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Calf Note #85 – Accelerated feeding #2 – limitations of current programs

Introduction. "New" strategies for feeding young dairy calves have been evaluated for a long time. New and "better" way for feeding calves seem to appear regularly. New equipment, feeds, programs (e.g., early weaning, later weaning, etc.), treatments (e.g., probiotics, acidification) and many other approaches. But most people still feed a fixed amount of solids (in the U.S. most commonly 1 lb. or 454 grams) of solids per day for a fixed amount of time (most typically about 56 days).

The current feeding program – 1 lb. of milk replacer solids – was developed assuming that calves would be weaned at an early age. Indeed, a significant body of work, developed primarily in the U.S. and Europe since the 1940's showed that when calves are fed and managed properly, they are prepared to be weaned as early as 28 days (some studies have reported even earlier weaning). Of course, if calves can be weaned early from milk or milk replacer, the cost of raising the calf is reduced if the cost of milk or milk replacer is greater than the intake of calf starter.

Why can't we wean calves at 28 days? Here are some ideas:

- Managing calves in groups. When calves are managed in groups – in many cases, groups can be as large as 100 calves per group – there is a tendency to wean the group of calves when the slowest calf is ready. Sort of "the lowest common denominator" theory, as was described in Calf Note #84. In this case, calves may indeed be ready for weaning, but aren't weaned. This isn't so much our inability to prepare calves to wean, but more it is our ability to monitor and execute early weaning.

- Management of starter. Although we usually wean calves at a certain age, calves are actually ready to be weaned at a certain amount of feed intake. If calves have not consumed the required amount of fermentable carbohydrate by weaning age, then they will not be prepared physically and you'll have problems. So, intake of starter is a real key. Unfortunately, starter is often not managed properly. Here are some problems that I've experienced
  - Calves are not offered starter until 4 weeks of age (hard to wean a calf that hasn't even been offered starter!)
  - Starter is fed in the "all in all out" method. By this I mean that baby calves are offered a bucket full of starter (in some cases more than 5 lbs. or 2 kg) and the starter is not replaced until the starter has been eaten completely. Of course, this starter can get wet, moldy, eaten by flies, etc., which will dramatically reduce intake. I have seen this practice on many farms – with serious consequences on calf health.
  - Starter is poor quality with lots of fines. Low quality starters will slow the rate of intake, which slows rumen development.
  - Dirty buckets. Starter buckets may be the "black hole" on the dairy farm. If they are cleaned, it is only between calves – never when the same calf is using it. Common soiling of the bucket by feces, urine, flies, spoiled feed, etc. is often uncleaned. It is no big surprise

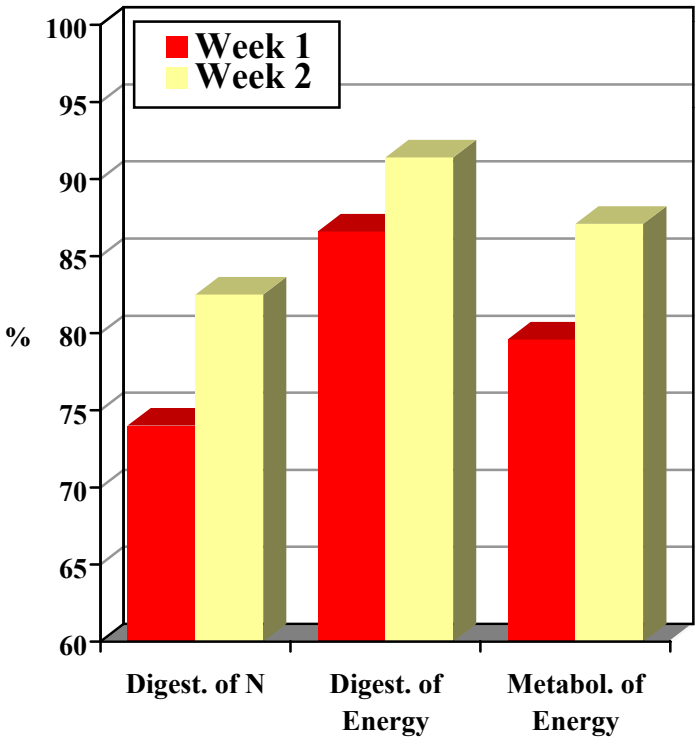
when a calf won't eat starter from a dirty bucket.

- Quality of starter ingredients. Selection of ingredients that are palatable to calves and putting them into the correct form is essential. Unpalatable ingredients, especially large amounts of chemical compounds (e.g., buffers), animal proteins (particularly those that may be burned) may reduce the aggressiveness of calves for calf starter. In addition, variability of ingredients of the presence of toxins, highly processed ingredients that change in composition (e.g., distiller's grains that are heated to variable rates) can cause changes in acceptance by calves. There's not a lot of good research data that indicates that changes in ingredient processing (i.e., variability between lots of ingredients) can affect intake in calves, but it certainly follows from similar effects in diets of cows that calves would also be sensitive to changes in ingredient composition.

  For example, molasses is commonly used as a palatability ingredient for calf starters. However, not all molasses products are alike. Some are derived from sugar beets, other products from sugar cane. Within ingredient sources (beet or cane), molasses can have very different characteristics. Changes in these characteristics can influence the acceptability of the product. It is important to be careful in selecting both the source and the consistency of feed ingredients for calves.

- Management of water. Calves need water – and when water is not available, intake of starter is impaired. As a general rule of thumb, calves should <u>always</u> have water available. Always. Aggressive, early intake of calf starter can only be achieved if water available. And water must be managed. It should be changed regularly and buckets must be cleaned frequently. If nipples and water lines are used (they are an excellent idea!), the nipples must be kept in good working order. Using nipples can be very effective, but it is more difficult to determine if the nipples are working. They must be checked daily to make sure they still deliver water to the calf on demand. Water lines must be cleaned regularly to eliminate the growth of bacteria, and water lines need enough water flow to eliminate bacterial buildup.

- Environmental stress. Calves that have to fight the environment to stay alive are unlikely candidates for early weaning. Much of their nutrient intake is directed towards survival, not growth. Increasing evidence exists that suggests that when an animal gets sick, its entire metabolism is shifted away from growth and towards supporting the immune response. One of these responses appears to be anorexia (a lack of appetite), so the animal is not willing to consume feed (either milk or starter) when it is sick or is exposed to chronic stress. There are many potential environmental



stressors that can affect the onset of intake by young calves – housing quality (especially when it affects their ability to stay within their thermal comfort zone), ventilation quality, presence of mud, temperature, exposure to drafts, contact with large groups of calves (especially if these calves may harbor pathogens), and many others. When a calf's environment promotes stress, the calf is more likely to get sick and less likely to be ready to wean at 28 days of age.

Another environmental stressor is transportation. Moving calves from one location to another is inherently stressful for calves. This is more of a problem is the transportation occurs at an early age, involves many hours and limits availability to feed and water. In our experience at the APC Calf Research Facility, we often find that the shipment of calves, rather than IgG status of the calf *per se*, has a tremendous effect on performance. Some groups arrive in good shape and do quite well. Other groups come off the truck in trouble and they stay in trouble for several weeks. We can often tell by looking at the calves as they arrive whether the group will be a "problem group" or not.

- Ability of calves to digest nutrients. Calves have a limited ability to digest nutrients in the first weeks of life. This ability improves (i.e., digestibility of nutrients increases) as the calf gets older. A report by Arieli et al. (see Figure) indicated the ability of calves to digest nitrogen and energy (digestibility of N and Energy, respectively) as well as the ability of the calves to utilize energy for productive functions (metabolizability of energy) are higher in the second week of life compared to the first week of life. Other researchers have reported similar findings in newborn calves. Therefore, it is very likely that calves will have a limited ability to digest nutrients (including those from dry feed) in the first week or two of life. In addition, there are significant changes that occur in the calf's ability to utilize the end-products of microbial fermentation in the rumen. All of these metabolic changes must occur quickly if the calf is to be weaned at 28 days of age. However, it can be done. But any delay in the onset of calf starter intake will slow the rate of change, making the calf's transition from monogastric to ruminant more difficult and extending the age at weaning.

- Colostrum status and disease. A critical, yet often overlooked component of rumen development and preparation for weaning is the colostrum status of the calf. Consumption of colostrum provides some very important factors that affect the calf's preparation for weaning at 28 days:
  - IgG and immune components. These colostrum components provide the passive immunity that protect calves from disease-causing pathogens and allow the calf to begin eating starter at an early age. It is important to remember that <u>when calves are sick, they are much less likely to have an appetite to consume calf starter.</u> When poor colostrum management practices affect the calf's initiation of calf starter intake, this will delay weaning.
  - Growth factors. Colostrum is a rich sources of growth factors and hormones that affect the metabolism of the newborn calf. Some of these components influence the calf's digestive system, which allows the calf to be better prepared for later starter intake. Researchers in Switzerland (Kühne et al., 2000) have reported that calves fed colostrum are better able to digest nutrients after birth than calves fed only milk replacer.
  - Nutrients in colostrum initiate the development of the digestive tract, which can start the calf "on the right foot". Some nutrients (e.g., vitamin E) may also help support the immune response, which can help keep the calf healthy.

There is little doubt that calves CAN be weaned at 28 days. However, it takes excellent management, attention to detail and a management scheme that deals with calves as individuals. There is a significant managerial investment that is required to be able to wean calves early. However, there is certainly a pay-back in lower costs and higher returns.

References:

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