NUTRITION NOTES
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SUBCLINICAL HYPOCALCEMIA

The incidence of milk fever (clinical hypocalcemia) has dropped significantly on dairy farms over the last two decades. However, in many herds subclinical hypocalcemia continues unnoticed and may affect as many as 60% of all cows and 80% of third and greater lactation animals. It is defined as low blood calcium levels without the symptoms of clinical milk fever. Since it is often undetected, the economic losses resulting from subclinical hypocalcemia far exceed those from milk fever. The losses due to milk fever are estimated to be about $345 per case (Guard, 1996) and subclinical $125 per case.

However, despite the lower cost per incidence, since there are far more cases of subclinical hypocalcemia, total dollars lost have been estimated to be nearly four times greater (Oetzel, 2011). These losses result from reduced dry matter intake (DM), lowered milk production, displaced abomasum (DA), delayed reproduction, impaired immune function, ketosis, metritis, and fatty liver.

It is normal for blood calcium concentrations to decline after calving, reaching its lowest levels 12 to 24 hours following calving. A moderate decline is expected due to the sudden demand for calcium in colostrum and milk. In cows with clinical milk fever, levels fall such that muscle and nerve function are depressed to the point where skeletal muscle control is lost causing cows to become unable to stand. At subclinical levels, muscle control may be maintained, but gastro-intestinal motility may still be depressed, reducing DM intake. The level below which cows are considered to be suffering from subclinical hypocalcemia is now identified as 8.5 mg/dL. Many dairymen and veterinarians are now blood testing to monitor the success of dry cow feeding programs. It appears that the optimal time to test is the second day of lactation.

The best approach to this problem is to prevent it by applying proven nutritional strategies to the pre-fresh diets. The first goal should be to limit the intake of potassium during the close-up period, three weeks just prior to freshening. This will begin to lower the dietary cation-anion difference (DCAD). However, most often reducing potassium alone is not enough. It is necessary to add an anionic salt such as Animate®, Bio-Chlor®, or SoyChlor®. These supply chloride or a combination of chloride, magnesium, and sulfur which quickly drop the DCAD. Studies indicate that to prevent subclinical hypocalcemia it is best to reduce DCAD to -15 mEq/100 g DM (Moore et al., 2000). These are considered to be “fully acidified” diets as compared to those in the –5 to +5 mEq/100 g DM range which are partially acidified. Blood calcium levels of many of the partially acidified diets have been found to be in the subclinical range. DCAD has not been lowered enough. Fully acidified diets have been found to increase bone calcium resorption and increased intestinal calcium uptake (Horst et al., 1994). An additional test that can be run on cows fed acidified diets is to test urine pH. The goal is to lower the pH to between 6.0 and 6.3 for Holsteins and between 5.8 and 6.2 for Jerseys. Urine samples should be collected mid-stream and not from first urine. With fully acidified anionic diets, it is also important to adjust the pre-fresh diet’s macro minerals to:

- Calcium: 165-190 grams/day
- Magnesium: 50-60 grams/day
- Sulfur: 50-55 grams/day

Since DCAD is dependent on chloride, it is recommended that chloride in forages also be tested. Tested values often differ significantly from the feeding program’s database values.

Subclinical hypocalcemia is an often unrecognized health problem. By testing urine pH and monitoring blood calcium, it is possible to unmask this profit leak. Once identified, it is possible by carefully regulating the DCAD and macro-mineral content of close-up diets to get fresh cows off to a better start. These cows will have fewer metabolic and other health issues and achieve and maintain higher levels of milk production.

continued

References:

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