
An experiment involving 32 growing-finishing pigs (8 pigs per treatment) was conducted to investigate the effect of dietary Ca: total P ratio on apparent absorption of nutrients in the ileum, cecum, and colon. Dietary Ca provided as ground limestone was reduced in the basal low P corn-soybean meal grower and finisher diets to obtain CatP ratio treatments of 1.5:1, 1.3:1 and 1:1. Microbial phytase (Natuphos®, BASF) supplementation at 500 PTU/kg replaced 1% of the inorganic (1) P in the low-P basal diets. The basal low P grower (23 to 54 kg) diet contained 0.7% Ca, 0.3% P, and 14% CP. The basal low P finisher (55 to 110 kg) diet contained 0.2% AP without added TiP, and 12% CP. A positive control (PC) diet contained 6% Ca and 4% P in the grower diet, and 5% Ca and 4% P in the finisher diet with a CatP ratio of 1:1. At 110 kg BW the pigs were humanely slaughtered and small and large intestines collected. Lowering the dietary Cat:P ratio linearly increased the apparent absorption of P (P < .08) and Ca (P < .01). Lowering the CatP ratio also linearly increased the absorption of Ca (P < .09) and DM (P < .03). Ileal P absorption was 2.24, 4.33, 5.30, and 4.48 (± 0.5) g/d, respectively, for the low-P treatments with Cat:P ratios of 1.5:1, 1.3:1, and 1:1 and the PC. Decreasing the Cat:P ratio from 1.5:1 to 13:1 and from 1.5:1 to 1:1 increased apparent ileal P absorption by 2.09 and 3.06 g/d, respectively. These results confirm the theory that high dietary Ca interferes with P absorption in the small intestine.

Key Words: Calcium, Phosphorus, Phytase, Swine


The effects of adding three levels of supplemental phytase (Natuphos-600®, BASF, Mt. Olive, NJ) to low Ca, low P diets on performance and bone strength of finishing pigs were investigated. Hampshire-Yorkshire pigs (n = 120) initially averaging 56.7 kg BW were randomly allotted to five dietary treatments from outcome groups of weight and sex. There were four replications of six pigs per pen. Fortified corn-soybean meal diets containing 75% lysine were fed for 26.5 d (56.7 to 79.5 kg BW) after which lysine was reduced to 65% for the remaining 35 d of the test (79.5 to 110.2 kg BW). During the initial phase, treatments were (1) .55% Ca and .45% P, (2) .55% Ca and .35% P, (3) as 2 + 250 PTU/kg, (4) as 2 + 500 PTU/kg, and (5) as 2 + 750 PTU/kg of added phytase. During the final phase, Ca and P levels in Diet 1 were reduced to 50% and .48%, and in Diets 2 to 5, they were reduced to .40 and .36%, respectively. Mono-dicalcium phosphate and ground limestone were the sources of supplemental Ca and P. All of the P in the 30% P diet was from corn and soybean meal. Analyzed P averaged 18% higher than targeted P levels due to higher than normal levels of P in corn (.30%) and soybean meal (.76%). ADCG, feed:gain, and bone (3rd and 4th metacarpals) breaking strength (adjusted for final BW by covariance) for treatments 1 to 5 were 889, 860, 854, 857, 910 g/d; 3.23, 3.45, 3.33, 3.26, 3.29, and 188, 163, 179, 183, 190 kg, respectively. Growth rate tended to decrease, feed:gain increased (P < .05), and bone strength decreased (P < .01) with P levels being reduced. Linear improvements in feed:gain (P < .05) and bone strength (P < .01) occurred with increasing levels of supplemental phytase. The results indicate that finishing pigs fed low P diets respond linearly to phytase additions of up to 750 PTU/kg.

Key Words: Pig, Phytase, Phosphorus


Two trials were conducted to evaluate the partial replacement of spray dried fish meal plasma (AP920S) with Menhaden fish meal and MF1 on a lysine basis in phase (P) 1 diets and complete replacement in the P2 diet. Crossbred pigs (total n = 312) were weaned at an average of 5.5 ± .01 kg BW and 20 ± 2 days of age and allotted to treatment by gender, litter and weight. Pigs were the experimental units with 90 pens of 3 or 4 pigs/pent. The basal P1 diet contained 6.0% AP920. Two more P1 treatments were obtained by replacing 2 or 4% of the AP920 with 2.9 or 5.8% MF1, respectively. Other ingredients were 30% dried wheat, 16% soybean meal, ground corn, lard, L-lysine, HCl, D-L methionine, and mineral and vitamin supplementation. All diets contained 17.5% lysine, 45% methionine and 3.4 Mcal of ME/kg. In P2 (d 14-28), P1 treatment replicates were allotted to one of two diets: either 20% AP920 or 2.9% MF1 in a 3 × 2 factorial arrangement. The P2 diets contained 20% dried wheat, 20% soybean meal, 14% lysine, 42% methionine and 3.4 Mcal of ME/kg. There were no treatment interactions (P > .04 to .09) between P1 and P2 for growth performance criteria. For P1 and overall, however, treatment and quadratic responses (P < .01) occurred because ADG, ADG and gain:feed ratio were increased with 2.9% MF1 and decreased with AP920 replacements in P1 compared to the 6% AP920 treatment. There were no differences (P > .10) among treatments in phase 1 and overall. These results suggest that 5% select menhaden fishmeal can replace soybean meal in a lactation diet with no adverse effects on sow or litter performance.

Key Words: Swine, Fish meal, Animal plasma, Performance


Soybean meal has been the predominant protein source used in lactation diets in the U.S. Unfortunately, limited information is available to evaluate the dietary high and palatable meal and digestible protein sources as select menhaden fishmeal on sow feed intake and performance. A total of 317 sows (PIC, C-15) was used to determine the effect of adding 5% select menhaden fishmeal to the lactation diet on sow and litter performance. During gestation, all sows were fed 1.8 kg of a milo-soybean meal gestation diet (.65% lysine) formulated to exceed NRC (1988) requirement estimates for amino acids, vitamins, and minerals. During lactation, the two dietary treatments consisted of a corn-soybean meal-based control diet or a diet with 5% select menhaden fishmeal replacing soybean meal on a lysine basis. Both diets contained 2.5% added soybean oil and were formulated to 10% total lysine. No parity X dietary treatment interactions were observed for any of the response criteria (P > .10). Adding 5% select menhaden fishmeal to the lactation diet had no effect (P > .10) on number pigs weaned (9.78 vs 9.8), pig survival from birth to weaning (95.25 vs 95.6%), or litter weaning weight (55.40 vs 55.64 kg). Composition of milk samples taken between d 14 and 16 of lactation was not affected (P > .10) by dietary treatment. These results suggest that 5% select menhaden fishmeal can replace soybean meal in a lactation diet with no adverse effects on sow or litter performance.

Key Words: Sow, lactation, select menhaden fishmeal