

128 Effects of increasing crystalline amino acids and the subsequent change in diet net energy on growing pig performance. N. Z. Frantz^{*1}, M. D. Tokach¹, M. U. Steidinger², S. S. Dritz¹, J. M. DeRouchey¹, R. D. Goodband¹, J. L. Nelssen¹, and J. L. Ury³, ¹Kansas State University, ²Anchor, ³Ajinomoto-Heartland LLC.

Three growth trials were conducted to evaluate the effect of increasing crystalline amino acids as a replacement for soybean meal (SBM) in diets for 10-20 kg pigs. A second objective was to determine if increasing dietary net energy as a result of increased crystalline amino acids and less SBM would influence growth. In all studies, pigs were fed a corn-SBM diet, or diets with 0.1, 0.2, 0.3, or 0.4 % L-lysine HCl and other amino acids (threonine and methionine) to maintain appropriate minimum ratios. There were 6 replicates per treatment in each trial and 48, 48, and 42 pigs per experimental unit in Exp. 1, 2, and 3, respectively. A total of 1,440 pigs (9.6 kg and 40 d of age) were used in Exp. 1 and 2 with 1,260 pigs (11.3 kg and 40 d of age) used in Exp. 3. Diets contained 1.36, 1.36, and 1.29% true ileal digestible lysine in Exp. 1, 2 and 3, respectively. In Exp. 1 and 3, added fat was constant at 1%. In Exp. 2, added fat was reduced slightly as amino acids replaced SBM to maintain constant ME levels. In Exp. 1, increasing crystalline amino acids had no effect on ADG, but improved (linear, $P < 0.05$) feed efficiency (G/F). In Exp. 2, ADG tended (linear, $P < 0.09$) to increase and G/F improved (quadratic, $P < 0.04$) with increasing crystalline amino acids. In Exp. 3, ADG and ADFI tended ($P < 0.09$) to increase with increasing crystalline amino acids, but G/F was unchanged. These results indicate that up to 0.4% L-lysine HCl with L-threonine and DL-methionine added to maintain proper ratios relative to lysine can replace SBM in a corn-SBM based diet for 10 to 20 kg pigs. Our results also demonstrate that the NE content of the diet increases as more crystalline amino acids are added. These data indicate that the ME values of NRC (1998) underestimate the energy value of diets containing high levels of crystalline amino acids.

Key Words: Pigs, Energy, Amino Acids

129 Effects of poultry meal source on nursery pig performance. T. P. Keegan^{*}, J. M. DeRouchey, J. L. Nelssen, M. D. Tokach, R. D. Goodband, S. S. Dritz, and C. W. Hasted, Kansas State University.

Two experiments were conducted to determine the effects of poultry meal in nursery pig diets on growth performance. In Exp. 1, 210 pigs (initially 7.4 kg and 21 ± 2 d of age) were fed one of five diets: 1) control with no specialty protein products, or the control with: 2) 2.5% fishmeal; 3) 5.0% fishmeal; 4) 2.9% poultry meal; or 5) 5.9% poultry meal. Poultry meal (11.8% ash) replaced fishmeal on an equal lysine basis. From d 0 to 28, pigs fed fishmeal had greater ($P < 0.05$) ADG than the pigs fed the control diet or diets containing poultry meal. Increasing fishmeal tended to increase (quadratic, $P < 0.10$) ADG. Pigs fed fishmeal had improved ($P < 0.05$) feed efficiency (G/F) compared to pigs fed diets containing poultry meal. In Exp. 2, 350 pigs (initially 8.9 kg and 22 ± 2 d of age) were fed one of seven experimental diets: 1) control diet with no specialty protein products, or the control with: 2) 2.5% fishmeal; 3) 5% fishmeal; 4) 2.9% low ash poultry meal; 5) 5.8% low ash poultry meal; 6) 3.1% high ash poultry meal; or 7) 6.2% high ash poultry meal. Analyzed ash content for the low and high sources of poultry meal was 10.9 and 13.5%, respectively. Poultry meal replaced fishmeal on an equal lysine basis. From d 0 to 15, there was no difference in ADG or ADFI. However, pigs fed fishmeal or poultry meal had improved ($P < 0.05$) G/F compared to pigs fed the control diet. Pigs fed diets with low ash poultry meal had improved ($P < 0.05$) G/F compared to pigs fed diets with high ash poultry meal. Increasing fishmeal or poultry meal in the diet improved (linear, $P < 0.05$) G/F. These results indicate poultry meal cannot entirely replace fishmeal in nursery diets without a reduction in performance. Quality control specifications, such as ash content, need to be considered when using poultry meal as an animal protein ingredient in nursery pig diets.

Key Words: Nursery Pig, Poultry Meal, Fishmeal

130 Evaluation of Illinois Bundle Flower by digestibility and nitrogen balance as a protein supplement for young pigs. S. K. Baidoo^{*} and Q. M. Yang, University of Minnesota.

The reestablishment of a native perennial legume, such as Illinois Bundle Flower (*Desmanthus illinoensis*) cover on retired cropland can reduce soil erosion, increase root turnover and increase accumulation of surface litter. The objective of this study was to determine the optimum inclusion rate of IBF in young pig diets. Twenty four 18-d old early-weaned pigs (6.2 ± 0.3 kg BW) were randomly allotted to 3 dietary treatments to study the effect of Illinois Bundle Flower (IBF) on feed digestibility and nitrogen balance in young pigs. Corn-soybean meal (SBM) basal diets with 0, 5% and 10% IBF were used for Phases 1 (d 1 - 14) and 2 (d 15-28) after weaning. Nutrient digestibility and nitrogen balance were determined using chromium oxide as indigestible marker. Supplementation of IBF at 10% decreased ($P < 0.05$) the digestibility of nitrogen (N) in Phase 1 and the digestibility of DM, N, P and crude ash in Phase 2. However, the digestibility in pigs fed diets with 5% IBF was not different from the control diets ($P > 0.05$) in both Phases 1 and 2. Nitrogen excretion increased with increase in IBF in the diets. Compared to the control diet, the increase in total N excretion or the decrease in N retention were 4.5% and 13.7% in Phase 1, and 1.9% and 5.0% in Phase 2 for the 5% and 10% IBF diets, respectively. The diet with 10% IBF increased N excretion in both feces and urine, but the diet with 5% IBF only increased N excretion in urine compared to control diet in Phase 1 ($P < 0.05$). Nitrogen retention ratios decreased with increase in IBF in the diets ($P < 0.05$). In Phase 2, the diet with 10% IBF increased N excretion in feces. However, urinary N: fecal N was lower ($P < 0.05$) for the diet with 10% IBF compared to control and 5% IBF diets. In summary, the supplementation of IBF at 10% decreased N digestibility and retention in Phase 1, and decreased the digestibility of N, P, DM, and ash in Phase 2. Based on the results of this study, 5% IBF included in the diets of young pigs did not affect nutrient digestibility and nitrogen retention.

Key Words: Piglets, Illinois Bundle Flower, Digestibility

131 Effect of Illinois Bundle Flower on the performance of young pigs. Q. M. Yang^{*}, S. K. Baidoo, and G. He, University of Minnesota.

Illinois Bundle Flower (IBF) (*Desmanthus illinoensis*) is a perennial native legume that produces high seed yields and has a potential as a protein supplement in young pig diets. The objective of this study was to determine the optimum inclusion rate of IBF in young pig diets. A total of 32 pigs (6.0 ± 0.4 kg BW) were randomly allotted to 4 dietary treatments with 2 pigs/pen and 4 pens/treatment to study the effect of Illinois Bundle Flower (IBF) on the performance of early-weaned pigs. Pigs were allotted to 1.2 m by 1.6-m raised-deck pens with plastic-coated floor at random by litter and initial weight. Pig weight and feed disappearance were determined at the end of Weeks 1, 2 and 4. Corn-soybean meal (SBM) basal diets with 0%, 5%, 10% and 20% IBF were fed in Phases 1 (d 1 - 14) and 2 (d 15 - 28) after weaning. The inclusion of IBF was substituted for SBM. Diets were iso-nitrogenous and iso-caloric. Increased in IBF in the diet resulted in a decline in weight gain in Wk 1 (179, 150, 115 and 114 g/d) Wk 2 (537, 473, 434, 379 g/d) and Wk 3-4 (599, 599, 543 and 554 g/d) for 0%, 5%, 10% and 20% IBF diets, respectively. The corresponding feed intakes were for Wk 1 (206, 166, 162 and 160 g/d), Wk 2 (600, 467, 484 and 475 g/d), and Wk 3-4 (777, 714, 715 and 657 g/d) for 0%, 5%, 10% and 20% IBF diets, respectively. The average feed efficiency (Gain:Feed) decreased by 4.8% for the diets with both 10% and 20% IBF, but was improved by 7.2% for the diet with 5% IBF compared to the control diet. The overall (Wk 1-4) ADG was 478, 455, 409 and 400 g and the ADFI was 590, 515, 519 and 487 g and the gain:feed was 0.83, 0.89, 0.79 and 0.79 for the diets with 0%, 5%, 10% and 20% IBF, respectively. In conclusion, 5% IBF in the diets of young pigs did not affect the overall performance during the 28-d study.

Key Words: Piglets, Illinois Bundle Flower, Growth Performance