

## POSTER PRESENTATIONS

### Graduate Student Poster Competition—M.S.

**117 Low-fat wet distillers grains and beef quality.** A. Haack\*<sup>1</sup>, C. Calkins<sup>1</sup>, A. de Mello Jr.<sup>1</sup>, S. Pokharel<sup>1</sup>, L. Senaratne<sup>1</sup>, J. Hergenreder<sup>1</sup>, K. Varnold<sup>1</sup>, T. Carr<sup>1</sup>, G. Erickson<sup>1</sup>, and D. Johnson<sup>2</sup>, <sup>1</sup>University of Nebraska, Lincoln, <sup>2</sup>University of Florida, Gainesville.

Strip loins (*M. longissimus lumborum*) from 45 USDA Choice steers were used to test the effects of diet oxidation, color changes during retail display, flavor and tenderness. The dietary treatments included a low-fat wet distillers grain without solubles (LFWDG; 4.72% fat) fed at 35% DM, traditional wet distillers grains with solubles (TWDGS; 6.91% fat) fed at 35% DM and a corn-based control diet. Four 2.5 cm steaks were cut for taste panels and Warner-Bratzler Shear Force (WBSF) testing. The remaining loin sections were cut into 1.3 cm thick steaks for measurement of oxidation with a thiobarbituric acid (TBA) assay and a 7 d retail display period. Four days after simulated retail display, samples from cattle fed LFWDG had more oxidation than TWDGS or control diets. Five days after simulated retail display, meat from LFWDG were less red in color (lower a\*) and had more visual discoloration than other treatments ( $P \leq 0.0001$  and  $P \leq 0.05$ , respectively). The L\* and b\* readings were not significantly different ( $P \geq 0.05$ ). Samples from LFWDG were less tender ( $P \leq 0.0006$ ) and had more off-flavor ( $P \leq 0.02$ ) after display than TWDGS. Samples from LFWDG had approximately 10% more PUFA than TWDGS (4.86% vs. 4.46%, respectively;  $P = 0.08$ ). These data suggest fatty acids contained within the distillers grains are partially protected from biohydrogenation during digestion, while fatty acids in the soluble fraction are more readily hydrogenated in the rumen. Consequently, diets formulated with LFWDG tend to compromise meat quality compared with TWDGS and corn-based control diet

**Key Words:** distillers grains, PUFA, oxidation, beef quality

**118 Nutrient digestibility and performance of weaned pigs fed diets containing fermented soybean meal and phytase.** L. A. Merri-man,\* J. P. Holt, and K. W. Tudor, *Illinois State University, Normal.*

The inclusion of fermented soybean meal and addition of enzymes to weaned pig diets may reduce nutrient excretion and enhance performance. Two experiments were conducted to determine the effects of replacing conventional soybean meal with fermented soybean meal on growth performance and digestibility of weaned pigs. Barrows (n = 14, BW 9.35 kg) were placed into metabolism crates and randomly assigned to experimental diets containing either conventional soybean meal (CON) or 7% fermented soybean meal (FSBM) replacing conventional meal. Two phases of experimental diets were fed. Total urine and feces were collected during each phase for 3 d following a 7 d adjustment period. Gross energy of feed, feces, and urine was determined by bomb calorimetry and N using the combustion method. A growth assay was then conducted with 328 pigs (BW 6.28 kg) blocked by weight and sex. Pigs were placed into 44 nursery pens and fed one of 4 experimental diets consisting of: a standard corn/soy diet (CON), a diet containing 7% inclusion of fermented soybean meal (PSG), CON + phytase (PHY), or PSG + phytase (PP). Experimental diets were fed for 28 d in 3 phases. Pig weights and feed disappearance were measured weekly to determine ADG, ADFI, and G:F. DM, N, and energy digestibility was not different ( $P > 0.05$ ) between pigs fed either CON

or FSBM during the metabolism trial. ADG of pigs consuming PHY (0.16 kg) and PP (0.15) was greater ( $P < 0.05$ ) compared with those fed PSG (0.11) or CON (0.09) during phase 1 of the growth assay. ADFI of pigs fed PHY (0.44 kg/d) was greater ( $P < 0.05$ ) compared with those fed PSG (0.37) during phase 2, with CON (0.39) and PP (0.42) fed pigs being intermediate. However, ADG was not different between treatments during this phase. No differences ( $P > 0.05$ ) in ADG, ADFI, or G:F were observed during phase 3. Diets containing phytase increased ADG and ADFI during the early nursery phase. Fermented soybean meal can be used as a partial replacement of conventional soybean meal without impacting pig performance.

**Key Words:** phytase, swine, fermented soybean meal

**119 Uterine expression of Na<sup>+</sup>/H<sup>+</sup> antiporters 1, 2, and 4 in beef cows from 60 to 96 hours following CIDR removal.** J. K. Grant\* and G. A. Perry, *South Dakota State University, Brookings.*

When synchronized with a fixed-time AI protocol, cows that exhibited estrus had decreased uterine pH at insemination and greater pregnancy rates than cows that did not exhibit estrus. Research has reported expression Na<sup>+</sup>/H<sup>+</sup> antiporter 1, 2, and 4 significantly decreased following onset of estrus among cows that exhibited estrus, but did not change among cows that did not exhibit estrus. Therefore, the objective of this study was to determine changes in uterine expression of Na<sup>+</sup>/H<sup>+</sup> antiporter 1, 2, and 4 in cows from 60 to 96 h following CIDR removal. Angus-cross beef cows (n = 28) were synchronized with a PG-CIDR protocol. Cows received PGF<sub>2α</sub> on d -9, GnRH and insertion of a CIDR on d -6, and PGF<sub>2α</sub> and CIDR removal on d 0. At CIDR removal, transrectal ultrasonography was performed to determine dominant follicle size. Cows were blocked by follicle size, and uterine biopsies were collected at 60, 72, 84, or 96 h following CIDR removal. Total cellular RNA was extracted from all biopsies, and relative mRNA levels were determined by real-time RT-PCR and corrected for GAPDH expression. Onset of estrus was determined by the HeatWatch Estrous Detection System, and mean interval to estrus was 59.38 ± 4.82 h. There was no effect of time, estrus, or an estrus by time interaction on expression of Na<sup>+</sup>/H<sup>+</sup> antiporter 1 ( $P = 0.54, 0.84, \text{ and } 0.29$ ; respectively) or 4 ( $P = 0.39, 0.09, \text{ and } 0.61$ ; respectively). Alternatively, there was an effect of time ( $P < 0.01$ ), estrus ( $P < 0.01$ ), and an estrus by time interaction ( $P < 0.01$ ) on expression of antiporter 2. Among cows that exhibited estrus, expression of antiporter 2 was increased at h 72 compared with h 60, 84, or 96 ( $P < 0.01$ ). Among cows that did not exhibit estrus, expression of antiporter 1, 2, and 4 did not change ( $P > 0.10, P > 0.61, \text{ and } P > 0.21$ ; respectively). In summary, expression of Na<sup>+</sup>/H<sup>+</sup> antiporter 1 and 4 did not change and antiporter 2 significantly increased 72 h following CIDR removal among cows that exhibited estrus, but did not change among cows that did not exhibit estrus.

**Key Words:** uterine pH, estrus, Na<sup>+</sup>/H<sup>+</sup> antiporter

**120 Effects of increasing PEP-NS on nursery pig performance.** A. J. Myers\*<sup>1</sup>, M. D. Tokach<sup>1</sup>, R. D. Goodband<sup>1</sup>, S. S. Dritz<sup>1</sup>, J. M.

DeRouchey<sup>1</sup>, J. L. Nelssen<sup>1</sup>, B. W. Ratliff<sup>2</sup>, D. McKilligan<sup>2</sup>, G. Xu<sup>3</sup>, and J. Moline<sup>3</sup>, <sup>1</sup>Kansas State University, Manhattan, <sup>2</sup>Tech Mix Inc., Stewart, MN, <sup>3</sup>Midwest Ag Enterprises, Marshall, MN.

A total of 180 nursery pigs (PIC 1050, initially 6.4 kg and 28 d of age) were used in a 24-d study to evaluate the effects of increasing PEP-NS on nursery pig performance. PEP-NS is a combination of porcine intestinal mucosa, dried fermentation biomass, and by-products of corn wet-milling. There were 5 pigs per pen and 6 pens per treatment. There were 6 dietary treatments: a negative control containing no specialty proteins, the negative control diet with 3, 6, 9, or 12% PEP-NS, or the negative control with 6% select menhaden fish meal (SMFM). The diet with 6% SMFM contained the same amount of soybean meal as the diet with 6% PEP-NS. A common pretest diet was fed in pellet form for the first 7 d post weaning. Experimental diets were fed in meal form from d 0 to 14, and a common diet was fed from d 14 to 24. From d 0 to 14, increasing PEP-NS increased (quadratic,  $P < 0.01$ ) ADG, ADFI, and G:F with the greatest response observed in pigs fed 9% PEP-NS. There were no differences ( $P > 0.29$ ) between pigs fed 6% PEP-NS or 6% SMFM. When pigs were fed a common diet from d 14 to 24, there were no differences in performance among treatments. Overall (d 0 to 24), pigs fed increasing PEP-NS had improved (quadratic;  $P < 0.01$ ) ADG and G:F, with the greatest improvement seen as PEP-NS increased from 3 to 6%. These results suggest that feeding 6% to 9% PEP-NS in phase 2 nursery pig diets is suitable replacement for 6% SMFM.

**Table 1. Effects of PEP-NS on nursery pig performance**

| Item      | PEP-NS, % |       |       |       |       | P-value |       |        |           |
|-----------|-----------|-------|-------|-------|-------|---------|-------|--------|-----------|
|           | 0         | 3     | 6     | 9     | 12    | 6% SMFM | SEM   | Linear | Quadratic |
| d 0 to 14 |           |       |       |       |       |         |       |        |           |
| ADG, g    | 197       | 289   | 353   | 373   | 328   | 351     | 12    | <0.01  | <0.01     |
| ADFI, g   | 359       | 401   | 437   | 455   | 410   | 450     | 13    | 0.01   | 0.01      |
| G:F       | 0.550     | 0.721 | 0.808 | 0.819 | 0.797 | 0.781   | 0.018 | <0.01  | <0.01     |
| d 0 to 24 |           |       |       |       |       |         |       |        |           |
| ADG, g    | 367       | 397   | 447   | 440   | 417   | 449     | 13    | <0.01  | <0.01     |
| ADFI, g   | 559       | 560   | 599   | 598   | 569   | 617     | 16    | 0.27   | 0.10      |
| G:F       | 0.658     | 0.707 | 0.746 | 0.737 | 0.733 | 0.729   | 0.015 | <0.01  | <0.01     |

**Key Words:** fish meal, PEP-NS, nursery pigs

**121 The effects of supplementing beef cows grazing cornstalk residue with a dried distillers grain based cube on cow and calf performance.** J. M. Warner,\* J. L. Martin, Z. C. Hall, L. M. Kovarik, K. J. Hanford, and R. J. Rasby, *University of Nebraska, Lincoln.*

Multiparous, spring calving, crossbred (Simmental x Angus) beef females (n = 832) were used over 5-years to study the effects of supplementing a dried distillers grain cube to cows grazing cornstalk residue on cow and calf performance. Cows were blocked annually by age, body condition score (BCS), body weight (BW), and calving date and assigned randomly to one of 2 treatments. Treatments were 1) supplemented (SUPP) with protein using a dried distillers grains with solubles (DDGS) cube or 2) not supplemented (CON) during the last trimester of pregnancy. SUPP and CON cows were managed together from the onset of calving until the start of cornstalk grazing. Each year by treatment group was considered an experimental unit. Cow weight (574.5 ± 10.7 kg) was similar at initiation of cornstalk grazing, at the end of cornstalk grazing (608.5 ± 7.5 kg), and at the initiation of the

breeding season (566 ± 4.4 kg) for both groups. Supplementation did not affect BCS at the start of the breeding season (5.4 ± 0.1) or BCS at the initiation of cornstalk grazing the subsequent year (5.4 ± 0.1). BCS of SUPP cows was greater ( $P = 0.02$ ) at the end of cornstalk grazing than CON cows (5.6 vs. 5.4 ± 0.1). Calving interval, calf birth weight, and actual calf weaning weights were not different between groups. Percentage of cows cyclic before the breeding season and final pregnancy rates were similar. Heifer progeny (n = 306) were not different in initial weight (277.5 ± 10.2 kg), final weight (351 ± 11.5 kg), initial BCS, final BCS, or ADG (0.45 ± 0.04 kg/d) for both treatment groups. Heifer age at puberty, estrus response to synchronization, A.I. conception rate, A.I. pregnancy rate, and final pregnancy rate were similar. Supplementation of a DDGS cube to cows grazing cornstalk residue improves BCS in the last trimester without affecting calf performance or reproduction. Dam supplementation regimen did not alter growth or reproductive performance of heifer progeny.

**Key Words:** cornstalk residue, beef cows, beef heifers, supplemental protein

**122 Growth performance, nutrient digestibility, and whole body oxygen consumption in growing pigs fed DDGS-containing diets supplemented with a multicarbohydase enzyme.** A. K. Agyekum,\* T. A. Woyengo, B. A. Slominski, and C. M. Nyachoti, *University of Manitoba, Winnipeg, MB, Canada.*

The aim was to determine growth responses and apparent total tract nutrient digestibility in growing pigs fed diets containing graded levels of DDGS and to determine the effect of a multicarbohydase enzyme (MC) supplementation on visceral organ mass and whole body oxygen consumption (WBOC). In Exp. 1, 48 pigs (~26 kg BW) were assigned to 4 diets (6 pens/diet; 2 pigs/pen) based on corn-barley-SBM with 0, 10, 20 and 30% DDGS in a 42-d trial. Apparent total tract digestibilities (ATTD) of DM, energy, and N were determined using AIA as the indigestible marker. Inclusion of DDGS tended ( $P = 0.072$ ) to decrease ADG (0.85, 0.88, 0.78, 0.75 kg/d) but not ( $P > 0.10$ ) ADFI (1.81, 1.80, 1.80, 1.71 kg/d) and G:F (0.47, 0.46, 0.44, 0.43). Diet had an effect on ATTD of energy and nutrients ( $P < 0.05$ ). In Expt. 2, 24 pigs (~20 kg BW) were randomly assigned to 3 corn-SBM-based diets (8 pigs/diet): control (C, 0% DDGS), C + 30% DDGS or C+30% DDGS + MC. On d 15, WBOC during the 24- to 30-h postprandial period was determined using an open-circuit indirect calorimeter on 4 pigs/diet. On d 28, pigs were killed to determine visceral organ mass. There was no diet effect ( $P > 0.10$ ) on final BW, WBOC, and liver, spleen, pancreas, stomach, cecum and small intestine weights relative to empty BW. However, pigs fed the C and C+30% DDGS+MC had heavier ( $P = 0.053$ ) empty BW compared with those fed unsupplemented diets. Colon plus rectum and the portal-drained viscera (PDV) were heavier ( $P < 0.05$ ) in DDGS-fed pigs compared with the Control. Results show that including DDGS in grower pig diets up to 30% has no effect of performance although ATTD of energy, DM, and N may be reduced. Inclusion of DDGS at 30% increased PDV mass and reduced dressing percentage but these effects were overcome by MC supplementation.

**Key Words:** performance, DDGS, portal-drained viscera, pigs

**123 Effect of ewe body condition during mid to late gestation on progeny mammary epithelial cell proliferation.** K. E. Boesche,\* A. L. Hunter, K. M. O'Diam, S. C. Loerch, and K. M. Daniels, *The Ohio State University, Ohio Agricultural Research and Development Center, Wooster.*