

## EFFECT OF ANIONIC SALTS FED IN LATE GESTATION ON THE PRODUCTION OF DAIRY COWS IN EARLY LACTATION AND ON BLOOD CALCIUM CONCENTRATIONS

C.R. STOCKDALE<sup>A</sup>, M. MELSEN<sup>B</sup>, J.-F. BOSCHER<sup>C</sup> and F. DEAN<sup>D</sup>

<sup>A</sup> Dept Natural Resources and Environment, Agriculture Victoria Kyabram, 120 Cooma Rd, Kyabram, Vic 3620

<sup>B</sup> School of Agricultural Sciences, La Trobe University, Bundoora, Vic 3086

<sup>C</sup> Ecole Supérieure d'Agriculture, Angers, France

<sup>D</sup> Dookie College, Institute of Land and Food Resources, The University of Melbourne, Dookie, Vic 3646

Anionic salts are fed to dairy cows in late gestation to improve their calcium status at calving in order to reduce the risk of milk fever. The salts alter the dietary cation-anion difference (DCAD) which, if done correctly, is reported to promote the absorption of calcium from the small intestine and starts the mobilisation of calcium from bone. Most research with anionic salts has been undertaken in the United States where cows generally have higher body condition scores than cows in Australia. Therefore, an experiment was conducted to investigate the interaction between body condition and the response of cows to the use of anionic salts.

Seventy two cows with body condition scores of about 4, 5 or 6 on an 8-point scale (Earle 1976) were individually fed a total mixed ration consisting of maize silage, barley grain, barley straw and canola meal at 1.6% of live-weight for 4 weeks before expected calving date. The diet of half the cows included 125 g of magnesium sulphate, on average. The remaining cows were fed an average of 21 g of magnesium oxide to ensure that each cow consumed a diet with about 0.4% magnesium. After calving, the cows grazed pasture at a daily allowance of ~35 kg DM/cow for approximately 5 weeks, and were supplemented with either 1 or 6 kg DM concentrates per day. Total blood calcium concentrations of the cows in the week after calving, urine pH before calving and milk production after calving were monitored. Results were analysed by 2-way analysis of variance, with no blocking.

The DCAD of the control and anionic salt diets, which is calculated from concentrations of potassium, sodium, chlorine and sulphur, averaged +5.2 and -5.4 mEq/100 g DM, respectively, resulting in urine pH values of 6.4 and 5.4 ( $P < 0.01$ ). The use of the anionic salts caused an elevation in levels of total blood calcium at calving, but these had disappeared within a week (Table 1). There was no effect of body condition of the cows on blood calcium concentrations. The resultant milk yields of the cows indicated that there were no effects of feeding anionic salts on either milk yield or milk composition (Table 1). There were no interactions between the use of anionic salts and body condition.

**Table 1. The effect of body condition and the use of anionic salts in the diet of dairy cows in late gestation on their total blood calcium concentrations in the week after calving and on production in early lactation**

	Body condition at calving				Anionic salts		
	4	5	6	l.s.d.	No	Yes	l.s.d.
	<i>Blood calcium (mmol/L)</i>						
At about 12 hours after calving	1.89	1.98	2.02	0.123	1.90 <sup>A</sup>	2.02 <sup>B</sup>	0.101
At 7 days ( $\pm 1$ ) after calving	2.31	2.33	2.40	0.120	2.38	2.31	0.098
	<i>Milk yield (kg/cow/day)</i>						
First 4 weeks of lactation	28.6 <sup>A</sup>	31.4 <sup>B</sup>	31.5 <sup>B</sup>	2.57	30.3	30.7	2.10
	<i>Milk composition (%)</i>						
Milk fat concentration – 4 weeks	3.47 <sup>A</sup>	3.94 <sup>B</sup>	4.08 <sup>B</sup>	0.316	3.87	3.79	0.258
Milk protein concentration – 4 weeks	3.36	3.26	3.43	0.142	3.33	3.37	0.116

<sup>A, B</sup> Values in rows for each variable with different superscripts are significantly different ( $P < 0.05$ )

Anionic salts elevated blood calcium at calving. If blood calcium levels indicative of sub-clinical hypocalcaemia are taken to be 1.2 to 1.9 mmol/L, then anionic salts reduced the incidence of hypocalcaemia. In spite of this, there were no effects on milk yield or milk composition. However, the cows in both additive treatments recorded urine pH values that suggested that the balance of minerals in both diets should have positively affected calcium status and, certainly, no milk fever was observed in either treatment.

EARLE, D.F. (1976). *J. Agric. (Vic)* **74**, 228-31.

Email: richard.stockdale@nre.vic.gov.au