from this feeding trial suggests that Biomate® supplementation of diets for finishing pigs may result in improved growth performance.

Key Words: Pigs, Herb Extract, Meat Quality

141 Effects of increasing calcium to total phosphorus ratio in diets containing phytase on finishing pig growth performance.

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Our objective was to determine the effects of increased calcium to total phosphorus (Ca:P) ratio on growth performance of grow-finish pigs fed diets containing phytase. A total of 144 grow-finish pigs (72 barrows and 72 gilts; initially 38.6 kg) were blocked by weight and sex, and allotted to one of four dietary treatments. Each treatment had six replications per sex and two pigs per pen. Diets were corn-soybean meal-based and fed in three phases. In each phase, diets were formulated to have Ca:P ratios of 0.75:1, 1:1, 1.25:1, 1.5:1, or 2:1. A sixth treatment group (negative control) was fed a diet containing 77% of the total P of the other treatment diets. Diets were formulated to contain 0.44%, 0.38%, and 0.32% total P from 32 to 60, 60 to 89, and 89 to 110 kg, respectively. All diets contained 0.05% phytase from Natuphos, providing 300 FTU/kg. For the overall experiment, increasing Ca:P ratio decreased ADG (quadratic, $P < 0.04$) and feed efficiency (G:F; quadratic, $P < 0.004$) with the greatest decrease observed when Ca:P ratio increased from 1.5:1 to 2:1. Bone ash, ADFI, carcass weight, and backfat thickness was not affected by Ca:P ratio. Similar to the decreases in growth performance and carcass characteristics when Ca:P ratio was increased from 1.5:1 to 2:1, pigs fed the sixth treatment had a numerical decrease in ADG, G:F, final wt, and decreased ($P < 0.05$) backfat. In conclusion, these data suggest that diets containing 300 FTU/kg phytase should not have total calcium to phosphorus ratio of greater than 1.5:1 when fed to growing-finishing pigs.

Ca:P Ratio

	Neg. Control	0.75:1	1:1	1.25:1	1.5:1	2:1	SED
ADG, kg	0.97	0.99	1.02	1.00	0.99	0.92	0.03
ADFI, kg	2.88	2.82	2.81	2.87	2.80	2.89	0.08
Gain/feed	0.34	0.35	0.36	0.35	0.35	0.32	0.01

Key Words: Calcium, Phosphorus, Pigs

142 Effect of magnesium sources on pork quality in finishing pigs.

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This experiment was conducted to evaluate the beneficial effects of various sources of magnesium on pork quality in finishing pigs (n=60; 121 kg BW; 4 pigs/pen). Treatments were: 1) a control basal diet, 2) basal + 0.12% $MgSO_4$, 3) basal + 0.12% $MgCl_2$, 4) basal + 0.12% MgO, and 5) basal + 0.12% magnesium gluconate (Mg-glu), respectively. The experimental diet and water were provided ad libitum for 5 days pre-slaughter. There were no differences on growth performance by Mg sources. When pigs were fed $MgSO_4$, muscle glycogen concentration was higher than other treatments ($P<0.05$). No effect on muscle pH was found; however, Hunter L* value (40 min post-mortem) of control groups was lower than that of MgO or Mg-glu treatments ($P>0.05$). Hunter a* value of the Mg-glu treatment was higher than other groups ($P>0.05$). And Hunter b* values in control and $MgSO_4$ treatments were lower than MgO, $MgCl_2$ or Mg-glu treatments ($P>0.05$). Blood cortisol level was not changed by Mg sources. But it showed that $MgSO_4$ supplementation in the finisher diet was an effective way to reduce stress response before slaughtering. While there were no significant differences among treatments on TBARS value, the value was the lowest when pigs were fed Mg-gluconate. Consequently, inorganic Mg (e.g. $MgSO_4$) is an effective source to influence pork color and muscle glycogen concentration while organic Mg (Mg-gluconate) may show a beneficial effect on reduction of pork oxidation.

Key Words: Magnesium Sources, Muscle Glycogen, Pork Quality

143 Chromium propionate influence on pig performance and meat quality.

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A total of 387 Duroc gilts (Compart Boar Store Line 442 X D100) weighing 32.5 $\pm$ 1.1 kg were allotted to one of three treatments: A corn-soybean meal control diet (CTRL), control diet + 200 ppb Cr from Kem-TRACE® Cr propionate (Cr), or the CTRL diet until 63-d and then the Cr diet (CTRL/Cr). Pigs were weighed on d-63 and 91. Day 0 to 63 gain was higher ($P<0.05$) for the Cr fed pigs with a trend for increased intake ($P<0.10$). There was no effect of Cr on G: F ($P>0.10$). Day 63 to 91 gain was also higher ($P<0.01$) for the Cr fed pigs, as was intake ($P<0.10$). Day 63 to 91 G: F was not different ($P>0.10$). At d-91, 80 gilts per treatment (116.2 $\pm$ 6.07 kg) were scanned via real-time ultrasound for 10th and last rib backfat and loin eye area . There was no effect ($P>0.10$) of Cr supplementation on carcass composition. A total of 40 gilts per treatment, within a common weight range (122.3 $\pm$ 3.8 kg), were individually tagged and tattooed prior to shipment. After 8-h of transit to a commercial packer, live weights were obtained (119.1 $\pm$ 3.5 kg). Hot carcass weight (HCW) was also measured (91.6 $\pm$ 2.9 kg). Farm weight, packer live weight, HCW and fat and muscle depth as well as percent lean, were not different ($P<0.10$). Loin pH at 1 and 22-h post-mortem was not different, however, there was a numerically ($P<0.16$) lower loin 22-h pH decline for the Cr fed pigs compared to the CTRL (0.52 vs. 0.60 units). At 22-h a 40 - 50 g loin core was taken between the 7th and 8th ribs and held for 7-d for determination of drip loss. The reduction in 22-h pH decline was associated with a trend ($P<0.10$) toward a reduction in 7-d drip loss (3.75 vs. 4.86%). NPPC measures of loin color, firmness, and marbling, as well as ColorTec L^*, A^*, and B^* values were not different ($P>0.10$) between the CTRL and Cr fed pigs. These results suggest that long-term Cr propionate supplementation may improve pig growth via stimulation of feed intake and may reduce drip loss via a reduction in the rate of post-mortem pH decline.

Key Words: Chromium Propionate, Meat Quality, Pigs

144 Effect of barley sample, particle size and enzyme supplementation on energy digestibility of barley fed to grower pigs.

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Variability in DE content of barley is caused by changes in energy digestibility that may be reduced by specific processing procedures, e.g., grinding and enzyme supplementation. Effects of three barley samples (B1, high; B2, medium and B3, low predicted DE using ADF), three particle sizes (fine, FPS; medium, MPS and course, CPS), and two enzyme treatments (control and -glucanase/xylanase) on energy digestibility and DE content were investigated in a 3 x 3 x 2 factorial arrangement. Diets included 96% barley and 0.4% chromic oxide. Pigs (30.9 $\pm$1.7 kg) were fed two different diets at 3 x maintenance in subsequent periods for 6 observations per diet. Grab fecal samples were collected for 5 d. Feed and feces were analyzed to determine apparent total-tract energy digestibility and DE. Energy digestibility was affected by barley sample ($P<0.001$), particle size ($P<0.001$), and sample x particle size ($P<0.05$), but unlike previous studies, not by enzyme supplementation ($P>0.10$). The diet DE content for B1, B2 and B3 were each different ($P<0.001$; 3180, 2997 and 2567 kcal/kg DM, respectively), confirmed the predicted ranking, and followed changes in energy digestibility ($P<0.001$; 74.3, 69.5 and 58.5%, respectively). Overall, the DE content for FPS was 3.4 and 4.2% higher than for MPS and CPS ($P<0.001$; 2988, 2891 and 2866 kcal/kg DM, respectively), following changes in energy digestibility ($P<0.001$; 69.2, 66.7 and 66.4%, respectively). Energy digestibility was similar for B2-FPS and B1-CPS, suggesting that reducing particle size for medium DE barley may reduce variation in DE content. The lack of enzyme response suggests that -glucans or xylans did not cause the reduced DE content for B2 and B3. Prediction of barley quality prior to processing and subsequent adjustments in processing may be components in a decision model to achieve a consistent diet DE content.

Key Words: Barley, Particle Size, Pig