grains plus solubles (WDGS) does not negatively influence, and may benefit, marbling score. When cattle are fed WDGS, a higher amount of 18:2 fatty acid is observed at the duodenum, and higher amount of polyunsaturated fatty acids (PUFA) as well as 18:2 and Omega 6 are found in the infraspinatus (top blade), longissimus (ribeye), and psoas major (tenderloin) muscles. Those muscles have higher oxidation when displayed at simulated retail conditions for 7, 14 and 21 days ($P < 0.05$). A series of studies suggest that higher visual discoloration ($P < 0.05$) is observed on strip loin, tenderloin and top blade steaks from cattle fed WDGS. Top blade and tenderloin steaks from cattle fed 30% WDGS were significantly less red (lower a* values) after 3 d of retail display ($P < 0.04$). This effect is originated by higher PUFA and oxidation. Higher discoloration is observed when long aging periods are practiced before the meat goes to retail display. No significant effects on objective tenderness (WBSF - Warner-Bratzler shear force) and sensory attributes (except off-flavor notes) were observed. More livery off flavors have identified when meat from animals fed WDGS is subjected to retail display. In addition, the solubles in WDGS are high in minerals which may lead deviation in flavor. Vitamin E tends to mitigate negative effects caused by feeding WDGS. Therefore, it is clear that feeding WDGS does not compromise marbling or tenderness. Shelf life (color stability and oxidation) and off-flavor issues may be controlled by vitamin E.

Key Words: beef quality, distillers grains, palatability

329 Effects of various coproducts on beef consumer sensory and tenderness traits. G. P. Lardy* and R. J. Maddock, *North Dakota State University*, *Fargo*.

Food processing industries generate significant volumes of processing coproducts typically used in livestock diets. As industrial and bioenergy demands for corn continue to increase, increasing emphasis on coproduct use in beef cattle production will occur in an effort to reduce costs. Traditional research has investigated a variety of coproducts and the effects on ADG, DMI, G:F, and carcass data. However, increasing emphasis must be placed on the effects on consumer sensory traits and tenderness when these coproducts are used in beef cattle finishing diets. The effects of corn coproducts are covered in a companion abstract while this abstract focuses on other coproducts such as potato processing waste, wheat middlings, sugar beet processing byproducts, glycerol, and other vegetable wastes. Unfortunately, data regarding the effects of these byproducts on beef consumer sensory and tenderness traits is limited. Work in several laboratories has investigated the effects of feeding potato processing waste on consumer sensory traits and indicates few differences in palatability, including juiciness, tenderness, or flavor when potato waste is fed at levels which maintain acceptable feedlot performance. Little, if any, data has investigated the effects of wheat middlings, sugar beet processing byproducts, and other vegetable wastes on meat quality traits. In the future, additional research should investigate the effects of these and other coproducts on mechanical shear force, and sensory ratings of tenderness, juiciness, and flavor. Future work should focus on characterizing the composition of coproducts, especially as it relates to compounds or components which may have positive or negative influences on beef flavor, color, and palatability (e.g. fat and fat soluble compounds). In addition, steps should be taken to investigate any possible concerns related to chemical components which may result in off-flavors or reductions in shelf life of fresh meat and further processed meat products. The use of feedstuffs or feedstuff combinations which decrease consumer acceptance of beef should be limited, or not used in beef cattle finishing diets.

Key Words: beef, coproducts, sensory characteristics

330 By-product feeding effects on pork quality and carcass traits. J. D. Wood*, F. M. Whittington, and K. G. Hallett, *University of Bristol*, *Langford, Bristol, UK*.

Many components of pig diets are by-products of industrial processes whose main aim is the production of foods or other materials for human use. Protein meals derived from oil seeds from which most of the oil has been extracted are important examples eg soyabean meal and rapeseed/canola meal. Distillers dried grains and solubles (DDGS), a by-product of ethanol production from maize, is another protein source. Interest in these protein meals from a meat quality perspective centers around their effect on the oiliness and firmness of fat tissues. Soft or oily fat is more difficult to process into ham or bacon and causes fresh cuts to lose their rigidity and become 'floppy'. These effects are due to the residual oil present in the meal. This makes an important contribution to energy value but because the oil is high in polyunsaturated fatty acids (PUFA), it will be incorporated into fat tissue and soften it if excessive amounts are fed. By-products high in saturated fatty acids such as palm kernel meal produce firmer carcass fat. The major PUFA in protein meals including soyabean meal and DDGS is linoleic acid (18:2n-6) whose fat softening effect is explained by a very low melting point. A close association between the amount of 18:2n-6 in the diet, its concentration in carcass fat and the hardness/softness of backfat and pork cuts has been demonstrated in several studies. A summary of work at Bristol showed that unacceptably soft fat occurred at values above 15% of total fatty acids in backfat. This was achieved at a level of about 1.6% 18:2n-6 in the diet and this figure has been used as an upper limit for formulation of finishing diets in Britain. However, this figure is based on pigs having fat thickness values of 12-14mm. The 18:2n-6 concentration can be increased above 1.6% in fatter pigs without adverse effects on fat quality because higher fatness itself depresses the concentration of 18:2n-6 in total fatty acids.

Key Words: by-products, swine, fat quality

Nonruminant Nutrition: Amino Acids and Energy

331 Birth order, birth weigh, sow colostrum IgG, and pig IgG concentration and their effects on neonatal piglet survival. R. Cabrera*[1], X. Lin[1], K. Shim[1], T. Inskeep[1], J. Campbell[2], A. Moeser[1], and J. Odle[1], [1]*North Carolina State University*, *Raleigh*, [2]*American Protein Coporation*, *Ankeny, IA*.

Uptake of colostrum after birth is essential to stimulate intestinal growth and function, and provides systemic immunological protection via absorption of Immunoglobulin G (IgG). The birth order and weight of 745 piglets (from 75 litters) were recorded during a one-week period of farrowing. Only pigs weighing greater than 0.9 kg birth weight were chosen for the trial. Sow colostrum was collected during parturition, and piglets were bled between 48 and 72 hours post-birth. Pig serum IgG and colostral IgG concentrations were determined by radial immunodiffusion. The data were analyzed using the GLM and REG procedures of SAS. Sow colostral IgG concentration explained 6% and piglet birth order accounted for another 4% of the variation observed in pig

IgG concentration (P < 0.05). However birth weight had no detectable effect. Pig IgG concentration had both a linear (P < 0.05) and negative quadratic effect (P < 0.05) on % survival. Pigs with 1,000 mg/dl IgG or less (n=24) had a 67% survival; whereas, 39% of the pigs (n=247) had IgG concentrations between 2250 to 2500 mg/dl with 91% survival. Birth order had no detectable effect on survival, but birth weigh had a linear effect (P < 0.05) on % survival. Pigs weighing 0.9 kg (n = 107) at birth had 68% survival rate, and those weighing 1.6 kg (n = 158; ~average birth weight) had an 89% survival. In conclusion, we found that sow colostrum IgG concentration and birth order can account for 10% of the variation of pig IgG concentration and that piglets with less than 1,000 mg/dl IgG serum concentration and birth weight of 0.9 kg at birth had low survival rate when compared to their siblings.

Key Words: neonatal swine, pig IgG concentration, sow colostrum IgG concentration

332 Efficacy of dietary amino acids to replace fish meal and whey protein on physiological changes in weanling pigs. Y. Zhao*[1], C. M. Ballou[1], A. C. Chaytor[1], R. L. Payne[2], and S. W. Kim[1], [1]*North Carolina State University, Raleigh,*, [2]*Evonik-Degussa Corp, Kennesaw, GA*.

One hundred sixty newly weaned pigs at 21 d of age were used in a randomized block design with 4 treatments, 8 replicates per treatment, and 5 pigs per pen (4 × 8 × 5). All diets contained the same amounts of SBM and plasma protein as common protein sources. Treatments with different protein sources were CON (fish meal and whey protein), FA (supplemental amino acids and fish meal), WA (supplemental amino acids and whey protein), and AA (supplemental amino acids). Pigs were fed the assigned experimental diets for 4 wks based on a 2-phase-feeding (P1: 1 wk; P2: 3 wks). Supplemental amino acids were Lys, Thr, Trp, Met, Val, and Ile, and these AA were used to match amounts of standardized ileal digestible Lys (1.34 and 1.19%), Thr (0.93 and 0.80%), Trp (0.26 and 0.24%), Met+Cys (0.68 and 0.64%), Val (0.99 and 0.91%), and Ile (0.78 and 0.76%) among treatment diets for P1 and P2, respectively. Pigs had access to diets and water ad libitum during the study. Body wt and feed intake were measured weekly. Blood samples were obtained from pigs at the end of P1 and P2 to measure plasma insulin and growth hormone contents as well as blood cell numbers. At the end of P2, pigs were euthanized to collect jejunum to measure villus height. Growth performance was reported previously and did not differ among treatments. Plasma insulin content of pigs fed AA (0.058 μg/L) tended to be greater (P<0.10) than CON (0.026), and WA (0.028) at the end of P1 but did not differ at the end of P2. Growth hormone contents and number of lymphocytes did not differ among treatments. Villus height of pigs did not differ among treatments. Collectively, extensive use of supplemental amino acids replacing fish meal and whey protein concentrate did not adversely affect the general performance of pigs but increased plasma insulin content which may benefit utilization of absorbed nutrients for tissue synthesis and energy storage.

Key Words: amino acid, pig, protein source

333 Maximizing the use of supplemental amino acids in diets for 14-kilogram pigs. V. D. Naranjo*[1], T. D. Bidner[1], R. L. Payne[2], and L. L. Southern[1], [1]*Louisiana State University Agricultural Center, Baton Rouge*, [2]*Evonik-Degussa Corporation, Kennesaw, GA*.

Four experiments were conducted to determine the maximum level of supplemental L-Lys, along with the commercially available AA, that can be added to diets for 14-kg pigs. In Exp 1, based on G:F, peanut meal (PM) was validated as a low Lys source. Weanling pigs (n = 150; initial BW of 14 kg [Exp 2]; n = 80; initial BW of 13 kg [Exp 3]; n = 80; initial BW of 14 kg [Exp 4]) were blocked by initial BW, sex, and ancestry to 6 (Exp 2) or 5 (Exp 3 and 4) treatments with 5 (Exp 2) or 4 (Exp 3 and 4) pens per treatment and 5 or 4 pigs per pen. The experiments were 7 to 14 d in duration. In Exp 2, C-SBM-PM diets contained 0.700, 0.825, 0.950, 1.075, and 1.200% SID Lys. A positive control (PC) diet without PM contained 1.200% SID Lys. Daily gain (452, 479, 465, 551, 567; 588 g/d) and G:F (0.46, 0.46, 0.49, 0.53, 0.54; 0.59) were linearly increased (P < 0.01) as SID Lys increased, but ADFI was not affected. Based on ADG, the SID Lys requirement was estimated at 1.075%. In Exp 3 and 4, C-SBM diets contained 1.075% SID Lys. Methionine, Thr, and Trp were kept in constant ratio to Lys in the diet, and Val and Ile were not added to any diet. The PC diet contained 0.10% supplemental L-Lys. In Exp 3, dietary treatments included 4 levels of supplemental L-Lys: 1) 0.146, 2) 0.192, 3) 0.238, and 4) 0.284%; and 5) PC. There was no linear (P > 0.68) or quadratic (P > 0.67) effect in ADG (580, 569, 624, 597; 598 g/d) or ADFI (1,091, 1,083, 1,109, 1,080; 1,067 g/d), but there was a quadratic effect (P = 0.03) in G:F (0.53, 0.53, 0.55, 0.55; 056). In Exp 4, dietary treatments included 4 levels of supplemental L-Lys: 1) 0.238, 2) 0.284, 3) 0.331, and 4) 0.377%; and 5) PC. There was no linear (P > 0.21) or quadratic (P > 0.22) effect in ADG (561, 545, 580, 539; 539 g/d), ADFI (976, 926, 1005, 964; 900 g/d), or G:F (0.58, 0.60, 0.58, 0.56; 0.60), but plasma urea nitrogen was decreased (linear, P < 0.1) as supplemental L-Lys increased (7.27, 5.66, 4.66, 3.66; 11.88 mg/dL). The results of this research indicate that 0.377% L-Lys can be added to diets for 14-kg pigs with no negative effects on growth performance.

Key Words: pig, nursery, amino acids

334 Optimum isoleucine to lysine ratio in a barley and wheat based diet fed to starter pigs. J. Htoo*[1], C. Zhu[2], and C. de Lange[2], [1]*Evonik Degussa Canada Inc., Gibbons, AB, Canada*, [2]*University of Guelph, Guelph, ON, Canada*.

Reducing dietary CP levels, to reduce N excretion, requires reliable information about the pigs' requirements for potentially limiting AA. Isoleucine may be limiting in low CP pig diets that are supplemented with Lys, Thr, Met and Trp. The objective was to determine the optimum dietary standardized ileal digestible (SID) Ile:Lys ratio for 10 to 22 kg starter pigs. A 3-week dose-response performance study was conducted with 144 Yorkshire pigs (initial BW 10.2 ± 0.8 kg), with 6 pen replicates (2 barrows and 2 gilts per pen) per treatment. A barley and wheat based basal diet was formulated, using analyzed ingredient AA contents and published SID AA values, to meet requirements of AA other than Ile (0.40% SID basis) and Lys (0.90% SID basis). Lys was marginally limiting to avoid underestimation of the Ile:Lys ratio. L-Ile was added to the basal diet to create 5 SID Ile:Lys ratios (44, 51, 57, 63 and 70% in diet 1 to 5). A Lys-adequate diet (diet 6, equivalent to diet 5 with added Lys) was formulated as a control. Pigs had free access to feed and water. Pigs' BW and feed disappearance were recorded weekly. Blood samples were taken on d 7 and 21 (2 pigs per pen) for determining plasma urea nitrogen (PUN). Pigs fed diet 6 had higher ADG, gain:feed and lower PUN than pigs on diet 5 (P < 0.02), indicating that Lys was limiting in diet 1 to 5. Among diets 1 to 5, gain:feed and PUN did not differ (P > 0.10), while ADG and ADFI were influenced by dietary Ile level (P < 0.01). Over the 3-week period, ADG were 436, 578, 542, 576 and 548 g (SEM 19), while ADFI were 740, 1030, 940, 990 and 945 g (SEM 29) for diets 1 to 5, respectively. The SID Ile:Lys ratios to optimize ADG were 50 and 51% based on broken-line and broken quadratic regression

analyses of ADG data, respectively. The optimum SID Ile:Lys ratio was determined to be 50 to 51% for 10 to 22 kg pigs that were fed a barley and wheat based diet.

Key Words: isoleucine, lysine, starter pigs

335 Ileal digestibility of amino acids in low-Kunitz soybeans fed to weanling pigs. K. P. Goebel* and H. H. Stein, *University of Illinois*, *Urbana*.

An experiment was conducted to determine the standardized ileal digestibility (SID) of AA in 5 sources of full fat soybeans (FFSB) and soybean meal (SBM) with different concentrations of trypsin inhibitor activity (TIU). A cold-processed FFSB (37.7% CP, 35.4 TIU/mg), a cold-processed low-Kunitz FFSB (36.17% CP, 23.5 TIU/mg), a conventional extruded FFSB (40.45% CP, 4.40 TIU/mg), a low-Kunitz extruded FFSB (38.19% CP, 4.0 TIU/mg), and a conventional SBM (47.47% CP, 3.20 TIU/mg) were used. Twelve weanling barrows (initial BW: 11.1 ± 1.3 kg) were fitted with a T-cannula in the distal ileum. Pigs were allotted to a replicated 6 × 6 Latin square design with 6 diets and 6 periods per square. Five diets were prepared using each of the soybean meals as the only source of AA in the diet. An N-free diet was also included to measure basal endogenous losses of AA. The 2 cold-processed FFSB had lower ($P < 0.05$) SID values for all indispensable AA than the 2 extruded FFSB and SBM. The SID values for all indispensible AA except Trp were greater ($P < 0.05$) in the cold-processed low-Kunitz FFSB than in the cold-processed conventional FFSB. The SID values for AA in the 2 extruded meals and in SBM were not different. These results indicate that trypsin inhibitors reduce AA digestibility in cold-processed FFSB, but a reduction in the concentration of the Kunitz trypsin inhibitor is not sufficient to ameliorate this situation.

Table 1. Digestibility (%) of AA in cold-processed conventional and low-Kunitz soybeans (CP-CV and CP-LK), extruded conventional and low-Kunitz soybeans (E-CV and E-LK), and in SBM

Item	CP-CV	CP-LK	E-CV	E-LK	SBM	SEM
Ile	55.3^{c}	68.4^{b}	89.8^{a}	92.3^{a}	92.4^{a}	2.14
Lys	57.5^{c}	71.0^{b}	90.7^{a}	92.5^{a}	90.6^{a}	2.38
Met	58.7^{c}	71.9^{b}	90.8^{a}	93.8^{a}	94.0^{a}	2.07
Thr	56.4^{c}	66.5^{b}	86.4^{a}	88.0^{a}	88.3^{a}	2.74
Trp	66.9^{b}	71.9^{b}	91.8^{a}	92.8^{a}	91.6^{a}	2.38
Val	54.7^{c}	67.5^{b}	88.1^{a}	90.0^{a}	90.6^{a}	2.52

^{a,b,c}Means within a row lacking a common superscript letter are different ($P < 0.05$).

Key Words: amino acid digestibility, soybeans, trypsin inhibitors

336 Amino acid digestibility and energy concentration in soybean meal produced from high protein, high digestible, or conventional varieties of soybeans and fed to weanling pigs. K. M. Baker* and H. H. Stein, *University of Illinois*, *Urbana*.

Two experiments were conducted using 3 sources of soybean meal (SBM). The SBM were produced from high-protein (SBM-HP), high digestible (SBM-HD), and conventional (SBM-CV) varieties of soybeans. The 3 SBM contained 54.9, 53.6 and 47.5% CP, respectively. The standardized ileal digestibility (SID) of AA in the 3 ingredients was measured using 8 barrows (initial BW: 14.3 ± 1.23 kg BW) that were equipped with a T-cannula in the distal ileum and allotted to a replicated 4 × 4 Latin square design with 4 periods and 4 diets per square. Three diets contained SBM-HP, SBM-LO or SBM-CV as the sole source of AA. The fourth diet was a N-free diet that was used to determine basal ileal endogenous losses of AA. Each period lasted 7 d and ileal digesta were collected on d 6 and 7 of each period. Results showed that the SID for all AA, except Pro, was not different ($P < 0.05$) among the 3 sources of SBM. The DE and ME in the 3 sources of SBM were measured using 24 barrows (initial BW: 11.9 ± 1.24 kg BW) that were placed in metabolism cages and randomly allotted to 4 diets. A corn-based diet and 3 diets containing corn and SBM-HP, corn and SBM-LO, or corn and SBM-CV were formulated. Urine and feces were collected over a 5-d period following a 7-d adaptation period. The DE and ME in each source of SBM were calculated using the difference procedure. The concentration of DE in SBM-HP, SBM-LO and SBM-CV was 4,349, 4,283, and 4,367 kcal/kg DM, respectively. These values were not different from the DE of corn (4,100 kcal/kg DM). The concentration of ME was 4,138, 4,047, and 4,244 kcal/kg DM in SBM-HP, SBM-LO, and SBM-CV, respectively. These values were not different. The ME of corn (4,053 kcal/kg DM) was not different from the ME of any of the SBM. It is concluded that the SID values for SBM-HP and SBM-LO are similar to the SID values for SBM-CV and there is no difference in DE and ME values among the 3 meals.

Key Words: amino acid digestibility, energy concentration, soybean meal

337 Amino acid digestibility in corn and corn co-products fed to growing pigs. G. I. Petersen* and H. H. Stein, *University of Illinois*, *Urbana*.

Many alternative feedstuffs are co-products of corn milling and fermentation. Little is known about the standardized ileal digestibility (SID) of AA in most of these products such as hominy feed, corn gluten meal, corn gluten feed, and corn germ meal in pigs and it is not known how the SID of AA in these ingredients compare to the SID of AA in corn and in distillers dried grains with solubles (DDGS). Eight growing barrows (initial BW: 55 ± 0.85 kg) originating from the matings of line 337 boars to C22 females (Pig Improvement Company, Hendersonville, TN) were randomly allotted to an 8 x 8 Latin square design with 8 diets and 8 periods in each square. Diets contained corn, two different sources of DDGS, hominy feed, corn gluten meal, corn gluten feed, or corn germ meal as the sole source of protein and AA. An N-free diet was used to measure basal endogenous losses of AA and protein. Results showed that the SID of most AA were greater ($P < 0.05$) in hominy feed and in corn gluten meal than in the other ingredients, whereas the SID for most AA in corn gluten feed was lower ($P < 0.05$) than in the other ingredients (Table 1). The SID of Lys in one source of DDGS was lower ($P < 0.05$) than in the other source, but no differences between these 2 ingredients were observed for the other AA. The SID of Ile, Met, and Thr in corn germ meal were lower ($P < 0.05$) than in corn, but for the remaining AA, no differences between corn and corn germ meal were observed. In conclusion, corn gluten feed has a very low SID of Lys and most other indispensable AA, but other corn co-products have SID values for most AA that are comparable to or greater than in corn.

Table 1. Standardized ileal digestibility (%) of AA

Diet	DDGS1	DDGS2	Hominy	Corn Gluten Meal	Corn Germ Meal	Corn Gluten Feed	Corn
Ile	76.27^{c}	79.32^{bc}	87.13^{a}	85.60^{a}	77.11^{c}	64.27^{d}	80.93^{b}
Lys	46.10^{c}	65.39^{b}	79.55^{a}	76.39^{a}	61.01^{b}	28.59^{d}	67.12^{b}
Met	81.12^{b}	83.52^{b}	89.54^{a}	89.03^{a}	81.50^{b}	67.17^{c}	87.29^{a}
Thr	69.77^{c}	74.56^{bc}	79.90^{ab}	82.38^{a}	66.02^{c}	53.90^{d}	76.48^{b}
Trp	86.35^{ab}	86.42^{ab}	90.70^{a}	91.18^{a}	85.50^{bc}	58.31^{d}	80.68^{c}
Val	74.85^{c}	78.54^{bc}	86.03^{a}	84.18^{a}	75.66^{bc}	63.14^{d}	79.12^{b}

$^{a, b, c, d}$ Means lacking common superscript in same row are different ($P < 0.05$).

Key Words: corn co-products, pig, standardized ileal amino acid digestibility

338 Net energy of distillers dried grains with solubles and high protein distillers dried grains fed to growing and finishing pigs. N. A. Gutierres*, D. Y. Kil, and H. H. Stein, *University of Illinois, Urbana*.

An experiment was conducted to measure the NE in distillers dried grains with solubles (DDGS) and in high protein distillers dried grains (HP-DDG) fed to growing and finishing pigs. Conventional DDGS (DDGS-CV), uncooked DDGS (DDGS-BPX), and HP-DDG were used. A total of 52 growing (20 ± 2 kg BW) and 52 finishing pigs (87 ± 10 kg BW) were allotted within each stage of growth to 6 groups based on BW. At each stage of growth, there were 8 replicate pigs in 2 groups and 9 pigs in the remaining 4 groups. The 2 groups with 8 pigs at each stage of growth were used as the initial slaughter group and were harvested at the initiation of the experiment. Pigs in the remaining 4 groups at each stage of growth were housed individually and had free access to feed and water. Treatments included a basal diet containing corn and soybean meal and 3 diets that were formulated by mixing 70% of the basal diet and 30% DDGS-CV, DDGS-BPX, or HP-DDG. Experimental diets were fed to growing pigs for 28 d and to finishing pigs for 35 d. All pigs were harvested at the end of the experiment and blood, carcass, and viscera samples were analyzed for GE, CP, and ether extract. The NE for DDGS-CV, DDGS-BPX, and HP-DDG were calculated by subtracting the contribution from the basal diet to the NE of the treatment diets. In growing pigs, no differences were observed in energy retention and the NE of DDGS-BPX (1,596 kcal/kg), DDGS-CV (1,665 kcal/kg), and HP-DDG (1,783 kcal/kg) were not different. Finishing pigs fed the DDGS-CV diet had greater ($P < 0.05$) lipid gain than pigs fed any of the other diets. The NE of DDGS-CV (2,718 kcal/kg) was also greater ($P < 0.05$) than the NE of DDGS-BPX (2,065 kcal/kg) and HP-DDG (2,291 kcal/kg). The NE of DDGS-CV, DDGS-BPX, and HP-DDG were greater ($P < 0.05$) in finishing pigs than in growing pigs. In conclusion, the NE of DDGS and HP-DDG may vary according to the stage of growth, but the NE of corn-soybean meal diets containing 30% DDGS or HP-DDG, is not different from the NE of corn-soybean meal diets containing no DDGS or HP-DDG.

Key Words: distillers dried grains with solubles, high protein distillers dried grains, net energy

339 Effect of saturated fat in diets with corn distillers dried grains with solubles (DDGS) on growth performance, carcass characteristics and apparent digestibility of nutrients of diets for finishing pigs. L. S. Freitas*[1], M. J. Azain[2], D. C. Lopes[1], C. R. Dove[2], T. D. Pringle[2], P. Cline[2], and T. C. Tsai[2], [1]*Federal University of Viçosa, Vicosa, Brazil*, [2]*University of Georgia, Athens*.

The objective of this study was to determine if the negative effects of DDGS on carcass characteristics could be offset by the addition of saturated fat to the diet. The study was conducted as a 2 × 2 × 2 design with main effects of: DDGS (0 vs 30%), saturated fat (0 vs 4%) and gender (barrow vs gilt). The saturated fat was a dry, animal fat with 70% saturated fat content and an iodine value of 28. There were a total of 80 pigs (IW = 76 kg) randomly assigned to 16 pens (5 pigs/pen) within gender. Experimental diets were fed for 6 wk and the effects on performance, carcass characteristics and nutrient digestibility evaluated. Two pigs/pen were slaughtered to collect samples of leaf and belly fat, backfat and loin for fatty acid profile determination and carcass characteristics. There were no significant effects of the saturated fat addition in either the control or 30% DDGS diets. Overall, ADFI (2.51 vs 3.06 kg/d, $P < 0.01$) and ADG (0.81 vs 1.02 kg/d, $P < 0.01$) were reduced in the pigs fed diets with 30% DDGS, as compared to those fed the control diet. This was largely due to reduced gain and intake in the first 2 wk. Overall, barrows had higher ADFI and ADG than gilts. Changes in carcass characteristics were largely a reflection of the reduced final body weight of pigs fed diets with 30% DDGS and of gilts relative to barrows. The content of linoleic acid was higher in the inner, outer, leaf, and belly fat, and loin muscle of the pigs fed 30% DDGS. As a result of this change, calculated iodine value (IV) of all adipose tissue depots was greater in pigs fed DDGS, with the greatest change in belly fat (Control 69.9 vs. DDGS 79.1, $P < 0.01$). There was no change in the calculated IV of the lipid in loin muscle. The results of this study indicate that the addition of a saturated fat source did not overcome the effects of DDGS on the carcass. This was most likely due to the low digestibility of the saturated fat used in the study.

Key Words: carcass quality, lipid, unsaturated fat

Production, Management and the Environment: Dairy

340 Short dry period: A new reality? Results from a long term field study. D. E. Santschi*[1,2], D. Lefebvre[3], C. L. Girard[1], and D. Pellerin[2], [1]*Agriculture and Agri-Food Canada, Sherbrooke, QC, Canada*, [2]*Université Laval, Quebec, QC, Canada*, [3]*Valacta, Ste-Anne-de-Bellevue, QC, Canada*.

The purpose of the present project was to verify the effects of two dry period length management practices on production and health of dairy cows in a large field study. Commercial dairy farms (n=13) were involved in this trial for 2 yr. Every two months and within each herd, Holstein cows (n=817) were randomly assigned to a SHORT (SDP; 35d, only pre-calving ration) or CONVENTIONAL (CDP; 60d, dry cow ration until d-21 then pre-calving ration) dry period management, based on parity, predicted 305d milk yield and calving interval. Actual dry period length was 38.2 and 65.8 ± 2.0d ($P<0.001$) for SDP and CDP, respectively. On average, SDP cows produced an extra 350 kg of milk before being dried off, compared to CDP cows. For 2nd lactation cows, incidence of ketosis was lower following the SDP (20 and 32% for SDP and CDP, respectively; $P=0.01$). For cows in their 3rd or greater lactation, incidence of retained placenta was increased (23 and 11% for