DIETARY POTASSIUM DOES NOT NEGATIVELY AFFECT BLOOD CALCIUM IN PERIPARTURIENT COWS FED PASTURE

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The importance of optimising the balance of sodium, potassium, chlorine and sulphur (Dietary Cation Anion Difference; DCAD) in the diet of the dairy cow pre-calving is well recognised in total mixed ration feeding systems (Block, 1984). Goff and Horst (1997) found that dietary potassium is more important than dietary calcium in the prevention of parturient hypocalcaemia and claimed that previous work investigating the benefits of low calcium pre-calving diets may have been confounded by different potassium concentrations also. Pastures often contain in excess of 35g K/kg DM and hence should be a major antagonist to calcium homeostasis. However, reducing the DCAD in pasture-based systems, through increased chlorine and sulphur concentration in the diet, did not increase plasma calcium pre- or post-calving (Roche, 1999). It was therefore hypothesised that a reduction in dietary potassium may increase plasma calcium concentration around calving.

Sixty-four grazing cows were randomly allocated to four groups of sixteen and offered pasture containing different concentrations of potassium. Mean pasture potassium concentrations were 35.2, 37.6, 41.2 and 42.2 g K /kg DM for K1, K2, K3 and K4 treatments, respectively. As K concentration in pasture increased, the dietary cation-anion difference decreased linearly ($P = 0.06$) in association with a decreased Na concentration ($P < 0.001$) and an increased Cl concentration ($P < 0.001$). This increasing Cl concentration supports the findings of Roche et al. (2000). Pasture Ca concentration declined linearly ($P < 0.05$) as K concentration in pasture increased but Mg concentration was unaffected.

Plasma Ca concentrations at calving and the day following calving were unaffected by treatment but increased linearly ($P < 0.05$) two days post-calving with increasing pasture K concentration. Plasma Mg around calving was not affected by dietary K concentration.

In summary, potassium concentration in pasture is positively related to chlorine concentration and negatively related to sodium and calcium concentration. Hence, increasing potassium concentration does not automatically increase DCAD. In the experiment reported here, an increased potassium concentration was associated with a lower DCAD. Dietary K concentration did not appear to influence the risk of hypocalcaemia around calving. Other factors, more important than potassium, appear to be influencing the occurrence of hypocalcaemia.

References

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