423 Optimal number of replications for the Meullenet-Owens-Razor-Shear (MORS) and tenderness variations between right and left broiler breast fillets. Y. S. Lee*, A Saha, C. M. Owens, and J. F. Meullenet, *University of Arkansas*.

MORS is a relatively new method for measuring poultry meat tenderness which is less time-consuming than the Warner-Bratzler and Allo-Kramer shear and shown to be equivalent in performance. However, the number of measurements for MORS to provide a reliable estimate of the tenderness of an experimental unit has not been investigated. There is also limited information available on the variation in tenderness between right and left fillets from a single carcass. The objectives were (1) to determine the number of recommended measurements to be taken on a fillet using MORS and (2) to examine differences in tenderness between the two halves of a fillet. Sixty birds were deboned at either 1.75 or 6 h postmortem (PM). Eight shears were taken on each cooked fillet at predetermined locations and the shear energy (MORSE) calculated in N.mm. The average from 8 measurements per fillet was considered to yield a representative estimated tenderness for the experimental unit (fillet half) and averages of 2 to 8 measurements were considered as potentials for a recommended number of shears. The appropriate number of replications was determined by simple regression using the average of 8 measurements as Y and the average of 2, 3, 4, 5, 6 or 7 as X. A composite hypothesis testing a slope of 1 and an intercept of 0 was then tested. The hypothesis (H0: intercept=0 and slope=1) for number of shears of 2, 3 and 4 was rejected implying that mean MORSE were in these cases not equivalent to mean MORSE for 8 shears. Averages of 5, 6 or 7 measurements did not significantly differ from 8 measurements. For 5 shears, the average error rate was found to be 0.78%. The overall correlation between left and right MORSE was found to only be 0.70. Overall correlations were better for fillets deboned after 6 hrs of aging. The recommended number of shears to be performed on pectoralis major muscles is 5 but error rates could be further reduced with 6 shears. This study also does not seem to indicate that left and right fillets are completely identical in tenderness especially for short aging durations.

Key Words: MORS, Tenderness, Broiler Breast Fillet

424 Carbon monoxide in MAP chicken breast fillets and drums as a food safety intervention to reduce pathogen loads and extend shelf-life. A. M. Lopez*[1], G. Poullier[2], A. M. Luna[1], C. Z. Alvarado[1], L. D. Thompson[1], M. M. Brashears[1], and J. C. Brooks[1], [1]*Texas Tech University*, *Lubbock*, [2]*Toulouse University*, *Toulouse, France*.

The Food and Drug Administration (2002) approved carbon monoxide (CO at 0.4%) as a component of a gas mixture in a modified atmosphere packaging (MAP) systems to maintain wholesomeness, provide flexibility in distribution and reduce shrinkage in meat; however little research has been done in poultry. This project evaluated the effect of MAP with CO on the growth of pathogens and quality parameters in poultry products, and its effectiveness as a possible food-safety intervention. Three replications of 144 samples each were conducted with skin-on drums and skin-off breasts fillets. The samples were either used as controls or inoculated with 1 × 104 cfu/g of a 3-strain Salmonella cocktail. Samples were stored at (4°C) in one of four packaging types: control (PVC overwrap); 0.4% carbon monoxide / 30.0% carbon dioxide / 69.6% nitrogen,;30% CO2 / 70% N2; or vacuum for 0, 3, 7, 14, 18, 21 days. Analyses included Salmonella enumeration, color (L*,a*,b*),TBARS, odor, Psychrotroph counts, aerobic plate counts (APC), coliforms, and generic E. coli. There were no differences in Salmonella growth or TBARS over time within treatments. However, psychrotrophs, coliforms, APC, and generic E. coli, were significantly lower in the MAP packages compared to control packages. Fresh color and odor were retained in the CO-packaged breasts and drums when compared to the other treatments. Therefore, some components of shelf-life of breast fillets and drums can be extended with MAP and CO MAP.

Key Words: Carbon Monoxide, Chicken Breasts, Salmonella

425 Quality of shell eggs stored under modified atmosphere packaging using gas mixtures containing CO and CO_2. D. Aggarwal*, C. Alvarado, C. Brooks, D. Wester, A. Tittor, A. M. Luna, and L. Thompson, *Texas Tech University*, *Lubbock*.

The effect of three types of modified atmosphere packaging (MAP) on the quality attributes of oiled fresh USDA Grade AA shell eggs during of storage was investigated. Shell eggs were subjected to one of four packaging treatments: (1) control - air; (2) 20% CO_2/0.4% CO/79.6% N_2; (3) 20% CO_2/80% O_2; and (4) 20% CO_2/80% N_2. Eggs were stored for up to 30 days in a retail case at a temperature of 6 ± 10°C (refrigerated) or on shelves at 21 ± 10°C (abusive). Eggs were packaged 8 to a tray with a tray considered as the experimental unit. Two trays per treatment per temperature per day were prepared in each trial with a total of three trials being conducted. Packages were opened and sampled on days (D) 1, 7, 14, 21, and 30 for determination of pH (yolk, albumen, whole egg), color (L^*, a^*, b^*), TBARS, foam capacity and stability, Haugh units, and yolk index (YI). Data were analyzed by ANOVA in a 2 (temperature) × 4 (packaging treatment) × 5 (time-points) factorial design using programs in SAS. Where appropriate, means were separated by LSMeans. Whole egg pH was lower throughout storage at both temperatures for the three MAP treatments ($P < 0.0001$). Albumen pH for MAP treatments was significantly lower regardless of temperature as compared to the controls ($P < 0.0001$). At 21°C, there was a significant decline in yolk index of the control eggs during storage compared to the eggs from the three MAP treatments (D1: control YI = 0.36 vs MAP average YI = 0.39, $P > 0.05$; D30: control YI = 0.25 vs D30 MAP average YI = 0.40, $P < 0.0001$). MAP treatment was effective at 21°C in maintaining Haugh units during storage compared to the control packaging. MAP was effective in reducing egg deterioration and loss of functional quality during storage at refrigerated and abusive storage temperatures.

Key Words: Shell Eggs, MAP Packaging, Yolk Index

426 Optimizing NaCl marinade concentrations to improve meat tenderness, flavor, and juiciness of early deboned broiler breast fillets. C. M. Owens, S. C. Purcell*, A. Saha, and J. F. Meullenet, *University of Arkansas*, *Fayetteville*.

Previous studies show that marination of broiler breast meat improves meat quality attributes and yield. Marinades typically contain salt and phosphates; however, due to increased health awareness, trends for lower salt content have increased. The purpose of this study was to evaluate the effect of various salt concentrations on early-deboned boneless breast fillet tenderness and juiciness. One hundred fifty broilers, six-weeks of age, were processed via automated line, chilled in a two-stage process, and deboned at 2 h postmortem. Test fillets were vacuum tumbled for 30 min with a 15% marinade containing phosphate (0.45%) and salt (NaCl) concentrations of 0.33, 0.50, 0.75, or 1.0 %. Control samples were neither tumbled, nor marinated. Cooked fillets were subjected to instrumental analysis using the MORS method (total energy; TE) and consumer sensory analysis using hedonic and Just About Right scales to assess texture, intensity of tenderness, saltiness and juiciness. Tenderness of breast fillets was highly correlated to salt concentration; TE decreased with increasing salt concentration indicating improved tenderness due to marination. Salt concentrations of 0.5% or more resulted in a significant decrease in TE compared to control. According to the consumer panel, a minimum of 0.33% salt was needed to improve texture/tenderness; values further improved as salt concentration increased. Less than 16% of consumers considered marinated fillets as ″too tough″ compared to 49% who considered the control fillets ″too tough″. The attribute, ″saltiness,″ increased as the levels of salt concentration increased, but even at the highest level (1%), only 14% of consumers considered fillets ″too salty″. When compared to the control, marinating with any level of salt improved juiciness. However, marinating with less than 1%, many consumers (31-41%) considered the cooked products ″too dry″. These results suggest that marination of early deboned breast fillets, even with low salt concentrations, can improve tenderness; however, marinating with lower levels of salt may lead to a less juicy product.

Key Words: Marination, Salt, Tenderness

427 Alpha, gamma, and acetate tocopherol determination in chicken muscle by HPLC. C. Narciso-Gaytán*, D. K. Shin, C. A Bailey, A. V. Haq, A. R. Sams, and M. X. Sánchez-Plata, *Texas A&M University*, *College Station*.

The amount, type and activity of vitamin E isomers in chicken muscle influence the lipid and nutritional stability of the meat. The objective of the present study was to estimate the presence and quantify the deposition of alpha and gamma tocopherol, and tocopherol acetate in breast and thigh muscles, affected by dietary fat/oil source and supplemented level of vitamin E. Six hundred Cobb × Ross broilers were fed for 6 weeks with a basal corn-soybean meal diet including soybean, palm kernel or animal/vegetable oil, each supplemented with 33 or 200 mg/Kg of dl-α-tocopheryl acetate. Broilers were randomly assigned into 6 treatments and 4 repetitions, with 25 birds each. After slaughtering of broilers, breast and thigh muscle samples were collected, vacuum-packed and kept frozen at -20°C for further analysis. A 1.0 g muscle sample was mixed with 250 mg ascorbic acid and 7.3 ml of KOH solution (11% in ethanol:water: 55:45) with subsequent incubation for 20 min in a 70°C water bath, hexane was used to separate the tocopherol isomers from the mixture. Tocopherols were extracted by reverse phase (mobile phase: methanol:n-propanol:water 78:17:5) and quantified by photo diode detection (210 and 295 nm wavelength). Efficiency recovery was determined by adding 8 µg of gamma tocopherol. Tocopherol acetate was detected only at 210 nm, while alpha and gamma tocopherols were observed in both 210 and 295 nm. The results showed no interactions in either tocopherol isoform with respect to dietary fat, vitamin E or muscle type. Dietary supplementation of vitamin E increased the deposition of alpha, and acetate, but gamma tocopherol. All tocopherol isoforms were significantly higher in thigh, than breast muscle ($P<0.05$). In conclusion, dietary supplementation of vitamin E increases alpha tocopherol and tocopherol acetate in breast and thigh chicken muscles.

Key Words: Vitamin E, Chicken Muscle, HPLC

428 Fatty acid composition of the gestation and lactation diet affects the fatty acid composition of the backfat of the progeny. G. Bee*, *Agroscope Liebefeld-Posieux, Research Station (ALP)*, *Posieux, Switzerland*.

The aim of the study was to determine the effect of 2 dietary fats (coconut fat [**CF**] and soy oil [**SO**]), which differs in their SFA, MUFA, and PUFA content, supplemented to the gestation and lactation diet of 16 multiparous Swiss Large White sows on the fatty acid (**FA**) composition of the backfat of their progeny at 105 kg BW. At weaning 4 gilts from each CF and SO sow were selected and fed a standard starter and grower diet from 9 to 63 kg BW. In the finishing period (66 to 105 kg BW) 2 gilts were fed a finisher diet (**A**) with the same FA composition (expressed as % total FA; SFA: 25.8; MUFA: 26.6; PUFA: 47.6) as the growing diet, whereas 2 littermates were fed a more saturated finishing diet (**B**; SFA: 28.8%; MUFA: 25.1%; PUFA: 46.1%). Growth performance, carcass characteristics, and the FA composition of the backfat was assessed. Regardless of the diet fed in the finishing period, progeny from CF sows grew slower (0.65 vs. 0.68 g/d; $P = 0.08$) and were less efficient (0.38 vs. 0.39 kg/kg; $P = 0.06$) than gilts from SO sows. Gilts in treatment B had lower carcass yield (82.0 vs. 81.4%; $P = 0.02$), higher percentage lean meat (59.3 vs. 58.5%; $P = 0.09$), lower percentage backfat (11.2 vs. 11.7%; $P = 0.08$), lighter hearts (408 vs. 428 g; $P = 0.05$) and kidneys (285 vs. 300 g; $P = 0.05$) and heavier livers (1551 vs. 1483 g; $P = 0.02$) compared to A gilts. The backfat of gilts in treatment B had higher ($P < 0.01$) SFA (40.2 vs. 39.3%) and MUFA (42.6 vs. 41.1%) and lower PUFA (17.2 vs. 19.7%) concentrations than the backfat of A gilts. These differences were primarily due to higher levels of stearic (23.5 vs. 22.9%), palmitoleic (2.0 vs. 1.8%), oleic (39.3 vs. 38.1%), and lower linoleic acid (14.6 vs. 17.1%) levels ($P < 0.01$ for each). Feeding the more saturated finisher diet decreased the PUFA content to a greater extent in the backfat of gilts born from CF (16.6%) than SO (17.7%) sows (maternal feeding × finisher diet interaction; $P = 0.04$). These findings revealed that not only the FA composition of the growing finisher diet but also the FA of the maternal diet affects the FA composition of the backfat of slaughter pigs.

Key Words: Dietary Fat, Maternal Nutrition, Pig

429 Comparison of vitelline membrane strength amongst breeds of commercial layers. D. R. Jones[1] and K. E. Anderson*[2], [1]*USDA, Agricultural Research Service, Egg Safety and Quality Research Unit*, *Athens, GA*, [2]*Department of Poultry Science, North Carolina State University*, *Raleigh*.

The strength and elasticity of the vitelline membrane is important for both food safety and product quality concerns. The strength of the

membrane has been associated with the ability of microorganisms to enter the nutrient rich yolk. Also, contamination of commercially prepared albumen with yolk during separation can lead to greatly diminished albumen functionality. A study was conducted to determine the strength and elasticity of the vitelline membrane of eggs from six strains of commercial laying hens (3 white, 3 brown). Two different probes were utilized to assess the membrane: 75 mm disc (2.0 g trigger force) and 1 mm, rounded end probe (0.2 g trigger force). Eggs were collected on three consecutive days from layers which were part of the North Carolina Layer Management and Performance Test. All eggs were stored at 4C until tested 5 d after lay. A TA.XTplus Texture Analyzer with a 750g load cell and test speed of 1mm/s was utilized for all measurements. Twelve eggs from each strain were tested daily for each probe. Force measurements for the disc ranged from 132.43 – 173.08 g ($P < 0.05$) with elasticities of 8.25 – 9.49 mm ($P < 0.01$). The 1 mm probe recorded average force measurements of 2.26 – 2.60 g ($P < 0.01$) and elasticities of 2.87 – 6.78 mm. Both probes identified the same strain of layers as producing eggs with the lowest vitelline membrane strength and the least elastic membrane. Force measurements recorded by the disc were much greater and were more closely associated with the linear detection region of the load cell. The disc probe allowed for a more complete assessment of membrane strength than the 1 mm probe due to the high percentage of the membrane having the force exerted upon it. The 1 mm probe could provide insight into the strength at a single point on the membrane where bacteria could attack. The choice of testing probe can have a direct effect on the outcome of the results and should be based on the precise quality concern being targeted.

Key Words: Shell Egg, Vitelline Membrane Strength, Yolk Quality

430 Postmortem sarcomere length characterization between *Psoas major* and *Longissimus dorsi* muscles in cattle. I. Zapata*[1], M. Yamaguchi[1], J. Wakamatsu[2], A. Hattori[2], and M. Wick[1], [1]*The Ohio State University*, *Columbus*, [2]*Hokkaido University*, *Sapporo, Japan*.

Understanding the biological mechanisms of postmortem events in muscle is of enormous importance for the meat industry due to its relation with quality. Although studies have attempted to relate sarcomere length to tenderness, there is a paucity of research on their postmortem characterization between the *Psoas major* (PM) and *Longissimus dorsi* (LD). The aim of this study was to characterize the postmortem sarcomere length of PM and LD muscles in cattle. Samples from the PM and LD muscles were removed from 32 animals at 45 min postmortem at the abattoir in the Ohio State University meat science laboratory. Muscle tissue free of evident fat or connective tissue was dissected from each sample and fixed in a glutaraldehyde/cacodylic acid buffer pH 7.1. Samples were homogenized in cacodylic acid buffer pH 7.1, mounted on glass slides and sealed. Slides were observed by phase contrast microscopy and images were captured with a CCD camera. Sarcomere lengths were measured using image analysis software. Statistical analysis of the sarcomere length was performed using the MIXED procedure from SAS. Representative samples from both muscles were postfixed with osmium tetraoxide and embedded in Eponate resin. Thin sections were obtained and mounted on copper grids, stained with uranyl acetate and lead citrate. Grids were observed using transmission electron microscopy (TEM) and images were taken. Phase contrast based sarcomere lengths of the PM and LD were significantly different ($P < 0.001$). Least square mean estimated lengths were 1.897 ± 0.067 µm for LD and 2.461 ± 0.067 µm for PM. Measured lengths of TEM images were consistent with the measured lengths from phase contrast microscopy. These data demonstrate clear differences in the postmortem architecture between the two muscles. Although tenderness values were not measured in this study, these results indicate that the difference in tenderness generally accepted to exist between the filet mignon (PM) and the ribeye (LD) may be related to the differences in initial sarcomere lengths.

Key Words: Microscopy, Postmortem, Sarcomere Length

431 Cholesterol quantification in meat and meat products. T. T. N. Dinh*[1], L. D. Thompson[1], J. C. Brooks[1], M. F. Miller[1], and J. R. Blanton, Jr.[2], [1]*Texas Tech University*, *Lubbock*, [2]*Intervet Inc.*, *Millsboro, DE*.

The objectives of this study were to develop an accurate and precise method for cholesterol quantification in meat samples based on modifications to an existing procedure (AOAC Official Method 994.10), and to apply this method to evaluate the differences in cholesterol content of longissimus muscles (LM) from Angus (AN, n = 5), Brahman (BR, n = 4), and Romosinuano (RM, n = 9) breeds. Validation of this method was performed using a meat homogenate (Standard Reference Material 1546) from National Institute of Standards and Technology (NIST), and LM samples from the three breeds with fat contents ranging from 2.4% to 9.3%. The results indicated that the modified method was efficient and accurate with cholesterol recovery exceeding 95%. The method was also found to be repeatable with an average coefficient of variation of 3.12%. The modification reduced 90% of chemicals used and eliminated time-consuming steps that hindered high throughput application of the traditional method. Application of this method for cholesterol quantification of LM samples revealed differences among the three breeds evaluated. The Angus LM with a higher fat content (50% higher than BR and RM) was associated with significantly higher cholesterol concentrations (70.25 mg/100 g) compared to Brahman and Romosinuano purebreds (64.77 mg/100g and 65.76 mg/100g; $P = 0.005$ and $P = 0.006$; respectively). Cholesterol concentration was found to be related to fatness of LM muscle from the three breeds ($r = 0.90$, $P < 0.001$). Cholesterol concentrations found in LM were slightly higher than those reported in the USDA National Nutrient Database for Standard Reference for separated lean of Choice rib-eye. This modified method was reliable and should be evaluated for adoption as an appropriate method for cholesterol quantification in meat samples.

Key Words: Cholesterol Quantification, Gas Chromatography, Beef Longissimus Muscle

432 Round muscle profiling of tenderness and postmortem proteolysis. M. J. Anderson*, S. M. Lonergan, and E. Huff-Lonergan, *Iowa State University*, *Ames*.

Definition of characteristics of individual muscles from the round will make it possible to consistently add value to individual cuts.

Therefore, the objective of this study was to determine the biochemistry underlying the differences in tenderness of specific muscles of the round. Ten beef cattle were slaughtered and the longissimus dorsi (LD) and the round muscles gracillus (GR), adductor (AD), sartorius (SAR), vastus lateralis (VL), and vastus intermedius (VI) were removed. Samples were aged 1, 3, 7, or 14 d. Objective tenderness measurements (star probe) and western blots for troponin-T to determine protein degradation were preformed. For troponin-T degradation, two bands (Upper intact band, UI; 30kDa degradation product band, 30kDa) were measured and compared to a reference. On d 1 star probe analysis found that VL required more force to penetrate ($P=0.04$) than VI, SAR, and GR. VI had a lower force ($P=0.04$) than LD. UI band of VI was less intense ($P<0.01$) than AD, GR, and LD. LD had a more intense ($P<0.01$) UI band than all other muscles except the AD. 30kDa was less intense ($P=0.016$) than GR, LD, and VI. On d 3 VL required more force ($P<0.01$) than all other muscles except the AD. AD required more force than GR, SAR, and VI and LD required more force than GR. UI band was less intense ($P<0.01$) for VI than LD, AD, and GR. The UI band from LD was more intense ($P<0.01$) than all other muscles except AD. 30kDa band of AD and LD were more intense ($P<0.01$) than all other muscles with the exception that LD tended to be more intense ($P=0.069$) than VL. On d 7 LD, AD, and VL all required more force ($P<0.01$) than GR, SAR, and VI. 30kDa band of LD was more intense ($P<0.01$) than all other muscles. On d 14 VL required more force ($P<0.01$) than all other muscles except AD, and AD required more force ($P<0.01$) than GR, SAR, and VI. 30kDa band of LD was more intense ($P<0.01$) than all other muscles. 30Kda band of AD was more intense ($P<0.01$) than SAR and VI, and VI was less intense ($P<0.01$) than VL. These data show that physical and biochemical differences exist between individual muscles of the round and may provide insight on ways to add value to individual cuts.

Key Words: Troponin-T, Tenderness, Beef

433 MSTN regulates IGF-2 but not IGF-1 expression during myogenesis of cattle. M. Miyake*, S. Hayashi, Y. Imai, K. Watanabe, S. Ohwada, H. Aso, and T. Yamaguchi, *Tohoku University*, *Sendai, Japan*.

Myostatin (MSTN) is a member of TGF-β superfamily that negatively regulates skeletal muscle mass. Conversely, insulin-like growth factor (IGF)-1 and IGF-2 are essential for the development, regeneration and hypertrophy of skeletal muscle. Although it seems that MSTN and IGF cooperate on skeletal muscle development, their mutual relationship still remains unclear. The present study was carried out to investigate the effects of MSTN on the IGF-1 and IGF-2 expression in Japanese shorthorn cattle. We first examined the IGF-1 and IGF-2 expression in the normal and regenerating the *M. longissimus thoracis* of normal-muscled (NM) and double-muscled (DM) cattle and next the effects of MSTN on the IGF-1 and IGF-2 expression in primary myoblast cultures derived from the *M. longissimus thoracis* of NM and DM cattle. The mRNA expression of IGF-2 was higher in the *M. longissimus thoracis* of DM than NM cattle although IGF-1 mRNA was similarly expressed in the normal and regenerating muscle of both cattle. In the differentiation medium cultures (DF cultures) but not the growth medium cultures (GR cultures), the mRNA expression of IGF-2 was significantly higher in DM than NM myoblasts. However, there were no changes of IGF-1 mRNA expression in the GR and DF cultures. In the both of NM and DM myoblast cultures, MSTN inhibited the fusion of myoblasts and the mRNA expression of MyoD and myogenin. Moreover, MSTN suppressed the mRNA expression of IGF-2 but not the mRNA expression of IGF-1 in DF cultures of NM and DM myoblasts. An inhibitor, SB431542, to activin receptor-like kinases (MSTN signaling molecules) abolished MSTN inhibitions on the fusion and MyoD mRNA expression of myoblasts. The mRNA expression of IGF-2 was augmented by an addition of SB431542 or both of MSTN and SB431542 in DF cultures. These results strongly indicate that IGF-2 expression is regulated by MSTN via activin receptor type IIB-Smad signaling pathway but IGF-1 expression is independent of MSTN during myogenesis of cattle.

Key Words: Myostatin, IGF-2, Bovine Myogenesis

434 Predicting lamb tenderness using proteomic analysis of 36 hour postmortem muscle. M. S. Updike*, A. Nichols, J. M. Reddish, H. Zerby, and M. Wick, *The Ohio State University*, *Columbus*.

Tenderness is one of three main components affecting palatability in lamb along with flavor and juiciness. Currently, carcasses are sorted into palatability classes using quality grade, a score based on physiological age and the amount of intramuscular adipose, which is only moderately correlated to tenderness. A method that would rapidly and accurately predict tenderness would be an advantage to the lamb industry. The long term goal of our laboratory is to create an immunochemical test strip which can accurately predict tenderness for consumers (7-14 d postmortem) at the time the carcasses move from the cooler for fabrication (24-48 h postmortem). Previous research from our lab used bovine myofibrils from 36 h to predict 7 d tenderness as proof of principle. To expand upon that research, 40 cross-bred lambs were harvested at The Ohio State University meat lab. Samples of Longissimus dorsi were taken at 36 h postmortem for proteomic analysis. Chops were assayed for tenderness using Warner Bratzler sheer (WBS) force at 7 d postmortem. Proteomic analysis samples were solublized in urea/thiourea buffer and run on SDS-PAGE using 5-20% gradient polyacrylamide gels. The gels were stained with Sypro Ruby® and the images were digitized. The resulting images were analyzed and the percent contribution of each band to the total was used in a reverse step wise regression on the WBS force value for that sample. Fourteen bands from the 36 h proteomic samples were identified that are associated with and predictive of 7 d tenderness ($r^2 = 0.88$, $p \leq 0.01$). These results suggest that an immunochemical test strip used at 36 h postmortem, based on these proteins, could accurately predict tenderness of lamb when it is consumed at 7 to 14 d postmortem.

Key Words: Lamb, Proteomics, Tenderness