
cal of 116 growing/finishing pigs (fed from 44 to 104 or 127 kg) were and to determine the means of the sex, age, and dietary Lys on carcass quality characteristics. The experiment was designed in a 2 x 2 factorial arrangement and analyzed as a randomized complete block. Pigs derived from genotypes previously characterized based on lean gain mean (high vs medium lean gain; HGL and MGL, respectively). Within genotype, pigs were split by sex (barrows vs gilts) and fed one of two dietary treatments. From 44 kg to a pen average of 104 kg, pigs were fed either 0 or .70% Lys corn-soybean meal diet. When the average pen weight was 104 kg, one pig was slaughtered, and the remaining two pigs were fed at a reduced 0.90 to .75% to .55% Lys diet, respectively. At an average of 127 kg, the remaining two pigs were slaughtered. After 24 h of post-mortem, 10th rib longissimus muscle (LM) quality traits were measured and chilled until further analysis. For carcasses from pigs fed to 104 LM from HGL had (P<.05) less visual marbling and higher Hunter a* were red), Hunter b* (more yellow), and higher saturation index (more vivid n) color values than LM from MGL. In a genotype x Lys interaction (.05), HGL pigs fed .70% Lys and MGL fed .90% Lys had higher (P<.05) LM pH's than MGL pigs fed .70% Lys. However, all pH means in the normal range of 5.4 to 5.5. In a genotype x sex interaction (.05), HGL gilts had (P<.05) smaller LM Hue angles (more red on a red vs yellow scale) than MGL barrows. In a genotype x Lys x Age interaction (P<.001) and a genotype x Lys x Breed interaction (.001), MGL barrows had higher Hue angles than HGL barrows. For LM from pigs fed to 127 kg, HGL is visually more reddish pink and firmer, but had less marbling than MGL (.05). Also, LM from MGL had (P<.001) a higher pH, less moisture date, lower Hunter L* values (darker) and smaller Hue angles than from LM. HGL barrows had (P<.05) more LM marbling and less chop thaw loss than HGL gilts. In a genotype x sex interaction (.05), HGL barrows had (P<.05) more Lys vs HGL gilts, HGL barrows, and MGL gilts). For LM from pigs fed to either 104 or 127 kg, dietary Lys had minimal effects on LM myofibril traits and HGL pigs had less LM marbling than MGL pigs. However, influence of genotype and sex for other LM quality traits varied between pigs to either 104 or 127 kg.

Words: Pork Quality, Genotype, Lysine


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The objective of this study was to determine the effects of the B-adrenergic agonist (BAA) L444,965 (Merck, Sharp and Dohme Research Laboratories) on calpastatin mRNA expression levels in control and treated beef and sheep longissimus dorsi (LD) muscle. Samples were obtained immediately upon slaughter from four control and four treated (3 ppm BAA) MARC III composite steers and eight control and eight treated (4 ppm BAA) weaner lambs. Total RNA was extracted from a single gram sample of each muscle and subjected to slot blot hybridization. NtRNA was analyzed using a new cDNA probe homologous to bovine skeletal muscle calpastatin. Autoradiographs were analyzed by densitometric analysis. Total calpastatin mRNA was determined from the linear portion of individual slot blot RNA standard curves (0.1 - 3.2 µg/µl) and normalized to total calpastatin/µg total RNA. BAA treatment was shown to increase the total calpastatin mRNA (P < .01) by greater than two-fold in both beef and sheep which is in agreement with calpastatin enzyme activity data previously reported. Northern blot analysis revealed that skeletal muscle calpastatin mRNA is present as three transcript sizes (3.8, 3.0 and 1.5 kbp) in beef and as four transcript sizes (3.8, 3.0, 2.5 and 1.5 kbp) in sheep. Densitometric analysis of the Northern blots revealed that the 3.8 and 3.0 kbp transcripts are the most responsive to BAA treatment with the 3.8 kbp form decreasing and the 3.0 kbp form increasing significantly from the controls (P < .01). The ratio of the 3.0 kbp band to the 3.8 kbp band has a positive correlation with LD Warner-Brazier shear values at 14 d post-mortem (beef, r = .66; sheep, r = .69). These results indicate that calpastatin mRNA and enzyme activity levels increase in a complementary manner in response to BAA treatment, suggesting that regulation of calpastatin activity is at the transcriptional level under these conditions. Selective responsiveness of the multiple calpastatin mRNA transcript forms suggests that BAA-sensitive mechanisms were controlling excision and/or selection of polyadenylation sites which in turn controlled the stability and cellular function of calpastatin.

Key Words: Calpastatin, Expression, Beta-adrenergic agonist

88 Evidence that the 30 kDa polypeptide in postmortem skeletal muscle comes from tropomin-T. C.Y. Ho*, M. H. Stromer, and K. M. Robson. Iowa State University, Ames.

A 30 kDa polypeptide is frequently seen by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) of postmortem aged muscle samples. The presence and amount of this 30 kDa polypeptide is congruent with an indication of the rate and extent of postmortem proteolysis. It has been hypothesized that the 30 kDa band originates from degradation of tropomin-T (TN-T). We have used antibodies to various myofibrillar proteins to study whether the sites of cleavage in 30 kDa band to the 30 kDa band is electrophoretically stimulated (ES) after slaughter with 250 volts, 20 Hz for 45 sec to achieve a 3 hr postmortem pH of 5.4-5.6. The other side as served as the non-stimulated (NS) control. The longissimus muscle was ES sampled immediately after stimulation and at 1, 3, 7, 14 and 28 days postmortem. A 5 cm cross section of the LD muscle posterior from the 13th rib was removed from the carcass at 1 day postmortem and was used for subsequent samples. All samples were stored at 2°C. SDS-PAGE and Western blots were used to monitor postmortem changes and to identify specific proteins. In SDS-PAGE of NS samples, the TN-T band decreased in density by 7 days and disappeared by 16 days. In ES samples, TN-T was absent by 7 days and indicated that a more rapid degradation was occurring. In SDS-PAGE, a trace amount of 30 kDa band was seen in the NS samples. In the ES samples, the amount of a 30 kDa band was seen in 1 day ES sample. In blots, a monoclonal antibody (mAb) to TN-T labeled both TN-T and the 30 kDa polypeptide. The prominent 30 kDa band that showed a large increase in density in the ES samples was consistently labeled by the TN-T mAb. Antibodies to other myofibrillar proteins did not label the 30 kDa band. Although small amounts of TN-T could still be detected in blots after 14 and 28 days in both ES and NS samples, one was much larger in ES samples. Based on these results, we conclude that ES caused more rapid degradation of TN-T and earlier appearance of the 30 kDa polypeptide in bovine longissimus muscle. Labeling with the ES mAb positively identifies the 30 kDa polypeptide as a degradation product of TN-T.

Key Words: TN-T, 30 kDa polypeptide, skeletal muscle, SDS-PAGE