Optimal negative DCAD targets in dairy prepartum rations

by Ruby Wu, PhD, Technical Services Manager, Arm & Hammer Animal and Food Production

Negative dietary cation anion difference (DCAD) in prepartum dairy diets mobilises calcium transfer from bone to bloodstream, ultimately reducing risks associated with milk fever and other post-fresh disorders. Recent research confirms optimal dietary calcium levels, as well as targeted urine pH values and DCAD concentrations. Here are the latest findings:

• Dietary calcium does not need to be elevated and can be as low as 0.4% of total dry matter (although ARM & HAMMER™ recommends a minimum of 0.5% to account for ingredient variation).

• Urine pH does not have to be less than 6.0, either for desired outcomes of postpartum productivity and disease reduction or for blood calcium levels that minimise the risk of hypocalcaemia.

• Choosing calcium carbonate to increase dietary calcium (or magnesium carbonate to increase dietary magnesium) could result in adding more anions than needed as the carbonate can buffer the urine.

Research published in the August Journal of Dairy Science shows that cows fed positive DCAD prepartum had higher adverse health score and somatic cell count, compared with cows fed negative DCAD. Positive DCAD also led to lower blood calcium, indicating hypocalcaemia.

Additionally, two separate presentations at the 2020 American Dairy Science Association conference arrived at similar conclusions. One indicated no difference in feed intake or metabolic acid-base status among dietary calcium carbonate at 0.2%, 1.2% and 1.8%, while the other concluded the target urine pH should be between 6.0 and 7.0.

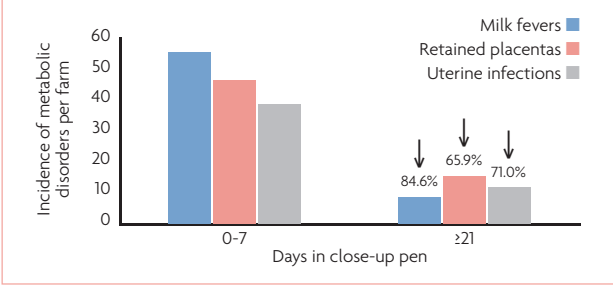
These findings sync with ARM & HAMMER recommendations to feed dietary DCAD concentration between -8 to -12mEq/100g, while targeting urine pH between 6.0 and 6.8 and dietary calcium at 0.5 to 0.6% of dry matter.

Feeding BIO-CHLOR™ helps producers achieve these goals, delivering negative DCAD and metabolisable protein in a single formula. In a study conducted by ARM & HAMMER, cows fed BIO-CHLOR for 21 days prepartum experienced fewer cases of milk fever, retained placenta and uterine infections.

CONCLUSION

Attention to proper DCAD balance prepartum puts fresh cows in the best possible position to succeed. Keep in mind that higher calcium levels are not conducive to dairy cow health and performance. Increased calcium carbonate in diets requires more anionic supplementation to achieve the desired range of urinary pH.

Fig. 1. BIO-CHLOR health benefits (based on observations of 13,000 cows).



References for all research cited available on request

First published in International Dairy Topics volume 19..6