weight gains than calves with “normal” calvings. Some nutrients, like selenium, easily cross the placenta to directly supply the calf. Other nutrients, like vitamins A, D and E, do not cross the placenta easily; however they do get transferred to the calf through the milk, especially through colostrum. Research has shown that increasing dry cow intakes of key nutrients, like vitamin E, increases the levels of these nutrients in the milk.

Colostrum intake in calves is essential. Calves get immunity and concentrated nutrients from colostrum; and without it have a higher risk for disease and poor growth. Colostrum management is probably the most talked about issue when it comes to raising calves. Despite this, a survey done in the US representing over 80% of all the dairy cows in the US showed that almost 25% of top percentile farms and over 50% of bottom percentile farms still rely only on nursing the calf on the cow for colostrum intake. Experts recommend bucket or tube feeding of colostrum so that intakes can be monitored. Also it reduces the chance of the calf picking up a disease from feces near the cow’s udder.

Recommended colostrum intake is 2-3 L within the first 4 hours of birth and a total of 4 L within 12 hours of birth. It is important to get colostrum into the calf as soon as possible since the gut’s ability to absorb antibodies decreases by one-third after the first 6 hours, and by 24 hours after birth digestive enzymes are active that destroy antibodies before they can be absorbed. Colostrum quality is imperative to calf survival. It is important to use colostrum from the first milking. The quality rapidly declines after this first milking and is no longer considered true colostrum (Table 1). The low level of lactose in colostrum reduces the risk of scouring and allows for the high intakes required in the first 4 hours. Timing of first milking is also important as research has shown that antibody levels in milk decrease by almost 4% per hour post calving. Transition milk should be fed for the next three days as its nutrient content is still higher than whole milk.

Table 1: Comparison of Milk Composition: Colostrum to Whole Milk

Component (%)	Colostrum	Transition Milk		Whole Milk
	1st Milking	2nd Milking	3rd Milking	
Total Solids	23.9	14.1	13.6	12.9
Fat	6.7	3.9	4.4	4.0
Protein	14.0	5.1	4.1	3.1
Lactose	2.7	4.4	4.7	5.0
Calcium	0.26	0.15	0.15	0.13
Immunoglobulins	6.0	2.4	1.0	0.1

Source: Pennsylvania State University

Colostrum can be stored for up to a year in a freezer for use in calves born to cows with Johne’s, severe mastitis, or no milk. Colostrum should be thawed with warm water, not hot water. Microwaves can be used on low power for short periods but this may reduce the quality of the colostrum by destroying nutrients and antibodies.

For the first few weeks milk is the calf’s main source of nutrients. The anatomy of the calf allows for milk to bypass the rumen and go directly to the true stomach. After 12 weeks this esophageal groove no longer functions and any milk consumed enters the rumen for fermentation. Every farm produces some waste milk, and this typically goes to the calves. Waste milk from cows treated with antibiotics should only go to older calves that are not going for slaughter, to prevent antibiotic residues in the meat. The general recommendation for milk/milk replacer intake is 10% of the calf’s body weight. However the Unweaned

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- Whole milk price will vary from farm to farm depending on components etc.
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Calves section of the Code of Practice – Dairy Cattle recommends an intake 20% of body weight until 28 days of age. During cold weather intakes should be increased to provide extra energy the calves need to keep warm.

Whole milk produced over quota is an excellent feed for young calves, although the supply may not be consistent. Different breeds produce different milk profiles (Table 2). Kenpal's firstSTART C calf milk replacers offer an alternative that cost less to feed than a litre of saleable milk. The firstSTART C program provides a range of protein and fat levels to suit the needs on farm, the most popular being the 20-20 milk replacer (20% protein and 20% fat). firstSTART C supplies a consistent source of nutrients to the calf at every feeding. All of the protein in firstSTART C is from milk products rather than plant proteins to more naturally mimic mother's milk. To optimize average daily gains, and get the calves off to a good start, firstSTART C is also balanced with synthetic amino acids to meet the calves' needs. Kenpal milk replacers are fully fortified and balanced with optimum vitamin and trace mineral levels, including the B-vitamins which a young calf cannot product itself. It is important to mix and feed milk replacers according to the manufacturer's instructions. Different companies may have balanced the milk replacer to be fed at a different feeding rate. Underfeeding may hurt growth performance as the calves aren't receiving all the required nutrients. Overfeeding can also hurt growth performance in calves as the excess of proteins and sugars may cause the calf to scour. If switching between milk replacer's make sure to read the product label carefully and mix the correct amount of powder.

Table 2: Holstein vs Jersey Milk Composition

Components	Jersey		Holstein	
	As Is	Water Removed	As Is	Water Removed
Fat %	4.8	33.3	3.8	29.7
Protein %	3.8	26.4	3.2	25.0
Other Solids %	5.8	40.3	5.8	45.3

Adapted from DFO

A good quality calf starter should be introduced to calves at 4 days of age. Finding a quality feed that is palatable to calves is important to getting them eating and getting their rumen developed. Kenpal's gemSTART 19% Calf Starter program provides a highly palatable, nutritious feed to get the calves eating solid food. The products are formulated with optimal levels of Selenium and Vitamin E, to help improve immune response, and highly digestible protein and energy sources, to help increase rate of gain and reduce digestive upsets. A special blend of herbs and spices make the feed especially tempting for calves. Initially calves won't eat much starter; a small coffee cup per day should be plenty. Remove any feed not consumed daily and replace with fresh feed. Any left over feed can be fed to older calves to reduce waste. This will keep the calves interested and get them on-feed faster. Kenpal's Calf Starter feed is a concentrated source of energy and nutrients that help put weight onto the calves so that when they are weaned they meet body weight targets. Free choice water should also be offered starting at 4 days of age. Research has shown a 31% reduction in starter intake and a 38% reduction in weight gain in calves deprived of water access. During periods of extreme cold, warm water should be offered 2-3 times a day.

The combination of quality calf starter and water help the rumen develop. When a calf is born the rumen is still developing and the calf is unable to use forage like an adult ruminant. This allows for the calf to get as much nutrients from milk as possible (without having to share it with rumen microbes). Feeding starter before weaning calves allows time for the rumen to grow in terms of volume, microbe population and the surface area of the lining. Grain-based feeds are needed to develop the many folds and finger-like



projections that form the rumen lining. Roughage doesn't produce the right volatile fatty acids to encourage the rumen lining to develop as a result feeding roughage to pre-weaned calves may slow rumen development (Figure 1). Roughages are also bulky feeds that aren't very nutrient dense compared to grains and protein products. The stomach of a young calf is not big enough to hold the amount of forage it would need to grow – if it could digest forage at all. It is best to introduce good quality hay after the calves have been weaned.

Figure 1: Comparison of Rumen Lining of Calves Fed: Milk, Milk + Hay, Milk + Grains

Source: Pennsylvania State University

Cont. >>

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- Helps replenish lost electrolytes.
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Once a calf eats 1 – 2 lbs of starter for 3 consecutive days it is ready for weaning. Calves should be weaned based on starter intake rather than weight or age. Weaning is a stressful time for calves. Gradual weaning of the calf over 3-7 days can help reduce some of this stress. Housing changes often occur at weaning as well. Moving calves from hutches or individual pens should be done along with weaning so that the calves are stressed for a smaller length of time overall. Calves under 4 months of age should be limited to groups of 4-6 heifers or steers. This allows them time to adjust to herd dynamics and group feeding and reduces competition at the feed bunk. Continue feeding the starter feed for 1-2 weeks post weaning before changing over to your heifer development program. Once they have adapted to the starter feed, and their rumens are developed, good quality hay provides the scratch factor needed to keep the rumen healthy. The best quality hay on the farm should be set aside for young heifers or steers.

Kenpal recommends feeding the gemSTART 16% Calf Grower pellet for up to 4 months as a transition feed from the calf starter to a more complex diet. Fermented feeds should not be fed until the calves are at least 4 months old. Kenpal's gemSTART Mama Maker Heifer Breeder products are designed to help heifers grow faster with fewer health problems. They contain yeast to help improve feed efficiency and maintain a healthy rumen. Supplemental thiamine enhances energy metabolism, and a full complement of vitamins and trace minerals help the heifers meet growth and breeding targets.

There is so much to say about raising calves, from housing to record keeping, and this just focuses on the nutrition end of things. Calf nutrition is important, especially when it comes to colostrum, but the best nutrition in the world can't overcome widespread disease challenges or poorly ventilated housing. Getting colostrum into the calves quickly can save a lot of trouble down the road, and feeding a good quality calf starter program can help grow the calves into profitable animals for the farm.



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