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# Weaning dairy calves at three weeks and feeding fermented colostrum



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## INTRODUCTION

Calf-feeding programs have changed significantly over the last several decades. The recommended age for weaning calves has been reduced from 8-12 weeks to 5-6 weeks. Recent research on early feeding of young calves indicates that calves can be weaned successfully even earlier. For example, studies at the Charlotte-town Research Station show that calves can be weaned when they are only 3 weeks old, and experiments at the Lennoxville Research Station confirm this finding.

This publication outlines the recommended feeding and management procedures for weaning dairy calves to dry feed when they are 3 weeks old and provides information on the production and use of fermented colostrum. In this publication, colostrum refers to the first 3 days' milk; true colostrum to the liquid from the first milking after parturition; and fermented colostrum to the liquid produced by adding a culture to the colostrum (for details see "Fermented colostrum—preparation and feeding").

The first 3 months of a calf's life are often described as the most critical period. During this time calves are susceptible to several illnesses, such as scours and pneumonia, which may cause up to 50% mortality in some herds. Good management, proper sanitation, and a high level of nutrition should minimize disease and reduce mortality, and provide healthy, well-grown calves.

Weaning when the calf is 3 weeks old is an alternative feeding program that offers certain benefits. Some producers may want to adopt this program of early weaning. Others may prefer to continue with more conventional calf-rearing systems, which involve longer periods of liquid feeding.

## **BENEFITS OF AN EARLY WEANING PROGRAM**

- Early weaning reduces the liquid-feeding period, when calves are subject to scours and digestive problems.
- It reduces the number of calves on liquid feeding at the same time; the animals can therefore be given better care, which should result in improved health during that period.
- It reduces the number of individual pens required for liquid feeding, because the calves are moved to group-feeding pens at a younger age.
- It reduces labor, because it is easier to care for calves on dry feed when they are in group housing.
- It reduces feed costs, because of the early transition to dry feeds, which are more economical than milk or milk replacer.
- It reduces feed costs further if fermented colostrum is fed during the first 3 weeks, because this eliminates the use of up to 83 kg of milk or 7.2 kg of milk replacer.

## **FEEDING AND CARE FOR THE THREE-WEEK WEANING PROGRAM**

### **The first three days**

The early feeding of colostrum to newborn calves cannot be overemphasized as a way of ensuring maximum antibody absorption and disease protection. The first feeding should be within 1 hour of birth and the second feeding should follow within 12 hours. The calf should continue to receive the dam's colostrum, or milk, for the first 3 days.

Although the separation of the cow from the calf is usually recommended within 12 hours of parturition, recent research indicates some advantage (attributed to better antibody absorption) to leaving the calf with its mother for the first 24 hours. The calving area and the pen for the new calf should be clean and dry, and the pen should be located in a well-ventilated area, free from drafts. Individual pens are recommended during the liquid-feeding period, to reduce the spread of disease and to prevent calves from sucking each other.

### **Three days to three weeks**

Feed fresh whole milk, fermented colostrum, or milk replacer during the liquid-feeding period. The program described in this publication is based on fermented colostrum, because its use makes the early weaning program more economical. In some cases, fermented colostrum has been reported to improve both the health and the growth of calves, whereas in others, no improvement over whole milk or milk replacer can be detected.

The recommended amount of liquid feed depends mainly on the calf's size (see Table 1 for feeding schedules). Do not overfeed the calves, because overfeeding often causes scours. Warm the fermented colostrum by diluting it with hot water at a ratio of 2:1 or 3:1. The recommended amounts of diluted colostrum are the same as for whole milk.

Table 1 Daily feeding schedule for dairy calves

	Colostrum, fermented colostrum (diluted), or whole milk kg/day		Milk replacer kg/day	
	Large calf	Small calf	Large calf	Small calf
1-3 days	2.7-3.5	1.8-2.7	-	-
4-7 days	3.6	2.7	0.3	0.2
2nd week	4.1	3.0	0.4	0.3
3rd week	4.5	3.6	0.5	0.4
4th week	4.1	3.6	0.5	0.4

If scours occur because of overfeeding, reduce by half the amount of milk that is fed. If they become a more serious problem, eliminate milk from the diet for at least two consecutive feedings. To avoid dehydration of scouring calves, replace the milk with an equivalent amount of water and add a commercial electrolyte solution, which replaces the minerals lost by the calves. Consult your veterinarian if the animals suffer severe or extended periods of scouring.

Calf starter may be first offered when the calves are 2-3 days old. Feed small amounts of fresh starter daily and add a handful of starter to the pail, just as the calf finishes drinking, to encourage early consumption of dry feed.

## Weaning

When a healthy calf is 3 weeks old, it can be weaned abruptly. Calves that are suffering from scours, pneumonia, or any other illness should be kept on liquid feeding until they are healthy again. All calves should be weaned by the time they are 4 weeks old. In studies at the Lennoxville Research Station, liquid feeding was reduced by half to encourage dry-feed consumption in the third week, but studies at Charlottetown show that liquid feeding up to 3 weeks, followed by abrupt weaning, is satisfactory and ensures good nutrient intake in the third week.

There is little or no setback in the growth of calves that are weaned when they are 3 weeks old. When milk feeding is stopped, calves adapt quickly to the dry starter mixture and consume up to 0.5-1.0 kg/day in the first week after weaning. Even calves that eat very little starter ration before weaning usually consume 0.5 kg/day

or more in the first week after weaning. Some calves start to eat dry feed quite early, consuming up to 0.5 kg or more per day by the time they are 2 weeks old; these calves may be weaned as young as 2 weeks old.

### Three weeks to three months

The starter mixture that is fed to calves weaned when they are 3 weeks old should contain at least 21% crude protein and should be based on high-energy grains, such as barley or corn. Vitamins and minerals should be added to meet the young calf's requirements (see Table 2 for suggested starter mixtures). Studies at the Charlotte Research Station show no advantage from pelleting the starter ration nor from adding animal protein or a feed flavor. Five percent coarsely ground hay may be added, and 4–5% liquid molasses reduces dustiness in the calf starter mixture.

Table 2 Suggested calf starter and grower rations

Ingredients	Starter mixture kg/t		Grower mixture kg/t	
	High protein (21%)	Low protein (16%)	Without hay	With hay
Rolled grain*	600	720	760	680
Soybean meal	280	160	160	140
Molasses	50	50	50	50
Dehydrated alfalfa	40	40	–	–
Dicalcium phosphate	15	15	15	15
Feed-grade limestone (CaCO <sub>3</sub> )	5	5	5	5
Trace mineralized salt	10	10	10	10
Vitamin ADE premix	0.50	0.50	0.50	0.50
Hay†	50	50	–	100

\* Mostly barley and corn but with some oats and wheat, if desired.

† Hay ground through a 9.6-mm screen. If hay is added to the starter mixture, reduce the amount of rolled grain by 50 kg.

Feeding the starter ration free-choice until the calf is 3 months old ensures rapid, efficient growth and development of the young calf. Gains should average 700–800 g/day during this period. Forage is not necessary during the first 3 months, but if it is offered it should be low-quality hay or straw, so that the animals do not prefer it to the starter mixture. Consumption of a small amount of forage may help to stimulate rumen function, but in larger amounts it will reduce nutrient intake and slow the growth rate of calves.

The protein content of the starter can be reduced to 16% at 8–10 weeks if a complete mixed ration (including hay) is fed free-choice. If additional forage is fed at this age, a slightly higher protein starter (17–18%) should be included in the diet to provide 16% protein in the total ration.

From weaning to age 3 months, calves are efficient converters of high-energy starting rations to liveweight gains. In studies at Charlottetown, feed-to-gain ratios of 3.0:1 to 3.25:1 were achieved when complete starter rations were fed free-choice.

The starter ration can be replaced by a grower ration at 12–14 weeks, and free-choice feeding can be continued, along with forage. At about 16 weeks, the intake of grower ration can be reduced to 2.5 kg/day. This level of grain intake and high-quality forage should maintain an adequate growth rate in replacement heifer calves. The efficiency of the early weaning program, combined with the savings from the use of fermented colostrum, can provide a marked reduction in feed costs compared with conventional calf-feeding programs.

## FERMENTED COLOSTRUM—PREPARATION AND FEEDING

Fermented colostrum as a liquid feed is well adapted to the 3-week weaning program, because the dam usually produces enough colostrum in the 3 days after calving to feed the calf for 3 weeks.

Fermented colostrum is produced by saving the surplus colostrum (and milk) produced by the dam in her first six milkings. After the first milking, place the colostrum in a clean, covered container, such as a plastic garbage pail, and add cultured buttermilk or yogurt. Then add the subsequent five milkings as the surplus becomes available. *Streptococcus lactis*, the predominant organism in cultured buttermilk, produces a more desirable fermentation than does yogurt. The cultures used to make yogurt vary and may produce a fermented product with high acidity, which the calves find less acceptable. However, the use of yogurt is preferable to allowing a natural fermentation to occur, because some wild organisms may initiate spoilage instead of a desirable fermentation.

True colostrum from the first milking is much higher in solids than is normal milk, but the solids decline to normal levels in the first 3 days after calving. For this reason, fermented colostrum tends to be higher in solids than normal milk and should be diluted before feeding. Dilute with hot water to provide a warm mixture and feed at the same rate as recommended for milk (Table 1). Fermented colostrum should be mixed thoroughly at each feeding to ensure a uniform product.

The calf can be switched to partly fermented colostrum on the fourth day, even though the fermentation is not yet complete. This allows the calf to adapt to the fermented colostrum before full acidity is developed. In larger herds, where many calves are near the same age, the calf can be started on a container of fermented




material. If colostrum from several cows is available, it can be pooled and fed to all calves to simplify the feeding procedure. At Charlottetown, the calf is started on the fermenting colostrum from its dam. Later, this colostrum is combined with that from other cows, and the pooled colostrum is fed to all calves on liquid feed.

If the supply of fermented colostrum is inadequate, the calves may be switched to fresh milk or milk replacer, which should not cause digestive disturbances. Make the transition gradually by increasing the amount of milk or milk replacer added to the fermented colostrum over several days. If the dam's milk supply is poor just after calving, it may be more convenient to add an extra milking to the colostrum container rather than to change to milk or milk replacer later.

#### CONVERSION FACTORS

Metric units	Approximate conversion factors	Results in:
<b>LINEAR</b>		
millimetre (mm)	x 0.04	inch
centimetre (cm)	x 0.39	inch
metre (m)	x 3.28	feet
kilometre (km)	x 0.62	mile
<b>AREA</b>		
square centimetre (cm <sup>2</sup> )	x 0.15	square inch
square metre (m <sup>2</sup> )	x 1.2	square yard
square kilometre (km <sup>2</sup> )	x 0.39	square mile
hectare (ha)	x 2.5	acres
<b>VOLUME</b>		
cubic centimetre (cm <sup>3</sup> )	x 0.06	cubic inch
cubic metre (m <sup>3</sup> )	x 35.31	cubic feet
	x 1.31	cubic yard
<b>CAPACITY</b>		
litre (L)	x 0.035	cubic feet
hectolitre (hL)	x 22	gallons
	x 2.5	bushels
<b>WEIGHT</b>		
gram (g)	x 0.04	oz avdp
kilogram (kg)	x 2.2	lb avdp
tonne (t)	x 1.1	short ton
<b>AGRICULTURAL</b>		
litres per hectare (L/ha)	x 0.089	gallons per acre
	x 0.357	quarts per acre
	x 0.71	pints per acre
millilitres per hectare (mL/ha)	x 0.014	fl. oz per acre
tonnes per hectare (t/ha)	x 0.45	tons per acre
kilograms per hectare (kg/ha)	x 0.89	lb per acre
grams per hectare (g/ha)	x 0.014	oz avdp per acre
plants per hectare (plants/ha)	x 0.405	plants per acre



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