

STUDENT COMPETITION ABSTRACTS

GRADUATE STUDENT COMPETITION— MS ORAL I

- 363 **Influence of dietary fat source and feeding duration on pig growth performance, carcass composition, and fat quality.** E. W. Stephenson*, M. A. Vaughn, D. D. Burnett, C. B. Paulk, M. D. Tokach, S. S. Dritz, J. M. DeRouchey, R. D. Goodband, J. M. Gonzalez, J. C. Woodworth, *Kansas State University, Manhattan.*

A total of 160 finishing pigs (PIC 327 × 1050; initially 45.6 kg) were used in an 84-d experiment to evaluate the effects of dietary fat source and feeding duration on growth performance, carcass characteristics, and fat quality. Pigs were blocked by sex and BW with 2 pigs per pen and 8 pens per treatment. Dietary treatments included a corn-soybean meal control diet with no added fat or a 3 × 3 factorial with main effects of fat source (4% tallow, 4% soybean oil, or a blend of 2% tallow and 2% soybean oil) and feeding duration (d 0 to 42, 42 to 84, or 0 to 84). One pig was identified in each pen on d 0, and biopsy samples of the back, belly, and jowl fat were collected on d 0, 41, and 81. On d 84, all pigs were harvested with carcass characteristics measured, and back, belly, and jowl fat samples collected. Overall, there were no differences between fat sources for growth and carcass measurements; however, pigs fed added fat diets from d 0 to 84 had improved ($P < 0.04$) G:F compared with pigs fed the control. Pigs fed added fat throughout the entire study also had improved ($P < 0.04$) ADG and G:F and heavier d-84 BW ($P < 0.01$) compared with pigs fed added fat for only period 1 or 2. Adding fat for the entire study increased ($P < 0.03$) backfat and tended to reduce ($P < 0.08$) fat-free lean index compared with pigs fed the control. Added fat also increased ($P < 0.05$) iodine value (IV) compared with pigs fed the control. Jowl fat, unlike the other two fat depots, did not show a period effect of IV when adding dietary fat. Increasing the feeding duration of soybean oil or a blend of soybean oil and tallow decreased monounsaturated and increased polyunsaturated fatty acids relative to feeding tallow (duration × fat source interaction, $P < 0.05$), with the greatest changes in C18:1 and C18:2. In conclusion, feeding added fat improved ADG and G:F; however, feeding soybean oil for an increasing duration, either alone or in a blend with tallow, negatively affected the fatty acid composition and IV of finishing pigs.

Key Words: fat source, finishing pig, iodine value

- 364 **Effects of lysine intake and divergent selection for residual feed intake on nitrogen metabolism and lysine utilization in growing pigs.** D. J. Hewitt*, C. F. de Lange², A. Gheisari¹, J. C. M. Dekkers³, A. Rakhshandeh¹, ¹*Texas Tech University, Lubbock*, ²*Department of Animal and Poultry Science, University of Guelph, Guelph, ON, Canada*, ³*Iowa State University, Ames.*

Residual feed intake (RFI) is defined as the difference between actual feed intake and that predicted on the basis of energy requirements for growth and maintenance. Little is known about the effect of divergent selection for RFI on efficiency of amino acid utilization in growing pigs. Our objective was to evaluate the effects of divergent selection for RFI and lysine (Lys) intake on nitrogen (N) metabolism and Lys utilization in growing pigs. Twenty four gilts (BW 66 ± 5 kg) were selected from generation 9 of the low RFI (LRFI; $N = 12$) and high RFI (HRFI; $N = 12$) Iowa State University Yorkshire RFI selection lines. Six pigs from each genetic line were assigned to each of two levels of Lys intake (70 and 100% of estimated requirements; NRC, 2012) from diets in which Lys was first limiting among AA. Following 5 d of adaptation, whole body N-balance and apparent fecal nutrient digestibility (AFD) was determined during a 3 d period, after which pigs were anesthetized for determining body composition using Dual-energy X-ray absorptiometry (iDXA). Pigs were then euthanatized and ileal digesta was collected for measuring apparent ileal nutrient digestibility (AID). No interaction effects of line and Lys intake on N retention, AID and AFD of N, body lean and fat contents, and efficiency of Lys utilization for N retention were observed ($P > 0.05$). Line had no effect on retention, AID and AFD of N ($P > 0.05$). An increase in Lys intake improved N retention in both lines (from 15.0 to 19.6 g/d, SE 1.44, in LRFI; and from 16.9 to 19.8 g/d, SE 1.67 in HRFI pigs; $P < 0.01$). Lysine intake had no effect on AID and AFD of N ($P > 0.05$). At the low Lys intakes and when Lys clearly limited N retention the efficiency of using Lys intake (above maintenance requirements) for Lys in retained N was 77 and 86%, SE 3.1, for the LRFI and HRFI pigs, respectively ($P < 0.05$). Body lean tissue content tended to be higher in LRFI than HRFI pigs (82 vs. 76%, SE 2.7; $P < 0.09$). Collectively, these results suggest that genetic selection for low RFI is not associated with improvements in Lys utilization efficiency in growing pigs. USDA-NIFA grant number 2011-68004-30336.

Key Words: residual feed intake, lysine, pig