

776 Apparent and true ileal digestibility of acid hydrolyzed ether extract in various feed ingredients fed to growing pigs. B. G. Kim*, D. Y. Kil, and H. H. Stein, *University of Illinois, Urbana*.

An experiment was conducted to measure the apparent (AID) and true ileal digestibility (TID) of acid hydrolyzed-ether extract (AEE) in extracted corn oil (CO), high-oil corn (HOC, 7.1% AEE), full-fat soybeans (FFSB, 21.4% AEE), distillers dried grains with solubles (DDGS, 11.8% AEE), corn germ (CG, 18.1% AEE), and high protein-distillers dried grains (HP-DDG, 6.8% AEE). The ileal digestibility of AEE in these ingredients was determined using 19 barrows (initial BW: 52.2 ± 3.81 kg) that were fitted with a T-cannula in the distal ileum. Pigs were allotted to a 19 × 12 incomplete Latin square design with 19 diets and 12 periods. A basal diet (0.67% AEE) based on cornstarch, casein, sucrose, and corn bran was formulated. Fifteen additional diets were formulated by adding 2.0, 4.0, or 6.0% AEE from CO (2 to 6%), HOC (24 to 72%), FFSB (9 to 28%), DDGS (17 to 51%), and CG (11 to 33%) to the basal diet at the expense of corn starch, casein, and corn bran. In the remaining 3 diets, 1.1, 2.2, and 3.2% of AEE was added to the basal diet by including 16, 32, and 48% HP-DDG, respectively. The AID of AEE increased with increased concentrations of AEE from CO and FFSB ($P < 0.05$; linear and quadratic), and from DDGS and HP-DDG ($P < 0.05$; linear). However, the inclusion level of AEE from HOC and CG did not affect the AID of AEE. The average AID of AEE was 85.8, 48.1, 76.6, 59.8, 49.4, and 66.5% (SEM = 1.68) in CO, HOC, FFSB, DDGS, CG, and HP-DDG, respectively. The ileal endogenous excretion of AEE was 0.695, 0.112, 0.525, 0.137, -0.021, and 0.427 g/100 g DMI, and the TID of AEE was 96.8, 50.8, 86.1, 62.6, 48.9, and 76.3% (SEM = 1.63) for CO, HOC, FFSB, DDGS, CG, and HP-DDG, respectively. In conclusion, the digestibility of AEE in DDGS and HP-DDG is greater than in HOC or CG, implying the distillation process may improve the digestibility of AEE in corn. However, all the sources of intact corn oil that were used in this experiment had lower AID and TID values for AEE than extracted corn oil.

Key Words: acid hydrolyzed ether extract, ileal digestibility, pigs

777 The impact of dried distillers grains with solubles withdrawal programs on swine carcass fatty acid profiles and bacon quality. J. Stevens, A. Schinckel, B. Richert, and M. Latour*, *Purdue University, West Lafayette, IN*.

Crossbred pigs (N=112; initial BW = 29.0 kg) were blocked by initial BW and sex and assigned to 1 of 7 dietary treatments to assess the impact of removing dried distillers grains w/ solubles (DDGS) the last 26 d and adding fat to the late finishing diet on carcass fatty acid (FA) profiles, belly processing, and bacon cooking traits. Dietary treatments were: 1) Corn-soybean meal (CS) control d 0-103; 2) 20% DDGS d 0-103; 3, 4, and 5) 20% DDGS d 0-77 and CS, CS+5% beef tallow (BT), or CS+5% choice white grease (CWG) from d 77-103, respectively; 6 and 7) 20% DDGS+5% CWG d 0-77 and CS+5% BT or CS+5% CWG d 77-103, respectively. All diets were formulated on an equal dig. Lys to calorie ratio and were phase fed (2 grower and 2 finisher diets). Belly firmness was tested by placing bellies over a 7.6 cm pipe. Bellies were pumped, smoked and the center slices were baked at 204°C for 12 min to evaluate cooking properties of the bacon. The FA profiles of the belly, loin, outer backfat, and inner 2 layers of backfat were determined. Pigs fed treatment 1 had firmer bellies than pigs fed treatment 2 (Avg. 8.4 vs 5.8 cm vertical flex scores; $P = 0.001$). Feeding treatment 4 during the 26 d withdrawal tended to improve belly firmness over all other withdrawal programs ($P < 0.10$). The high levels of linoleic acid in the DDGS resulted in the greatest difference between treatments 1 and 2

in linoleic acid (Belly; 9.3 vs 16.2%) in all adipose tissues measured ($P = 0.001$), resulting in a higher carcass calculated iodine value (belly; 57.1 vs 66.4), increased omega 6 to omega 3 ratios, and decreasing ($P = 0.037$) saturated to unsaturated ratios (belly; 0.70 vs 0.59) in all adipose tissues. Dietary treatments had minimal effects on belly yields or bacon cook scores. Feeding a CS or CS + 5% fat diet during a 26 d DDGS withdrawal program partially recovered some of the adverse fat quality effects caused by the increase in linoleic acid in the diet from the DDGS, however longer withdrawals are required for complete recovery of pork fat quality.

Key Words: swine, distillers dried grains, fatty acid profile

778 Analysis of iodine value in pork fat by Fourier transform near infrared spectroscopy for pork fat quality assessment. R. A. Coccia*, J. M. Benz², H. Li¹, S. S. Dritz², J. M. DeRouchey², M. D. Tokach², J. L. Nelssen², R. D. Goodband², and A. W. Duttlinger², ¹*Bruker Optics Inc., Billerica, MA*, ²*Kansas State University, Manhattan*.

The inclusion of dried distillers' grains with solubles (DDGS) in swine diets has rapidly increased in recent years because of increased availability. Because DDGS is high in linoleic acid, dietary intake by pigs has resulted in pork fat with higher levels of unsaturated fatty acids, adversely affecting pork fat firmness and quality. In this study, Fourier transform near infrared (FT-NIR) spectroscopy was used to measure iodine value (IV), a measure of the degree of unsaturation of fat. A total of 168 pork belly and jowl fat samples from pigs fed DDGS or ractopamine HCl were cut into pieces, placed on a glass petri dish and analyzed by FT-NIR spectroscopy in diffuse reflectance. Partial-least-squares (PLS) calibration models were developed for measuring IV in fat derived from pigs fed DDGS and ractopamine HCl by correlating their FT-NIR spectra to their respective gas chromatography-mass spectrometry reference values. Leave-one-out cross validation of the PLS models yielded R² values of 89.0 and 90.6 and a root mean square error of cross validation of 1.04 IV and 1.26 IV for pork fat samples from pigs fed ractopamine HCl and DDGS, respectively. When the ractopamine HCl pork fat model was used to predict the DDGS pork fat model, a bias of 1.41 IV was obtained due to the compositional differences between the two types of samples. To obtain a more robust PLS calibration model, both data sets were merged and a test set validation of this model using half the samples as a validation set yielded an R² value of 90.9, a root mean square error of prediction of 1.10 IV and a bias of 0.02 IV. This study demonstrates that FT-NIR spectroscopy combined with a robust PLS calibration model can measure IV in pork fat samples directly with an accuracy of approximately 1.1 IV. Conventional methods for measuring IV in pork fat are time consuming and costly, while this method allows processors to obtain IV results for quality assessment of pork fat on-site in under a minute.

Key Words: near infrared spectroscopy, iodine value, pork fat

779 The role of linoleic and α -linolenic acid for synthesis of long chain polyunsaturated fatty acids in liver and brain: A model study with growing pigs. W. Smink, J. Van Baal, R. Hovenier, and W. J. J. Gerrits*, *Wageningen University, Wageningen, the Netherlands*.

The effects of linoleic acid (LA) and α -linolenic acid (ALA) as precursor and inhibitor in the chain of n-3 and n-6 polyunsaturated fatty acids (LC PUFA) were studied in liver and brain of growing pigs (15-30 kg BW). In a 2x2 factorial arrangement, 32 gilts from 4 litters were