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Effects of replacement of multi-anionic salts with a single coated calcium chloride source on performance, health, and metabolic status of periparturient cows

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This study evaluated the replacement of three anionic salts in close-up diets with a single encapsulated calcium chloride source (enCaCl). Multiparous cows were randomly assigned to receive either enCaCl (270 g/head/day, n = 74; NutriCAB™, Kemin Animal Nutrition and Health, Belgium; DCAB -192 mEq/kg DM) or multi-anionic salts (mAS; 320 g/head/day, n = 66; 100 g CaCl₂, 120 g MgSO₄, and 100 g NH₄Cl; DCAB -252 mEq/kg DM) from 28 days prepartum until calving. After a common far-off diet, cows were housed in separate close-up pens, moved to lactation pens post-calving, and milked twice daily. Blood and spot urine samples were collected once per animal during the close-up period, with urine pH monitored for net acid excretion. Production data was extracted from the dairy system. Colostrum samples were also analyzed. Data quality was ensured via Robust Fit Outlier detection (Huber M-Estimation, K=4), with log transformation as needed. A mixed model (REML, JMP v18) was used, considering treatment as a fixed effect and cow as a random effect. LSmeans were reported, with significance at $p < 0.05$. Serum tCa (11.3 vs. 10.2 ± 0.4 mg/dL), P (6.4 vs. 5.9 ± 0.2 mg/dL), Ca:P ratio (1.8 vs. 1.6 ± 0.1), and urine pH (5.82 vs. 5.96 ± 0.09) were similar between mAS and enCaCl groups ($p > 0.05$). However, Mg was significantly higher in enCaCl cows (0.9 vs. 2.2 ± 0.3 mg/dL, $p = 0.002$). After the 3-day colostrum period, milk yield on d1 (38.5 vs. 41.4 ± 1.2 kg), d2 (48.0 vs. 48.9 ± 0.8 kg), and peak milk yield (48.5 vs. 49.7 ± 0.7 kg) tended to be higher ($p > 0.05$) in enCaCl as compared to mAS cows. Colostral fat, SNF, total solids, protein, lactose, Brix, and pH were comparable ($p > 0.05$). These findings suggest that replacing multi-anionic sources with a single encapsulated CaCl₂ product can support anionic nutrition without adverse prepartum effects.

KEYWORDS:

Encapsulation, Calcium, DCAD