

## Vitamin and Mineral Focus: Potassium

Potassium is the third most abundant mineral in the bovine body and has the highest requirement of all mineral element cations. Potassium is involved in a wide array of physiological processes including: osmotic pressure and acid-base regulation, water balance, nerve impulse transmission, muscle contraction, as an activator or co-factor in many enzymatic reactions, carbohydrate metabolism, and many more (NRC, 2001). One important thing to consider is that cows don't have large potassium stores so potassium must come from the diet, on a daily basis. According to the NRC, the requirement for potassium in the lactating diet is 1.2% on a DM basis, but several researchers have recommended that early lactation cows should be receiving at minimum 1.7% on a DM basis. This is because early lactation cows typically have lower intake, and because cows rely on intake to meet their potassium needs, they may run the risk of falling short if they aren't consuming sufficient amounts of feed. On the other hand, it is particularly important that potassium levels don't get too high in the dry cow diet. The role of potassium in the dry cow diet is most commonly discussed in terms of dietary cation anion difference (DCAD). The role of DCAD in dry cow diets is widely discussed and encompasses how sodium, potassium, chloride, and sulfur interact with one another and how metabolic alkalosis is affected based on varying levels of those cations and anions in the diet. Simply put, potassium is a positive cation that raises the DCAD level. Typically, we want DCAD levels to be positive for lactation diets (i.e. more positive cations are favorable), and we want DCAD levels to be negative for dry cow diets (i.e. less positive cations). It is widely accepted that high potassium dry cow diets increase the cow's risk of experiencing milk fever, and this is because of the role potassium plays with magnesium and calcium. As discussed in last month's issue, magnesium is involved in regulating parathyroid hormone function which is directly involved in calcium homeostasis. Potassium can interfere with magnesium absorption which ultimately results in impaired calcium homeostasis and increased milk fever incidence rates. One of the best things you can do to reduce the risk of milk fever is to feed low potassium dry cow diets so that magnesium absorption is not interfered with. If you are experiencing high milk fever rates it may be worth while to discuss potassium levels with your nutritionist.