While treating a cow with IV calcium has become a rarer occurrence on many farms these days, hypocalcemia is still a big deal, says Jesse Goff, veterinarian and professor emeritus, Iowa State University. When 50% of multiparous cows develop subclinical hypocalcemia and nearly 3% of multiparous cows require treatment for milk fever, that’s a big deal, and it impacts your bottom line.

The day before calving a cow needs about 18 grams of dietary calcium for maintenance and fetal development. On the day of calving a cow needs about 50 grams of dietary calcium. That’s an additional 32 grams of calcium needed to produce colostrum and avoid hypocalcemia. The cows’ endocrine system, based on parathyroid hormone (PTH), signals the body to restore calcium homeostasis. As a result, the kidneys stop excreting calcium in the urine, vitamin D is converted into a hormone that enhances diet calcium absorption and bones release calcium into the bloodstream.

In cows fed an alkaline diet, blood and urine pH is elevated (urine pH > 7.75), which means bone and kidney tissues are less responsive to PTH, and many cows fail to mobilize the additional 32 grams of calcium needed and develop hypocalcemia.

But when cows are fed an acidogenic diet, the cows move into a state of mild metabolic acidosis which increases tissue responsiveness to PTH signals. That’s why acidified cows can pull more calcium immediately from their bones compared to non-acidified cows. They also begin absorbing dietary calcium faster. Properly acidified cows generally mobilize the required calcium to meet the 32 gram increase in demand imposed by colostrum and milk production the day after calving. In cows fed an alkaline diet, blood and urine pH is elevated (urine pH > 7.75), which means bone and kidney tissues are less responsive to PTH, and many cows fail to mobilize the additional 32 grams of calcium needed and develop hypocalcemia.

With a group average for urine pH of 6.2 to 6.3 all cows are in a state of compensated metabolic acidosis. If you aim for a lower group average for urine pH, 5.5 to 6.0, some cows will become over acidified. These cows reduce intake because eating less of an extremely acidified diet is the only way cows can avoid developing life threatening acidosis. From all of the research and on-farm experience so far, “I can’t see any benefit to push cows’ urine pH below 6.0,” stresses Goff. “I don’t want to run the risk of over acidifying the cows and have them stop eating.”

During the transition period keeping cows eating and maximizing DMI is so important. Feeding an anionic product instead of traditional anionic salts also helps increase DMI. The palatability and consistency of anionic products, such as SoyChlor which utilizes chloride as anion source rather than sulfate, boosts prepartum cows’ DMI by 2.5 to 3 lbs/day over traditional anionic salts.

CALCIUM AND MAGNESIUM

The amount of dietary calcium fed also impacts urine pH. Calcium is a cation and therefore alkaline. So, if you feed anions to produce a mild metabolic acidosis and feed high levels of dietary calcium in the form of limestone, greater than 1% of diet DM, that extra calcium works against the anions. When aiming for a target urine pH of 6.0 or less, feeding high levels of dietary calcium may rescue cows from over acidification. However, it also means you are paying more to feed extra calcium that your cows don’t need and paying more to feed additional anions to reach your desired urine pH, says Goff. That is not his preferred strategy. Current research recommends a range for dietary calcium between 0.7 and 1.3% of diet DM. In diets Goff formulates he prefers to keep calcium in the lower end of that range with a group urine pH of 6.2 to 6.3.

Magnesium is another important aspect of hypocalcemia prevention. Inadequate magnesium in the prepartum diet impedes calcium mobilization from the bone. In the transition diet very soluble sources of magnesium, such
YOU CAN PREVENT MINERAL DISORDERS IN TRANSITION COWS

as magnesium chloride or magnesium sulfate, should be fed at 0.3% of diet dry matter (0.4% if MgO is primary Mg source). After calving, when cows are switched to the lactating diet, a cheaper and less soluble magnesium like magnesium oxide is often fed. After the switch it can take cows 7 to 10 days to get their magnesium levels back up to normal. Hypomagnesemia can decrease DMI and lead to secondary milk fevers during lactation. If feeding magnesium oxide look for one that is finely ground with small particles that can be quickly absorbed by the cow.

Another key point is your dry cow pen. If you have the ability to separate multiparous cows and first-calf heifers during the close-up period, do so. First-calf heifers don’t benefit from negative DCAD diets like multiparous cows do, and they actually lose a little bit of milk production that first lactation if fed anions. The compromise in a mixed pen, Goff says, is to not push urine pH so low. Instead feed for the upper end of the optimal range for urine pH. This still provides the health and production benefits to multiparous cows but can minimize the negative impact on heifers.

PREVENTION PAYS

“It still surprises me when I visit a farm that has no control measures in place to prevent hypocalcemia,” says Goff. “They IV cows for milk fever, but none of the proven control measures to prevent hypocalcemia are in place—feeding a negative DCAD diet, space for all cows to eat at once, good cow comfort and cow management.”

When you have a good transition cow management program that includes a negative DCAD diet it is money well spent. The payback is easily 3:1, says Goff. By using production data from the Santos et al. (2019) meta-analysis and rounding for easy math, a milk production increase of 3 lbs/day for multiparous cows yields an additional 900 lbs of milk per cow for a 305-day lactation. At $17/hundredweight that’s about $153 in extra milk income from feeding a negative DCAD diet. You could spend $50 per cow on prevention and still have a 3:1 return. Anionic products, such as SoyChlor, cost about $15 to $20 per cow. Even if you give multiparous cows a couple of calcium bolus after calving at $6 each that’s an additional $12 per cow. Total spent on prevention is $32. That’s a profit of $121 per multiparous cow. Add in the value of improved cow health including fewer milk fevers, fewer retained placenta and displaced abomasum and it makes feeding a negative DCAD diet to prepartum cows a home run.

HAPPENINGS

SoyPlus Plays Role in Sustainable Agriculture

As we lean into the future of agriculture, sustainability will continue to be a pillar at Landus. As sustainability in agriculture becomes more defined, it brings us back to the start of launching SoyPlus. By feeding a product that reduces overall protein consumption by the cow, SoyPlus can be thought of as the original sustainable ingredient for dairy rations. Manufactured with locally sourced beans using a 100% natural, chemical free process, we are able to provide a product that is good for your cows and our environment. Stay on the lookout as we unveil our next steps on sustainability for SoyPlus!
Decades of research has identified how much of individual nutrients prepartum cows need and how best to formulate and deliver that diet during the last few weeks of gestation, but the optimal number of days to feed prepartum diets has not been clearly defined. Nor do we know if the number of days spent in the prepartum group should be the same or different for nulliparous (having their first calf) and multiparous cows. New research from the University of Florida provides some answers.

The observational and epidemiological study tracked performance of 18,657 cows on 2 California dairies over multiple years. Cows with a gestation length shorter than 256 days, longer than 296 days or those that spent 0 days in the prepartum group were excluded. That left 18,021 cow records to analyze for prepartum group was observed. These data suggest that there is an optimal number of days that cows should spend in the prepartum group.

Both farms grouped nulliparous and multiparous cows separately during the prepartum and lactation periods. All cows received a similar prepartum diet. The one difference was that multiparous cows were fed an acidogenic product prepartum and lactation periods. All cows received a similar prepartum diet.

MILK YIELD
Increasing the days spent in the prepartum group from 7 to 28 increased daily milk yield by 3.3 lbs/day for nulliparous cows and by 7.7 lbs/day for multiparous cows. However, when days in the prepartum group increased from 28 to 42, milk yield decreased. The plateau for daily milk yield was reached when nulliparous and multiparous cows spent 24 and 25 days in the prepartum group, respectively.

In terms of total milk yield for the 300-day observation period, increasing days in the prepartum group from 7 to 28 increased total milk yield by 736 lbs for nulliparous cows and by 2,321 lbs for multiparous cows. Total milk yield reached a plateau when nulliparous and multiparous cows spent 21 and 24 days in the prepartum group, respectively.

HEALTH EVENTS
Interactions between days in the prepartum group and parity/diet were observed for retained placenta, metritis, lameness and morbidity. Incidence rates varied with the number of days spent in the prepartum group. For retained placenta, the smallest incidence was observed when cows spent 27 days in the prepartum group. For metritis, the smallest incidence for nulliparous and multiparous cows occurred with 9 and 26 days spent in the prepartum group, respectively. The smallest incidence of lameness in nulliparous and multiparous cows occurred with 9 and 25 days spent in the prepartum group, respectively. Morbidity during the first 90 days in milk was smallest in nulliparous cows with 9 days in the prepartum group compared to 23 days for multiparous cows.

Days in the prepartum group also impacted reproduction. At 300 DIM, the proportion of pregnant cows was greatest when the days spent in the prepartum group was 19. And in terms of survival, culling decreased as days in the prepartum group increased until reaching a nadir at 20 days for both groups.

For most of the responses evaluated, a quadratic association with days in the prepartum group was observed. These data suggest that there is an optimal number of days cows should spend in the prepartum group that is somewhere between 21 and 28 days. Any greater, or fewer days in the prepartum group might have detrimental impacts on postpartum performance.

Soybean harvest is underway in Iowa! With each harvest comes a different bean crop, and this year’s crop yields look good. But rest assured, your Landus Animal Nutrition team is on the job continuously analyzing current crop conditions and making adjustments accordingly, to ensure that the SoyPlus you rely on for results remains the same, load after load, rail car after rail car. Our team reviews the moisture content of beans, sourced locally from Iowa fields and hitting our production lines, in real time to ensure consistency in each and every shipment. Regardless of the composition of the incoming bean, the product leaving our facility will always provide top results for your operation.