(P<0.009) ADG than pigs previously fed Ractopamine (0.98 and 0.88 kg, respectively). During the last 21-d, and for the overall 56-d trial, pigs fed Ractopamine the last 21-d of the study or those fed Ractopamine from d 0 to 21 and then d 35 to 56, had greater (P<0.0004) ADG and improved (P<0.0001) G:F than control pigs or those fed Ractopamine from d 0 to 21 (1.02 kg and 0.34 vs 0.89 kg and 0.29 from d 35 to 56, respectively, and 1.00 kg and 0.36 vs 0.95 kg and 0.33 from d 0 to 56, respectively). These results indicate that feeding 10 ppm Ractopamine increases ADG and G:F. Furthermore, the response to Ractopamine appears to be similar among pigs fed Ractopamine for the first time and those fed Ractopamine intermittently.

Key Words: Ractopamine, Withdrawal, Finishing pig

185 Effects of a solid-state fermented phytase on growth performance and nutrient digestibility of growing pigs fed barley-soybean meal based diets.

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Previous reports from our lab found that the addition of a solid-state fermented (SSF) phytase complex to corn-soybean meal diets improved P digestibility, but had little effect on digestibility of other nutrients. This enzyme complex contains side-enzyme activities other than phytase that could improve the digestibility of other nutrients (i.e., DM, N, energy) in lower quality feedstuffs. Thus, an experiment utilizing 24 barrows (24.3 kg) was conducted to determine the effects of adding SSF phytase complex (Allzyme SSF; Alltech, Inc.) to low available P, barley-soybean meal diets on growth performance and nutrient digestibility in a 21-d study. Pigs were blocked by BW and allotted randomly to four dietary treatments (6 pigs/trt). Diet 1 was a fortified barley-soybean meal based diet (0.77% dig. Lys; 1.2:1 Ca:total P) adequate in all nutrients, except available P. This diet contained 0.42% total P (0.11% available P), all of which was provided by barley and soybean meal. Diets 2, 3, and 4 were as Diet 1 plus SSF phytase to provide 250, 500, and 1,000 phytase units (PU)/kg, respectively. Pigs were housed individually and diets were fed at 3.0 maintenance with *ad libitum* access to water. There was a 7-d period (d 14 - 21) for collection of feces and urine. The addition of SSF phytase complex improved (linear, P < 0.05) ADG and F:G. Digestibility of P and ash was dramatically improved (linear, P < 0.01) with addition of SSF phytase. The increase in P digestibility led to a 17% decrease in absolute P excretion for pigs fed 1,000 PU/kg. Digestibility of GE improved (linear, P < 0.01) with SSF phytase resulting in an approximate 75 kcal/kg increase in DE concentration of the diet for pigs fed 1,000 PU/kg. Also, SSF phytase improved (P < 0.05) DM, OM, and N digestibility. These results indicate that the addition of SSF phytase complex to low P, barley-soybean meal diets markedly improved nutrient digestibility of growing pigs.

Key Words: Pigs, Phytase, Digestibility

186 Inadequate diet mixing time greatly reduces nursery pig performance.

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While the importance of thoroughly mixing diets is often emphasized, little data is available to quantify the impact of adequate mixing on pig growth performance. Therefore, a 28 d trial was conducted to evaluate the effects of mixing time on growth performance of nursery pigs. A total of 180 weanling pigs (6.31± 0.84 kg BW, 21±3 d of age) were used with 6 pigs/pen and 6 pens/treatment. Experimental treatments consisted of mixing a diet for 0, 30, 60, 120 or 330 s in a horizontal ribbon mixer. Diets were fed in two phases (d 0 to 14 and d 14 to 28) with diets in both phases containing high levels of synthetic amino acids. Diets in phase 1 also contained 3.75% fish meal, 15% dried whey, and 2,500 ppm zinc from zinc oxide. Eight samples were collected from the mixer at the completion of the respective mixing time for each batch of feed to determine a CV. Each bag (22.5 kg) was labeled (first to last) and sampled to determine the degree of mixing that occurred as feed was conveyed from the mixer to the bagger. Mixer CV values were 178, 38, 26, 21, and 5% for phase 1 and 172, 79, 60, 48, and 26% for phase 2 as mixing time increased. Bag CV values were 26, 20, 16, 11, and 7% for phase 1 and 56, 45, 40, 33, and 12% for phase 2 as mixing time increased. Each pen was then assigned a bag of feed. Bags were distributed across pens within the specific treatments in the order they were filled. As needed, the next chronological bag of feed was used. Growth performance was linearly (P<0.01) improved in both phases. From d 0 to 28, increasing mix time increased (linear and quadratic, P< 0.01) ADG (331, 405, 407, 426, 463 g for 0, 30, 60, 120, and 330 s, respectively). Increasing mix time also increased G:F (linear P<0.01, quadratic P<0.10; 0.67, 0.72, 0.76, 0.75, 0.77 for 0, 30, 60, 120, and 330 s, respectively). With greater use of low inclusion ingredients such as synthetic amino acids in swine diets, these data clearly demonstrate that inadequate mixing reduces nursery pig performance.

Key Words: Growth, Mixing efficiency, Nursery pigs

187 Growth performance of nursery pigs fed yeast alone or in combination with in-feed antimicrobial.

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Weaned pigs (initial BW 6.08 kg) were used in a 28 d growth study to evaluate the effects of feeding the combination antibiotic neomycin and oxytetracycline (Neo-Terra), varied levels of *Saccharomyces cerevisiae* (BIOSAF) yeast (0.15% or 0.3%) and the combination of Neo-Terra and BIOSAF in nursery diets. Pigs were blocked by weight and sex, and assigned randomly within blocks to five treatments. There were seven pigs per pen and six pens per treatment. Phase 1 diets were fed from d 0-14, and Phase 2 diets were fed from d 15-28. The negative control diet contained no added antibiotic or yeast, and the positive control diet contained Neo-Terra. Two diets contained BIOSAF yeast at 0.15 or 0.3 %, and a fifth diet contained the combination of 0.15 % BIOSAF and Neo-Terra. Diets were formulated without growth promoting levels of copper sulfate or zinc oxide. Growth performance data including ADG, ADFI, and feed efficiency (G/F) were calculated. Overall, pigs fed the diet containing both Neo-Terra and 0.15% BIOSAF® had greater ADG and ADFI than pigs fed the control diet and pigs fed either level of BIOSAF® alone (P < 0.05). Furthermore, over the entire trial, pigs fed the diet containing both Neo-Terra and BIOSAF® tended to also have greater ADG and ADFI than pigs fed only Neo-Terra (P = 0.15). Pigs fed Neo-Terra had greater ADG and ADFI than pigs fed the control diet and the diet containing 0.15 % BIOSAF®, but both ADG and ADFI were similar between pigs fed Neo-Terra and pigs fed 0.3 % BIOSAF. In summary, whereas BIOSAF® fed alone did not significantly improve growth performance over that of control pigs, overall, pigs fed the diet including both Neo-Terra and 0.15 % BIOSAF® had a 16 % improvement in ADG compared to pigs fed the control diet, and a trend for an improvement in ADG compared to the diet containing Neo-Terra without added yeast. Thus, in nursery settings where Neo-Terra will be added, addition of 0.15% BIOSAF® to diets could enhance growth performance. Additional research will be required to determine definitively if a level at or close to 0.3% BIOSAF® can be added to nursery diets to approach growth performance observed with Neo-Terra.

Key Words: Antimicrobials, BIOSAF®, Nursery pigs

188 Effect of milk supplementation with a direct-fed microbial during lactation on subsequent nursery performance.

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A total of 216 pigs were evaluated to determine the effect of pre-weaning milk supplementation with or without a direct-fed microbial (*Lactobacillus brevis*; 1E1) on subsequent nursery performance. At birth, 34 litters received either: 1) no milk supplement, 2) milk supplement devoid of 1E1, or 3) milk supplement with 1E1. At weaning, pigs were blocked by BW within previous lactation treatment groups and allotted to 12 pens/treatment. During the nursery, pigs were fed common Phase 1 (d 0 to 14), Phase 2 (d 14 to 28), and Phase 3 (d 28 to 42) diets. One pig/litter/treatment was euthanized on d -10, d 0 (weaning), and d 5 post-weaning to obtain duodenum, jejunum, and ileum tissue samples for intestinal morphology measurements. On d -10, pigs provided milk supplement with or without 1E1 had longer (P<0.05) jejunal villi than unsupplemented pigs. Pigs provided milk with and without 1E1 had longer (P<0.05) duodenal villi and greater (P<0.05) villus area at weaning than unsupplemented pigs. Pig BW at weaning was greater (P<0.01) with 1E1 supplementation compared to unsupplemented pigs, whereas BW of pigs provided milk tended to be greater (P=0.06) than unsupplemented pigs. From d 0 to 5 after weaning, ADG was greater