

207 Effect of corn distiller's dried grains with solubles (DDGS) on growth, carcass characteristics and fecal volume in growing-finishing pigs. S. X. Fu*¹, M. Johnston², R. W. Fent¹, D. C. Kendall¹, J. L. Usry³, R. D. Boyd², and G. L. Allee¹, ¹University of Missouri, ²The Hanor Company, ³Ajinimoto Heartland LLC.

Two trials were conducted to determine the effect of dietary corn distiller's dried grains with solubles (Dakota Gold[®]; DDGS) on growth, carcass characteristics and fecal excretion in growing-finishing pigs. In Trial 1, 256 barrows with an initial BW of 28.5 kg were fed experimental diets in a 5-phase feeding program. Dietary treatments involved 0, 10, 20 and 30% DDGS, with 8 replicate pens of 8 pigs per pen. Experimental diets were formulated to contain equivalent apparent ileal digestible lysine (1.06, 0.89, 0.77, 0.70 and 0.63% respectively). Diets were isocaloric (1 to 2% added fat) and formulated using 0.15% (Phase 1 to 4) or 0.10% (Phase 5) L-Lysine HCl so that digestible threonine, tryptophan and sulfur amino acids were held equal or above the control. The addition of DDGS resulted in a linear decrease in feed intake (2.56, 2.53, 2.44 and 2.41 kg/d; $P < 0.001$), ADG (1.03, 1.01, 0.99 and 0.98 kg/d; $P < 0.001$) and body weight (123.8, 121.7, 121.2 and 118.9 kg; $P < 0.01$) after 92d on test. No difference was observed in G:F (0.405, 0.400, 0.407 and 0.405; $P > 0.45$) for the 92-d test period. However, gain:feed was improved in a linear ($P < 0.01$) manner for the first 42 d on test with increasing DDGS. Carcass weight was reduced linearly ($P < 0.002$) as dietary DDGS level increased. No differences in backfat, loin depth, percentage carcass lean and yield were observed among treatments. In Trial 2, 12 pigs (97.4 kg) were placed in metabolism crates allowing for separate and total collection of urine and feces in an environmentally controlled room. Pigs were allotted to treatments of 0, 10 or 20% DDGS in two periods of a 7d adaptation and 3d collection of urine and feces. Fecal mass increased linearly ($P < 0.06$) with increasing DDGS addition. Fecal volume increased 5.7% and 13.2% in pigs fed 10% and 20% DDGS diets, respectively. These results suggest that feeding DDGS for a fixed time period will reduce pig slaughter and carcass weight while increasing fecal volume.

Key Words: Distiller's Dried Grains with Solubles, Pigs, Fecal Volume

208 Energy value of dried distillers grains with solubles in swine diets. C. W. Hastad*, M. D. Tokach, J. L. Nelssen, R. D. Goodband, S. S. Dritz, J. M. DeRouchey, C. N. Groesbeck, K. R. Lawrence, N. A. Lenehan, and T. P. Keegan, *Kansas State University*.

Two experiments were conducted to determine the energy value of dried distillers grains with solubles (DDGS). In Exp.1, 360 pigs (initially 17.5 kg) were used in a 22 d growth assay. Treatments consisted of five corn-soybean meal-based diets with added wheat bran or soy oil to provide five ME levels ranging from 3,064 to 3,536 kcal/kg. Two sources of DDGS were used, one from a relatively new plant (MN), and a second from an older plant (NB). Pigs were fed four additional diets including either 15 or 30% DDGS from each source. For the 22 d growth trial, increasing energy increased (linear; $P < 0.01$) ADG and feed efficiency (G/F) and reduced (linear; $P < 0.01$) ADFI. The linear improvement in G/F allowed estimation of the kcal of ME/kg of DDGS for the MN (3,494) and NB (3,128) sources. In Exp. 2, eight barrows (initially 44.6 kg) were used in a metabolism study with treatments arranged in a Latin square design to determine the ME of the two DDGS sources used in Exp. 1. Diets were 97% DDGS with added amino acids, vitamins, and minerals to meet or exceed the pigs nutrient requirements. Estimated DE (3,871 vs. 3,728; $P < 0.02$) and ME (3,697 vs. 3,587; $P < 0.05$) were higher for the MN compared to the NB DDGS. These ME values were 6% higher for the MN DDGS and 15% higher for the NB DDGS than were calculated in our growth trial. Estimating net energy from chemical composition suggests that DDGS have a lower energy value relative to corn (96% and 90% for MN and NB, respectively). These studies suggest possible variation in the energy value of DDGS based on how it is measured. Measurement of ME through nutrient balance studies where pigs are individually fed a limited amount of feed appears to over estimate utilizable energy as compared to net energy calculations or the predicted value from growth trials.

Key Words: Distillers Dried Grains with Solubles, Pigs, Energy

209 Effect of basal diet formulation and wheat bran inclusion on growth performance and carcass characteristics of finishing pigs. D. M. Sholly*, M. C. Walsh, R. B. Hinson, K. L. Saddoris, L. M. Wilson, A. L. Yager, B. T. Richert, and A. L. Sutton, *Purdue University*.

Three hundred-thirty six pigs (initial BW = 67.5 kg) were used to determine the effects of basal diet formulation (BD) and wheat bran (WB) inclusion rate on growth performance and carcass characteristics. Pigs were blocked by BW, sex, and barn (7 mixed sex pigs/pen; 3 pens/treatment/barn) and randomly allotted to one of 8 diets arranged in a 2 X 4 factorial design with two basal diet formulations (standard corn-SBM meal diet; CTRL, and a reduced nutrient excretion diet; LNE) and 4 levels of WB (0, 5, 10, or 15%). The LNE diet contained low phytic acid corn, 300 U/kg phytase, synthetic amino acids balanced to NRC ratios, and added dietary fat to maintain ME/kg. Bi-weekly BWs and pen feed intakes were recorded and diets were fed in two phases, Finisher 1 (F1; d 0-27) and Finisher 2 (F2; d 27-55). ADG, ADFI, and G:F were unaffected by BD formulations, except during F2 when ADFI was lower for the LNE diet compared to the CTRL ($P < 0.05$). As WB inclusion increased, F1 ADG and ADFI decreased linearly ($P < 0.01$) and F1 and F2 G:F improved up to 5% and 10% inclusion, respectively, and then declined (quadratic; $P < 0.03$). There was an interaction of BD and WB for F2 ADG ($P < 0.05$), with ADG increasing up to 5% WB and then decreasing with further increases in WB. The magnitude of this response was more pronounced in the CTRL diets than in LNE diets. Overall, ADFI linearly decreased ($P < 0.02$); ADG (779, 784, 777, 730 g/d, WB 0-15%, respectively), G:F (.311, .322, .323, .307, WB 0-15%, respectively), and final BW increased and then decreased as WB inclusion increased (quadratic; $P < 0.01$). Last rib and 10th rib backfat (TRBF) linearly decreased as WB inclusion increased from 0 to 15% ($P < 0.02$). The LNE formulation tended to increase ultrasound TRBF depths ($P < 0.06$), carcass loin depth ($P < 0.08$), and carcass yield ($P < 0.10$) compared to the CTRL diets. Inclusions of WB up to 5% of the diet improved pig ADG and G:F, however, including 15% WB in finisher diets decreased growth performance.

Key Words: Pigs, Crude Protein, Wheat Bran

210 Influence of Carnichrome[®] on energy balance of gestating sows. M. G. Young*¹, M. D. Tokach¹, J. Noblet², F. X. Aherne³, S. S. Dritz¹, R. D. Goodband¹, J. L. Nelssen¹, J. van Milgen², and J. C. Woodworth⁴, ¹Kansas State University, ²INRA, France, ³Alberta Pig Company, ⁴Lonza, Inc.

Twelve multiparous sows with an average initial weight of 182 kg were utilized in a randomized complete block design to determine the effects of feeding Carnichrome[®] (r) (50 ppm carnitine and 200 ppb chromium picolinate/kg feed) on the energy and nitrogen utilization in early-, mid- and late-gestation. All sows were fed a diet either with or without Carnichrome[®] (r) for the 28 d lactation, the weaning-to-estrus period, and for the duration of gestation. Daily feeding allowances were based on calculated energy and nutrient requirements to achieve a target sow maternal weight gain of 20 kg and remained constant throughout gestation. The kinetics of heat production (HP) and its partitioning (activity HP) were determined in early- (wk 5 or 6), mid- (wk 9 or 10) and late- (wk 14 or 15) pregnancy using indirect calorimetry. Net maternal weight gain and total number of fetuses averaged 21.6 kg and 16.5, respectively. Organic matter and energy digestibility for the Carnichrome[®] (r) diet was greater ($P < 0.05$), which resulted in greater DE and ME contents ($P < 0.05$) compared with the control diet. Carnichrome[®] (r) had no effect on total HP, energy retained as protein or lipid and maternal energy retention in early-, mid- or late-gestation. There was no interaction between Carnichrome[®] (r) and stage of gestation. Increased energy requirements in late gestation led to a linear increase in HP (4.0 kJ/kg BW^{0.75}/d) from d-90 to 110. Energy requirements for maintenance averaged 405 kJ/kgBW^{0.75}/d. On average, activity HP was 116 kJ/kgBW^{0.75}/d, which was equivalent to 20% of ME intake, but ranged from 11 to 37%. This shows that physical activity represents a major factor causing differences in energy balance between sows. In conclusion, Carnichrome[®] (r) had no effect on the components of heat production and maternal weight gain during gestation, although it improved energy and organic matter digestibility of the diet.

Key Words: Sows, Carnichrome[®], Gestation