

lactate (CaLac) has free radical scavenging and antioxidant effects. Hence, it can be hypothesized that CaLac may both activate calpain and retard oxidative inhibition of calpain. The objective of this study was to determine the effects of CaLac on calpain activity under oxidizing conditions in vitro. Porcine skeletal muscle m-calpain (66 U/mg) was incubated with 40mM Tris-HCl, at 23°C for 5 min and 10 min with various combination of 100 µM H₂O₂, 5 mM CaCl₂, and/or 5 mM CaLac generating 8 treatments; 1) control, 2) H₂O₂, 3) CaCl₂, 4) CaLac, 5) H₂O₂ + CaCl₂, 6) H₂O₂ + CaLac, 7) CaCl₂ + H₂O₂, and 8) CaLac + H₂O₂. The m-calpain activity was measured in a standard casein assay under both reducing and non-reducing conditions (with and without 0.2% MCE) in triplicate. In order to determine the effects of lactate concentration on calpain activity, m-calpain (66 U/mg) was incubated at the same conditions as above but with 50 µM H₂O₂ and with 5 mM CaCl₂, or CaLac (5, 10, 15, and 20 mM). Under both reducing and non-reducing conditions, CaLac activated m-calpain, similar to CaCl₂ ($P > 0.05$). Pre-exposure of calpain with H₂O₂ + CaLac treatment significantly lowered calpain activity compared to the H₂O₂ + CaCl₂ under the reducing condition. These results suggest that CaLac may scavenge oxidants, which would allow more autolysis during pre-incubation, and consequently resulting in lower calpain activity ($P < 0.05$). Increasing CaLac concentration decreased ($P < 0.05$) the activity of m-calpain pre-incubated with H₂O₂ under the reducing condition. Taken together these data suggest that the antioxidant capacity of CaLac may be concentration dependent, because the extent of m-calpain oxidation by H₂O₂ was decreased with increasing lactate ion levels in aqueous solution. Thus, it can be concluded that CaLac is able to activate m-calpain, and may provide antioxidant capacity against m-calpain oxidation.

Key Words: calpain, calcium lactate, oxidation

119 Influence of selection for reduced residual feed intake on pork quality. R. M. Smith^{*1}, J. M. Young¹, M. J. Anderson¹, R. C. Johnson², E. Huff-Lonerger¹, J. Dekkers¹, and S. M. Lonergan¹, ¹Iowa State University, Ames, ²Farmland Foods, Dennison, IA.

Selection for improved growth efficiency has the potential to alter meat composition and fresh meat quality. The objective of this study was to determine the extent to which selection for reduced residual feed intake (RFI) affects pork composition and meat quality. The two lines evaluated in this study consisted of a line selected for reduced RFI over five generations (select) and a randomly selected control line (control). Selection for reduced RFI resulted in 0.052 kg lower RFI per day. Yorkshire gilts (select = 80, control = 89) were harvested and the boneless loins were collected at 24 hours postmortem. Back fat and loin eye depth were collected off the midline of the posterior part of the loin using the Fat-O-Meater. Quality attributes were measured at 2 and 3 days postmortem. Drip loss and water holding capacity were measured in duplicate. Hunter L, a, and b values were measured in triplicate on two chops using a C10 illuminant, 10° observer, and 1.27cm aperture. Intramuscular lipid and moisture content were determined by AOAC guidelines. The model included the fixed effects of line, slaughter date, MC4R genotype, barn group, and line by slaughter date, and genotype by line interactions, off-test weight as a covariate, and sire, pen, and litter as random effects. There were no differences between lines for hot carcass weight, pH, drip loss, or Hunter L and a values. Compared to the control line, carcasses from the select line tended to have less ($P=0.09$) backfat (15.2 ± 0.9 vs. 17.3 ± 0.7 mm), greater ($P<0.05$) loin depth and greater ($P<0.05$) calculated percentage of fat free lean (56.5% vs. 54.8%). Select line chops tended to have greater water holding capacity ($P=0.07$). Loin chops from the select line had less ($P<0.01$) intramuscular lipid content than control chops (1.14% vs. 1.67%). Select chops had a

greater ($P<0.01$) percentage of moisture than the control chops. Selection for reduced RFI has the potential to improve carcass composition with few detrimental effects on selected measures of meat quality.

Key Words: carcass composition, pork quality, residual feed intake

120 Effects of different winter growing programs and subsequent finishing on gene expression in different adipose tissue depots in beef steers. D. Stein^{*1}, A. Pillai¹, U. DeSilva¹, C. K. Krehbiel¹, G. W. Horn¹, M. McCurdy², J. J. Wagner³, P. Ayoubi¹, J. B. Morgan¹, and R. D. Geisert⁴, ¹Oklahoma State University, Stillwater, ²Nutrition Service Associates, Kenmore, QLD, Australia, ³Southeast Colorado Research Center, Colorado State University, Lamar, CO, ⁴University of Missouri, Columbia.

The objective was to determine gene expression profiles between SC and IM depots in beef steers from different winter growing programs. Steers of similar breed, type, and age were assigned to an initial harvest group or one of four treatment diets; steers placed in the feedlot after weaning and fed a high-concentrate diet (CF); steers grazed on wheat pasture (WP); steers fed a sorghum silage-based growing diet (SF); or steers program fed a high-concentrate diet (PF). SF and PF were fed to gain BW similar to WP. At the end of a 112 d growing phase (GP), 6 steers from WP, SF, and PF were harvested, with the remaining steers of WP, SF, and PF placed in the feedlot. At finish (FP), 6 steers from each diet were harvested at a common 12th-rib fat. SC and IM adipose tissue was collected from a 7.6 cm³ section dissected from the LM at the 12th rib. Total RNA was extracted and cDNA microarray hybridizations performed. Preprocessing and normalization of data was accomplished utilizing the R-project statistical environment with the Bioconductor and LIMMA packages through GenePix AutoProcessor (GPAP 3.2). Ontology analysis of significantly differentially expressed genes was carried out using GFINDer. Ingenuity Pathways Analysis (IPA) was utilized to identify the most relevant biological mechanisms, pathways and functions of the annotated genes. Top functions of IPA network 1 for WP_FP included cellular movement and cellular growth while top functions for IPA network 1 of both SF_FP and PF_FP included lipid metabolism and molecular transport. These findings provide insight into the regulation of adipogenesis in animals with different nutritional backgrounds.

Key Words: adipose tissue, bovine, gene expression

121 Effects of DDGS on sow carcass fat quality. A. N. Gipe^{*}, T. A. Houser, J. M. DeRouche, B. L. Goehring, S. L. Hillyard, A. W. Duttlinger, S. S. Dritz, M. D. Tokach, R. D. Goodband, and J. L. Nelsen, Kansas State University, Manhattan.

An experiment was conducted to determine the effects of feeding non-pregnant sows a diet containing 50% dried distillers grains with solubles (DDGS) on carcass fat oxidation and composition. A total of 8 open sows were allotted to one of 2 diets by parity (average 2.3) and BW (initially 215 kg). One diet was a corn-soybean meal-based gestation diet, while the experimental diet was a corn-soybean meal-based diet that contained 50% DDGS. All sows were fed 2.27 kg of feed per day in a single feeding for 92-d. All sows were harvested on d 92 at the KSU Meat Laboratory, chilled for 48 h, fabricated into lean trimmings, ground, packaged in oxygen permeable overwrap and placed into simulated retail display. Overall (d 0 to 92), there were no differences ($P>0.64$) in BW (-1.5 vs 1.25 kg) or backfat (0.75 vs 0) change for sows fed either 0 or 50% DDGS. No differences ($P>0.23$) in lipid oxidation from lean