All aspects of a negative DCAD diet must be consistent

Tim Brown for *Progressive Dairy*

Eliminate or reduce the inconsistencies you can in negative DCAD diets for transition cow success.

Often, when I visit a farm to troubleshoot an incident of poor transition cow performance, I hear the comment, "Things had been going so well until now. What might have changed with my anionic supplement?" While using a consistent anionic supplement is one critical component for success with a negative dietary cation-anion difference (DCAD) diet, all too often the problems I observe with farms experiencing issues with transition cow health are stemming from other sources – inconsistencies hidden within other ingredients or management practices.

Yes, it is important to verify the quality and consistency of your anionic supplement. As a manufactured feed ingredient, the manufacturer should be able to provide documentation to verify the chemical and physical consistency of the product. But once you are satisfied your anionic supplement has the same composition batch after batch, you can focus on finding what else might have caused the clinical or subclinical hypocalcemia you've noticed.

A variety of factors may be the culprit. When diagnosing the cause of a falter in transition cow performance, consider the following variables that could be sabotaging success with hidden inconsistencies:

Has your forage source recently changed?

A change in forage can quickly alter the total DCAD of the diet and therefore change the results of the program. Any change in forage, such as a new hay crop, forage from a different field or a different bunker or bag of silage can quickly alter your total DCAD equation.

For example, let's say your close-up ration includes 25 pounds per cow of corn silage, and DCAD calculates to be -10.0 milliequivalent (meq) per 100 grams diet dry matter when the potassium content of the silage is 1.22%. It would not be unrealistic for urine pH to average around 6.5 at this DCAD level. But then you hit a spot in the silage bag where the potassium content is 1.5%. That change alone is enough to raise DCAD to around -7.5 meq per 100 grams. The slightly less negative DCAD could realistically result in a slight rise in urine pH, say to something between 6.5 and 7.0.

With the moderate DCAD numbers I am using here, that unrecognized change likely wouldn't cause noticeable issues. But if your initial intended DCAD was closer to neutrality, and initial urine pH was already above 7, that upward DCAD drift could produce a few symptoms of hypocalcemia. Looking at it from the perspective of a change that lowers DCAD, suppose the diet contained about 6 pounds of grass hay. If you

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switched sources from hay with 2.1% potassium to hay with 1.4% potassium, you would drop DCAD from -10.0 to -13.8 meq per 100 grams. As in the example above, with urine pH initially 6.5, this decreased DCAD could realistically lower urine pH to something closer to 6.0.

Again, with this example of a relatively conservative initial DCAD and degree of metabolic acidification, this unrecognized additional acidification of the cows likely wouldn't cause a wreck. But suppose your initial DCAD level was more aggressive, say something that was already yielding urine pH at 6 or below. Then, the additional unrecognized acidification could easily start a series of those "unexplainable" problems that stem from uncompensated metabolic acidosis (over-acidified cows). Resulting urine pH readings below 6.0 would not be well correlated with the magnitude of additional metabolic acidification because once urine pH drops below about 6.3, it is no longer a reasonable reflection of the metabolic status of the cow.

Are you using highly variable ingredients?

Using ingredients known to have a smaller natural range of mineral content (primarily potassium) is one way to deliver greater DCAD consistency. There is simply less potential for large differences in potassium content of forage species that have less potential for accumulating potassium. Let's do some comparisons, starting with alfalfa as one example. Depending on soil type, fertilization, etc., potassium content may easily vary from 2% to over 4%. This large range creates great opportunities for unexpectedly affecting diet DCAD if much alfalfa is used in the pre-fresh diet. That's why alfalfa isn't usually recommended for close-up diets, but if you have nothing else to use, that's what you use.

Another example is cool-season grasses, many of which can accrue potassium as "luxury consumption" when potassium is available in the soil (from potash or manure fertilization). The range and actual content of potassium in these grasses can be even greater than for alfalfa. But if that's all you have to use, that's what you use. On the other hand, warm-season grasses (such as native prairie hay) and corn silage would generally contain much less potassium, typically between 0.9% to 1.4%. Thus, the absolute range in possible potassium content is smaller, too. Even when fed at fairly high inclusion rates in the pre-fresh diet, the smaller range in potassium content of these lower-potassium forages doesn't allow as much opportunity for unexpected impact on a DCAD diet.

Are your mixing practices impacting the ration?

Without consistent mixing practices, the ration that ends up being presented to and consumed by each cow may be quite different from what you intended each cow to eat. We know poor mixing of the TMR can negatively affect lactating cow performance, but such effects are often hard to recognize or quantify. But when it comes to the close-up cows and negative DCAD diets, poor feed mixing is sometimes all it takes to prompt that call to the nutritionist to ask, "What's going on?"

All considerations for good mixing of the lactating cow TMR apply to the close-up TMR too. Sufficient batch size for the capacity of mixer, attention to how and where each ingredient is placed into the mixer, adequate mixing time, enough moisture to stick things together and accurate weighing of ingredients are some obvious considerations. And when you consider that many close-up diets today have lots of "rough" and rather unpalatable forages, such as wheat straw, processing those forages to an acceptable particle size becomes a huge consideration, not only for thorough mixing but also to help prevent selection and sorting by the cows after feed is delivered. Besides the obvious impact feed sorting would have on the DCAD level of what each cow eats, research recently demonstrated that chop length of wheat straw in prepartum diets affects feed intake as well as health and rumen stability in early lactation.

Is the pre-fresh pen overcrowded?

Despite our best efforts to

thoroughly blend all ingredients and eliminate opportunities for sorting by the cows, the first cows to gain access to the TMR will still get more of the good stuff – the corn silage, the grain components, the anionic supplement. In an overcrowded pen, cows that have later access to the feed will get less of the good stuff and more of the coarser ingredients. Thus, the DCAD of what is in front of the earlier eaters is surely different from the DCAD of what's left for the timid cows. Additionally, overcrowding leads to reduced intake by the later group. And since the degree of metabolic acidification of the cow is a function of the net intake of anions relative to cations (diet DCAD multiplied times the amount of dry matter intake), those that eat less don't get acidified as much as those that eat more.

Are you using traditional anionic salts?

Traditional anionic salts were used in diets to develop and prove some of the earliest concepts of negative DCAD nutrition. If used straight from the bag on the farm, they can be quite a bit cheaper than a newer-generation commercial anionic supplement. But the challenges to success in doing it this way are a whole different conversation.

One step up from "straight out of the bag" is for a feed mill to blend traditional salts with some grain ingredients to make an anionic grain supplement. But the cost savings for such a traditional salt blend may no longer be so great compared to a commercial supplement made with more specialized and unique manufacturing techniques. But, in either case, traditional anionic salts and their blends have long been recognized as a factor setting the stage for a higher rate of DCAD failure.

Whether that DCAD failure resulted from the difficulty in obtaining and maintaining a uniform distribution of the salts in either a premix or the TMR, or from poorer palatability due to concentrated spots of salt in the feed or larger particle size of traditional salts, the increased rate of DCAD failure with traditional salts is what led to development of more uniform, more consistent and more dependable commercial anionic supplements. One of the easiest ways to remove one more variable during the challenging transition period is to simply switch from traditional anionic salts to a trusted commercial product with verifiable consistency.

Differences in particle size and mass density are what cause separation of various dry feed components during mixing and delivery. A commercial anionic supplement with an average particle size and a particle size distribution like that of common close-up feed ingredients (ground corn, soybean meal, DDGS, canola, etc.) contributes stability to the distribution of anions in both a pre-mix supplement and in the ration. Verify the consistency of the chemical and the physical characteristics of your anionic supplement by asking the manufacturer for test data and quality assurance protocols.

Consistency in all aspects of transition cow management is key for success. Eliminate or reduce the inconsistencies that you can. Manage the rest as best you can. Make it a short list of remaining possible reasons for unexpected DCAD failure and focus on those suspects if problems should arise.

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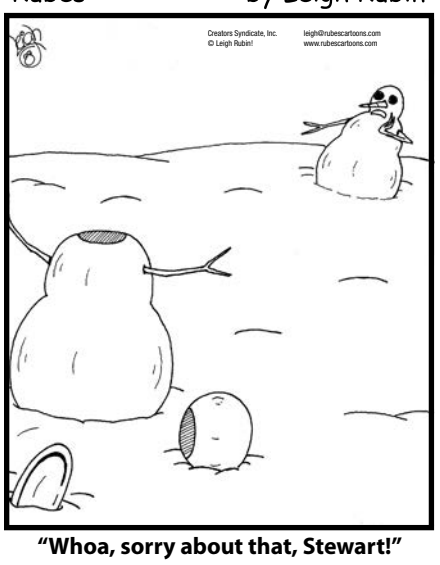

"Whoa, sorry about that, Stewart!"