

Graduate Student Competitive Research Papers M.S. Divisions

74 Pre- and postweaning performance of pigs injected with dexamethasone at birth. A.M. Gaines^{*1}, J.A. Carroll², G.L. Allee¹, G.F. Yi¹, J.D. Spencer¹, J.W. Frank¹, and D.C. Kendall¹, ¹University of Missouri-Columbia, ²Animal Physiology Research Unit, ARS-USDA, Columbia, Missouri.

A trial was conducted to determine pre- and postweaning performance of pigs injected with dexamethasone (Dex) either 1 or 24 hr after birth. In Exp1, at an 1800 head commercial sow unit, 225 pigs (TR4 x C22) were assigned according to birth weight and sex to three treatments. Treatments (Trt) included either saline (Cont), Dex1 (2-mg/kg BW i.m. injection of Dex within 1 hr of birth) or Dex24 (2-mg/kg BW i.m. injection of Dex within 24 hr after birth). Birth weights (1.56 ± 0.36 kg) did not differ among Trt ($P > 0.96$) or between sexes ($P > 0.70$). For body weight (BW) at weaning (15d), there was a Trt x Sex interaction ($P < 0.02$) with Dex males 12% heavier than Cont males (4.8 vs. 4.3 kg, respectively) and Dex females lighter than Cont females (4.5 vs. 4.8 kg, respectively). In Exp2, 186 pigs from Exp1 were transported to a nursery facility. There were 10 pens/Trt/Sex (60 pens). Pigs were fed fortified corn-soybean meal diets in a three-phase feeding program. At the end of Exp2 (49d period) there was a Trt x Sex interaction ($P < 0.01$) for BW with Dex barrows 8% heavier than the Cont barrows (30.0 vs. 27.8 kg, respectively) and no difference in gilts. No differences in feed efficiency (G:F) were observed during the nursery period. In Exp3, pigs from the nursery were moved to a finishing facility where there were 4 pens/Trt/Sex (24 pens). All pigs were fed fortified corn-soybean meal diets in a four-phase feeding program with sexes fed separately. Real-time ultrasound was used to measure 10th rib backfat depth (BF) and loin-eye area (LEA). At the end of Exp3 (83d period) there was a Trt x Sex interaction ($P < 0.04$) for final BW with Dex barrows being 4.9 kg heavier than Cont barrows (119.6 vs. 114.7 kg, respectively) and no difference in gilts. No treatment differences were observed for BF, LEA or G:F ($P > 0.10$). These studies demonstrate that Dex given within 24 hours of birth significantly improves both pre- and postweaning performance of barrows with no beneficial effects on gilts.

Key Words: Dexamethasone, Pigs, Birth

75 Effect of formulating grow-finish swine diets using standardized ileal amino acid digestibility values on nutrient excretion and odor emissions from slurry. J. S. Knott^{*} and G. C. Shurson, University of Minnesota, St. Paul, MN.

Effect of diet formulation on nutrient excretion, gas and odor emissions from slurry was evaluated in a 16-wk study. Barrows (n=16) received either a corn-soybean meal diet containing 0.075% synthetic lysine (CTL) and formulated on a total amino acid basis, or a diet low in N and S formulated on a standard ileal digestible amino acid basis using synthetic amino acids (SID). Feces and urine were collected and mixed daily from four metabolism crates per treatment, separated into four equal subsamples, and added to one of four DPSM corresponding to the assigned crate. Eight pairs of pigs were assigned to crates and alternated in and out of crates every two wks during the experiment. Nutrient balance (GE and N) was determined using a 3d total collection period four times throughout the experiment. Hydrogen sulfide (H₂S) and ammonia

(NH₃) concentrations were measured weekly. Air samples were collected at 5 wk intervals and analyzed for odor detection threshold (ODU), intensity (OI), and hedonic tone (OHT). Feeding SID diets had no effect on GE and N retention or excretion. During wk 4, H₂S emissions were low (< 1.8 ppm), but were greater ($P < .10$) from manure produced by pigs fed the SID diets. During wks 7, 11 ($P < .15$) and 16 ($P < .05$), there was a reduction in H₂S emissions from manure of pigs fed SID diets, and differences in H₂S emissions between treatments were greatest during wk 16 (3.41 vs 8.06 ppm for CTL and SID, respectively). Manure from pigs fed SID diets had lower NH₃ emissions for wks 11 ($P < .15$) and 14 ($P < .05$). No differences between treatments were observed for ODU, OI, and OHT. Slurry samples from each DPSM were collected at the end of wk 16 and analyzed for DM, N, and S. Slurry from pigs fed the SID diets had higher ($P < .05$) DM, N, and S concentrations compared to slurry from pigs fed CTL diets. These results suggest that formulating grow-finish diets using SID may be effective in reducing NH₃ and H₂S emissions in slurry, but has no effect on ODU, OI, and OHT, or GE and N balance.

Key Words: Amino Acids, Odor, Swine

76 Influence of linoleic acid isomers on body fat in mice. K. M. Hargrave^{*} and J. L. Miner, University of Nebraska - Lincoln.

Conjugated linoleic acid (CLA) causes a loss of body fat when fed to mice, rats, and pigs. Elongation and desaturation of CLA in animal tissues produces conjugated isomers of arachidonic acid. We hypothesize that this metabolism is required for the CLA-mediated reduction in body fat and that this metabolism is enhanced during linoleate deficiency. Our objective was to determine whether mice fed a diet deficient in essential fatty acids (EFAD) are more sensitive than mice fed a control diet to the anti-obesity effect of CLA. Eighty, newly weaned male mice (3 wk of age, 14 g BW) were blocked by weight and allotted to a 2 x 2 factorial arrangement of dietary treatments: Control = 7% soy oil diet for 8 wk; Control + CLA = Control diet for 6 wk then 6.5% soy oil + 0.5% CLA diet for 2 wk; EFAD = 7% coconut oil diet for 8 wk; EFAD + CLA = EFAD diet for 6 wk then 6.5% coconut oil + 0.5% CLA diet for 2 wk. Feed intake and BW were measured weekly. After 8 wk the mice were killed, and liver, and retroperitoneal (RP), and epididymal (Epi) fat pads were removed and weighed. Body fat percentage (BF%) was determined by ether extraction. Addition of CLA to the Control diet reduced ($P < 0.05$) BW by 8% and feed intake by 11%, and reduced ($P < 0.01$) fat pad weights (0.37 vs 0.19 g and 0.61 vs 0.45 g for RP and Epi pads, respectively) and BF% (21.08 vs 15.37%). There was no Control vs EFAD diet main effect. However, there was a pronounced CLA x EFAD interaction ($P < 0.001$). Body fat depletion by CLA was 40% greater in mice fed the EFAD diet than in mice fed the Control diet. We conclude that mice fed essential fatty acid deficient diets are especially sensitive to the anti-obesity effect of CLA. This supports our hypothesis that the anti-obesity effect of CLA involves elongation and desaturation of CLA.

Key Words: Conjugated Linoleic Acid, Body Fat, Essential Fatty Acids

Growth, Development, Muscle Biology, And Meat Science

77 Effect of feather meal on live animal performance and carcass quality and composition of growing-finishing swine. C. B. Boger^{*}, J. K. Apple, C. V. Maxwell, W. J. Roberts, and K. G. Friesen, University of Arkansas.

Crossbred pigs (n=120; BW=24.5±0.1 kg) were used to assess the effects of dietary valine (VAL), from hydrolyzed feather meal (FM), on performance and carcass traits of growing-finishing swine. Pigs were blocked by BW, allotted to 24 pens (5 pigs/pen), and pens were assigned randomly to 1 of 4 treatments: 1) positive control (PC) corn-soybean meal (SBM) starter, grower, and finisher diets; 2) negative control (NC) corn-SBM-wheat middlings starter, grower, and finisher diets that met minimum requirements for VAL; 3) NC-diets supplemented with 3% FM; and 4) NC-diets supplemented with 6% FM. Within FM-diets, FM was substituted for SBM on an equal lysine basis at the expense of

wheat middlings. All diets were formulated to be isocaloric, and fed in 4 phases with diet transition occurring when mean block weight was 36, 68, and 91 kg, respectively. When the lightest block averaged 107 kg, all pigs were harvested, and Fat-O-Meater fat and longissimus muscle (LM) depths and hot carcass weight were recorded. After a 24-h chilling period, Lean content of hams from left side of carcasses was determined using TOBEC. Loins were captured and used to measure instrumental color and drip loss. Neither PC, NC, nor FM-supplemented diets affected ($P > 0.10$) ADG, ADFI, or G:F, and dietary treatments had no effect ($P > 0.10$) on fat and LM depths, or lean composition of the carcass and ham. There was a linear trend ($P < 0.07$) for L* values to increase as FM increased in the wheat middlings-based diets; however, the LM of pigs fed NC-diets was redder ($P < 0.01$) than the LM of pigs fed PC or FM-supplemented diets, and the LM from pigs fed FM-supplemented