



# Dairy Briefs



## The Latest Information on Dairy Cattle Nutrition

### Starting Calves off Right on Solid Feed

Laura Martin, M.Sc

Getting calves off to a good start should be the goal of every dairy producer. These calves are the future milking herd and what happens to them when they are young affects them for the rest of their lives. Transitioning calves from milk or milk replacer to solid feed without them going backwards is a struggle. There are many different theories on the best way to get calves eating solid feed, from feeding no forages at all to feeding a TMR with fermented forages. Recent research has helped shed some light on this problem.

Research from the University of Guelph's Overvest et al. (2015), looks at how the type of feed affects dry matter intake and growth of dairy calves. This study fed either calf starter alone, calf starter with hay (85% starter to 15% hay), or a corn silage based TMR to calves. The research showed that calves fed a corn silage based TMR did not eat as much feed or grow as well as calves fed calf starter, either with hay or without (Table 1). The low gains observed in calves fed TMR are closely linked to the lower dry matter intakes. Overvest concluded that the high moisture and fibre content of the TMR limited intakes in the calves, and that calves would have needed to eat about 75% more of the TMR to get the same level of energy of the calves fed calf starter. That intake would likely be impossible for calves of that age due to limited rumen capacity.

For the first few weeks, milk is the calf's main source of nutrients. The anatomy of the young calf is designed such that milk bypasses the rumen and goes directly to the true stomach, the abomasum. This allows for the calf to get as many nutrients from the milk as possible (without having to share it with the rumen microbes). After 12 weeks this esophageal groove no longer functions and any milk consumed enters the rumen for fermentation. Allowing calves access to solid feed before weaning gets them used to a different kind of eating, different textures, tastes and smells. It also helps the rumen microbes get used to breaking down feeds before the calf becomes dependent on them to provide most of their energy for growth.

A good quality calf starter should be introduced to calves at 4 days of age, this gives plenty of time for the calves to start eating solid feed. Kenpal's gemSTART 19% Calf Starter program provides a highly palatable, nutritious

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*Starting Calves off Right on Solid Feed*

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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. Finding a quality feed that is palatable to calves is important to getting them eating and getting the rumen developed. Initially calves won't eat much starter; a small coffee cup per day should be plenty. Replacing calf starter daily with fresh feed is recommended. This will keep the calves interested and get them on feed faster. The leftover feed can be fed to older, weaned calves to help reduce waste. 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 done by Kertz et al. (1984) showed a 31% reduction in starter intake and a 38% reduction in weight gain in calves deprived of water access (Table 2). During periods of extreme cold, warm water should be offered 2-3 times a day.



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This combination of quality calf starter and water helps the rumen develop. When a calf is born, the rumen is still developing and the calf is unable to digest forage like an adult ruminant. Feeding starter to calves before weaning 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 only roughage to pre-weaned calves may slow rumen development (Figure 1). Calves fed high volumes of milk or milk replacer (6 L or more a day) have been shown to benefit from eating some hay prior to weaning. In this case, calves are consuming more milk and less starter, and the roughage helps develop the muscles of the rumen and increase its capacity. The hay should be fed up off the ground to encourage calves to eat it and not the bedding. If smaller amounts of milk are fed, there is typically little benefit to feeding hay before the calves are weaned.

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, or even longer for high volume milk feeding systems, can help reduce some of this stress. Continue feeding the starter feed for 1-2 weeks post weaning before changing to a calf grower feed. Feeding hay provides the scratch factor needed to keep the rumen healthy. Chopping the hay to no longer than 2 inches allows the calves to maximize intakes and get more out of the hay. The amount of hay in the diet should remain quite small, between 10 – 20% of the diet. As it is such a small portion of the diet, a low to medium quality hay is all that is necessary, as the majority of the calves' nutrient requirements will be met by the calf starter. Calves tend to eat more grass hay than alfalfa hay, partly because it is more digestible.

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.

Getting calves on solid feed and off to a good start can be a challenge. As tempting as it might be to mix up a TMR while feeding the rest of the herd, calves really do better on non-fermented feeds. The high moisture and fibre levels of fermented forages can limit intakes and growth of dairy calves. Feeding Kenpal's Calf Starter Program, with or without hay, can help turn calves into money makers for the farm.

Table 1: Intakes and Gains of Calves on Different Feeds

	Starter	Starter with Hay (Mixed)	Starter with Hay (Fed Separate)	TMR
<b>Pre-Weaning</b>				
Solid Feed Intake (kg of DM/d)	0.08	0.10	0.09	0.03
ADG (kg/d)	1.1	1.1	1.1	1.0
<b>Weaning</b>				
Solid Feed Intake (kg of DM/d)	0.46	0.50	0.52	0.19*
ADG (kg/d)	0.40	0.50	0.50	0.20*
<b>Post-Weaning</b>				
Solid Feed Intake (kg of DM/d)	2.68	2.67	2.87	1.78*
ADG (kg/d)	1.20	1.20	1.20	0.70*

Overest, et al. (2015)

\*values differ significantly due to effect of treatment (P < 0.05)

Calves fed calf starter alone, or with the hay fed separately, pre-weaning were switched to the calf starter with hay mixed in post-weaning.

Table 2: Effect on Water Access on Calf Performance

	Free Choice Water	No Water Access
Daily Gain (grams)	302	188*
Total Starter Intake (kg)	11.72	8.08*

Kertz, et al. (1984)

\*values differ significantly due to effect of treatment (P < 0.05)

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



Source: Pennsylvania State University

Reference:

Kertz, A.F., L.F. Reutzel, and J.H. Mahoney. 1984. Ad libitum water intake by neonatal calves and its relationship to calf starter intake, weight gain, feces score and season. *J. Dairy Sci.* 67: 2964-2969.

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