

224 Dietary anionic mineral (CAD-MATE®) addition increases body pools of readily exchangeable Ca in prepartum sows. C. Darriet^{*1}, D. E. Axe², and T. D. Crenshaw¹, ¹University of Wisconsin, Madison, ²Granco Minerals, Petersburg, VA.

Increased milk production by “elite” sows is associated with an increase in unexplained sow mortality during the prepartum and early postpartum periods. This association has led to purported claims of hypocalcemic disorders. Assuming responses similar to dairy cows, feeding anionic mineral salts in late gestation and early lactation periods might help reduce potential hypocalcemia related disorders in sows. CAD-MATE (Granco Minerals, Petersburg, VA), a novel anionic mineral supplement, was fed to 30 multiparous gestating sows (Landrace x Large White) to determine the dose required to increase Ca pools. CAD-MATE was added to a standard gestation diet at 0, 0.5, 1.0, 1.5, 2.0 or 2.5% which provided 33, -17, -67, -116, -166, and -216 mEq excess cations (Na+K-Cl-S). Animals were fed 1 of 6 diets for 12 d. Composites from 24-h urine samples collected via bladder catheters over the last 2 days were analyzed to identify renal compensatory responses to acid loads. Urine pH decreased with incremental additions of CAD-MATE, but increases in urinary Ca excretion were only observed at 2.0 and 2.5% CAD-MATE additions. As expected, urine Cl and SO₄ excretion increased with incremental additions of CAD-MATE. Venous blood (2 sows/trt) pH (range 7.41-7.33) and base excess (range 5.4-0.5 mmol/L) decreased linearly ($P < 0.10$) but ionized Ca (range 1.28-1.37) increased linearly ($P < 0.05$) as dietary CAD-MATE increased. Blood anion gap was not affected ($P > 0.10$). In conclusion, CAD-MATE induced an acid load as exhibited by urinary ion excretion patterns, but dietary acid loads were compensated as reflected by maintenance of blood gas values within physiological ranges. At 2.0 and 2.5% inclusion, compensatory responses to CAD-MATE apparently induced Ca regulatory mechanisms, inferring that at least 2.0% CAD-MATE addition is required to increase mobilization of body Ca pools in prepartum sows.

Table 1. Dietary CAD-MATE, %

Urine	0	0.5	1.0	1.5	2.0	2.5	SEM
pH ^a	7.47	6.23	5.61	6.08	5.74	5.52	0.3
Ca, mEq/d ^{ab}	38.3	39.9	32.3	46.3	66.1	67.6	6.0
Cl, mEq/d ^{ac}	196	183	230	290	360	300	30.0
SO ₄ , mEq/d ^a	171	192	239	314	316	443	39.9

^alinear, ^bquadratic, ^ccubic response to CAD-MATE, $P < 0.05$

Key Words: swine, dietary cation-anion balance, hypocalcemia

225 Effect of an enzyme blend (Livestock Answer®) on growth performance of nursery pigs. J. M. Benz^{*}, J. L. Nelssen, J. M. DeRouchey, M. D. Tokach, R. D. Goodband, and S. S. Dritz, *Kansas State University, Manhattan.*

A total of 180 pigs (PIC, 5.56 kg) were used in a 28-d trial to determine the influence of an enzyme blend (Livestock Answer®; contains amylases, cellulases, proteases, lipases, and phytases) on growth performance of nursery pigs. Pigs were blocked by BW and allotted to 1 of 3 levels of enzyme (0, 0.125, and 0.175%) at weaning. There were 10 replications with 6 pigs per pen. Diets were fed in two phases. Phase 1 (d 0 to 14) diets (1.35% SID Lys, 0.80% Ca, and 0.48% available P) were corn-soybean meal-based with 15% whey, 3% fishmeal, and 15% dried distillers grains with soluble (DDGS). Phase 2 (d 14 to 28) diets (1.30% SID Lys, 0.79% Ca, and 0.41% available P) were corn-soybean meal-based with 25% DDGS. Feed-grade antibiotics were not used in either phase. From d 0 to 14, increasing level of enzyme improved ADG (quadratic, $P = 0.04$) and G:F (linear, $P = 0.05$), and tended to improve

ADFI (quadratic, $P = 0.06$) and d 14 BW (quadratic $P = 0.07$). From d 14 to 28, enzyme level had no effect ($P > 0.20$) on ADG or ADFI but reduced G:F (quadratic, $P = 0.04$). Overall (d 0-28), the enzyme had no effect ($P > 0.22$) on ADG, ADFI, G:F, or d 28 BW. However, the tendencies for improved BW at d 14 were maintained numerically at d 28. Feeding this enzyme blend improved ADG and G:F from d 0 to 14, with a level of 0.125% resulting in the best performance.

Table 1.

Item	Enzyme level				P	
	0%	0.125%	0.175%	SE	Linear	Quadratic
D 0 to 14						
ADG, g	181	225	204	10.0	0.04	0.04
G:F	0.79	0.84	0.84	0.02	0.05	0.47
D 14 to 28						
ADG, g	357	350	363	12.7	0.81	0.43
G:F	0.66	0.63	0.65	0.02	0.17	0.04
D 0 to 28						
ADG, g	269	288	284	10.1	0.23	0.53
G:F	0.70	0.69	0.70	0.01	0.50	0.35
D 14 BW	8.09	8.72	8.42	0.28	0.07	0.07
D 28 BW	13.1	13.6	13.5	0.41	0.23	0.50

Key Words: enzyme, growth, nursery pig

226 Effect of intake of yeast β -glucans during lactation on post weaning performance of piglets after a pathogenic E. Coli infection. P. J. L. Ramaekers^{*1}, C. H. M. Smits¹, and J. J. Eissen², ¹Swine Research Centre, Boxmeer, The Netherlands, ²Trouw Nutrition International, Tilburg, The Netherlands.

In total one hundred ninety two piglets were used in two batches to examine the effect of intake of yeast β -glucans (Fibosel®) during lactation on post weaning performance after a pathogenic E. Coli infection. In the lactation period of 21 days, 4 female piglets per litter were allotted to one of two treatments at an age of 7 days (2.9 kg). Within each litter, 2 piglets received treatment 1 and the 2 other piglets received treatment 2. In treatment 1, the piglets were daily orally supplied with 2 ml yoghurt from day 7 till weaning. In treatment 2, the 2 ml yoghurt was supplemented with 4 mg yeast β -glucans (ca 200 ppm feed equivalents). After weaning, the piglets received 3 ml Colisol and were housed in groups of three piglets for seven days to acclimatise to their new environment and had free access to water and a commercial feed. Seven days after weaning, the piglets were housed individually, in the same room and with the same feed and feeders and then the piglets were orally infected with pathogenic E. Coli O149K91K88ac (109 cfu/ml). Post weaning diarrhoea was scored daily on a scale of 0, no diarrhoea till 3, watery faeces. Post weaning skin quality was scored daily on a scale of 0, pink (normal) till 4, grey. Body weight at weaning was similar among treatments. The piglets in the yeast β -glucans treatment had a higher ($p < 0.05$) body weight at day 14 post weaning, had a higher ($p < 0.05$) feed intake on day 5 and feed intake tended to be higher ($p < 0.1$) on day 1 compared to the control treatment (Table 1). Diarrhoea score between day 14 till day 21 and overall skin scores tended to be lower ($p < 0.1$) in the piglets in the yeast β -glucans treatment compared to the control treatment (Table 1). Results indicate that piglets tend to suffer less from an E-Coli infection when yeast β -glucans were fed. It is concluded that oral intake of yeast β -glucans of piglets during lactation has a positive effect on post weaning performance and general health of piglets under an E.Coli challenge.