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Selecting the Right Milk Replacer Feeding Program

Introduction

It used to be so simple to feed the young dairy calf. A calf feeder would put a cup of milk replacer in two quarts of warm water, give it a quick stir to go into solution and then feed it to a hungry calf.

During the past several years, calf nutrition research has taken a look at the level of nutrition the dairy industry traditionally provides to a calf. This research has led to the introduction of a new method of feeding calves milk replacer which has been referred to by a number of names, including biologically appropriate growth, intensified nutrition, enhanced early nutrition, and accelerated growth. Evidence is accumulating which suggests that 1st lactation milk yield can be increased by this method, which will be referred to as "accelerated growth" throughout this article.

Traditional Feeding of Dairy Calves

We need to fully understand what is meant by the traditional method of feeding dairy calves. Milk replacers were first developed over 50 years ago in response to the dairyman's need to have an economical alternative to feeding saleable milk. The desire was to allow the dairyman to sell their milk at market prices and then purchase a replacer that was more economical but would still grow calves at an acceptable rate.

The traditional feeding system mixes 1 to 1.25 pounds (454 to 568 grams) of powder in a gallon (3.8 liters) of warm water. The calf is then fed 2 quarts (1.9 liters) of milk replacer solution twice a day. This method of feeding is designed to encourage dry feed intake. It is this emphasis on early calf starter intake that will stimulate development of the rumen, which is necessary for a successful weaning and transition program.

To fully understand the issue of starter intake, we need to look at energy. A 100 pound calf requires 1.75 Mcal of metabolizable energy (ME) to maintain its body weight in a thermoneutral (68°F) environment. One pound of a typical 20-20 calf milk replacer provides about 2.15 Mcal of ME. In this situation, milk replacer provides enough energy to maintain the calf and support small amounts of growth, but the calf will need to eat dry feed to grow at acceptable rates; traditionally-fed calves are energy-driven to eat their starter feed. Additionally, a traditional feeding program will need to be adjusted considerably to meet the energy needs of the calf during cold weather.

There are many positives to a traditional feeding calf program. It is easy to manage, minimizes expense, and producers are comfortable with the system because they have done it for many years. In spite of these positives, we do know that we can grow calves on milk at a faster rate when we use higher protein levels and greater powder intakes.

Accelerated Growth Feeding of Dairy Calves

Accelerated growth feeding programs tend to have two common features: 1) the milk replacer is higher in protein (24% to 30%) and generally lower in fat (15-20%), and 2) powder feeding rates are much higher than the typical 1 to 1.25 pounds of powder per head per day. The higher protein content coupled with a higher feeding rate has been shown to increase lean tissue growth in the calf. Raisers that try feeding more of a typical 20-20 milk replacer or whole milk will find that calves may initially grow more but the tissue is not muscle or skeletal growth, and will quickly lose this body weight gain later in life. This response is due to the imbalance between the protein and energy supplied versus what is required for lean tissue growth. Therefore, it is essential that accelerated programs utilize a higher CP milk replacer along with a higher feeding rate.

The advantages of accelerated programs are numerous, and include better early growth and potentially greater 1st lactation milk production. Challenges to be aware of with the accelerated growth feeding programs are:

1. Higher milk feeding rates will increase daily gain but reduce starter intake.
2. Reduced starter intake can delay weaning age.
3. Poor starter intake at weaning can cause calves to stall or lose weight in the transition pen.
4. Out of pocket expense is much greater with these programs.

Key issues that many producers are noticing with accelerated growth programs are:

1. Calf stools will be looser on these programs: This does not mean they are scouring or sick, there is just more fluid and protein being fed and the manure is not as firm. There will also be a need for extra bedding with these calves.
2. Free choice water is very important: Water will help stimulate starter intake and also help dilute solids in the milk solution if it is more concentrated than normal.
3. Weaning age must be closely managed: It can be argued that starter intake should be higher prior to weaning for accelerated growth calves (consistently consuming 3-4 lbs/d of calf starter) than for calves raised in a traditional program (consistently consuming 2 lbs/d of calf starter). Accelerated growth calves will likely be heavier and taller; therefore, they will have higher maintenance requirements and require more calf starter consumption to maintain their body weight. Going to once daily milk feeding for a period of time (at least 7 days) prior to weaning is especially important for accelerated growth programs due to the lower calf starter intake while on full liquid feed.
4. Transition pen management: Calves on these programs develop their rumens later in life than on traditional programs. Because of this, calves can go backwards after weaning if starter consumption is not adequate. Adequate calf starter intake is essential prior to grouping. Hay should not be introduced until 12 weeks of age to further help with rumen development postweaning.
5. Expenses: Make sure these programs are producing positive results as much as 3 to 4 months post weaning. Focus on return on investment.
6. Disease: These programs do not cause greater disease in calves, but if there are subclinical or clinical issues present on the farm, they may become more obvious if they are not controlled before going on an accelerated growth program. Issues such as biosecurity, maternity pen and colostrum management are really important. On the other hand, accelerated growth programs provide greater nutrition in early life, which can provide greater protection against cold weather stress.
7. Overall system management: Accelerated growth programs are usually fed in phases. This means that calves in week 1, week 2-6, and week 7 are fed differently than the other calves. Management must have systems in place to make sure these feeding phases are consistently executed.

Moderate Growth Feeding of Calves

Due to the number of concerns related to accelerated growth programs noted above, a moderate approach to increasing daily gains in calves has recently emerged. These milk replacers provide 24-28% protein and 15-18% fat, but call for moderate feeding rates (1.5-2 lbs. per calf per day) to minimize the concerns discussed above. The slightly lower feeding rate of these products should not reduce starter intake as much or at all compared with the more intense programs.

A recent study compared a 20-20 milk replacer fed at 1.25 lbs powder per calf per day (12.5% solids solution) with a 28-16 milk replacer fed at 1.50 lbs powder per calf per day (16.7% solids solution; Raeth-Knight et al., 2009). In this study, calves fed the 28-16 at a moderate rate had a 7 lb body weight advantage over the traditionally-fed calves as early as 14 days of age, and a 10 lb body weight advantage at 56 days of age. The moderate growth calves consumed the same amount of calf starter as the traditionally-fed calves. This study supports the use of moderate growth programs for increasing early growth while minimizing or eliminating the starter intake and weaning transition problems discussed earlier.

Overall Considerations on Calf Growth

The decision on milk replacers for many years has been based on mixing, consistency, service, and price. These factors continue to be important, but now calf performance and health should be part of the decision on which product to purchase and which feeding program to use. Consult with your knowledgeable service person to decide if a traditional, moderate, or accelerated growth program is best for your operation.

References

Raeth-Knight, M., et al. 2009. Impact of conventional or intensive milk replacer programs on Holstein heifer performance through six months of age and during first lactation. J. Dairy Sci. 92:799-809.