46 Protein extractability of breast muscle from broilers and three non commercial strains of chicken. B. M. Rathgeber*1, R. M. Currie2, K. L. Thompson1, and F. G. Silversides1, 1Agriculture & Agri-Food Canada, Kentville, NS, Canada, 2Nova Scotia Agricultural College, Truro, NS, Canada, Agriculture & Agri-Food Canada, Agassiz, BC, Canada.

The extractability of myofibrillar proteins is a useful indicator of functional properties of chicken breast meat. Post-mortem metabolic events are influential on protein functionality and are the focus of many investigations evaluating pale meat of poor quality. The objective of this study was to investigate the protein extractability of 4 breeds of chicken subjected to 2 chilling regimens. Thirty-two males of each breed, Columbia Rock (CR), Barred Rock (BR) White Leghorn (WL) and Commercial Broilers (CB) were grown to 50 d of age and processed. The left carcase halves were immersed in ice water and the right sides were immersed in 40°C water for 4 h. The carcase halves were removed from water and air chilled at 4°C until 24 h post-mortem when a 5 g muscle sample was removed and quick frozen at −80°C. The protein content of all samples was estimated following nitrogen analysis. Samples were homogenized in low ionic strength (LIS) buffer and centrifuged. The supernatant was removed to determine proteins in solution. Following a second extraction with LIS the pellet was homogenized in high ionic strength (HIS) buffer to determine salt soluble proteins. Statistical analysis using SAS mixed model was employed. The CB breast meat had the highest (P < 0.05) level of protein (22.4%) and BR (20.7%) was higher than CR (20.3%) or WL (19.2%). The extractability of proteins in LIS was higher for CB (40.0% of total protein) than CR (35.6%) with the other breeds intermediate and not different from these. Delaying the chilling of one side reduced the extractability of proteins in LIS (P < 0.05) and the salt soluble proteins, however, the effect was less for CB. There was a 24% reduction in extractability of proteins in HIS for CB when chilling was delayed. For BR there was a 60% reduction, 53% for CR and 52% for WL. The functional properties of breast muscle proteins from non commercial chickens used in this experiment were markedly different from CB and may serve as a valuable resource for studying the mechanisms behind the development of poor quality breast meat.

Key Words: protein functionality, protein extractability, broiler chicken, non-commercial chicken

47 Textural properties of chicken breast fillets in different package types and stored under freezer conditions. A. G. Sanchez Pena*1, A. M. Luna2, and C. Z. Alvarado1, 1Texas A&M University, College Station, 2Texas Tech University, Lubbock.

Most consumers purchase fresh chicken breast fillets only to freeze them for extended shelf-life. Different packaging is available to consumers for freezing, however, the effects of these packages are not well known to consumers. Therefore, the objective of this study was to evaluate the effect of packaging materials on the quality of chicken breast fillets after 1, 3 and 6 wk storage at 0F. A total of 296 fillets were used in 2 trials with 3 replications each. Chicken breast fillets were randomly placed in 3 different packaging materials (tray pack, Ziplock freezer bags, and butcher paper) and analyzed for raw pH and color at d 0, wk 1, 3, and 6. In addition, cooked texture and sensory attributes (juiciness, tenderness and overall flavor) were analyzed at wk 1 and 6. Data was analyzed using the GLM procedure of SAS and the means were separated using Duncan’s Linear Model with a P value of <0.05 to determine significance. There were no significant differences in pH through wk 3. However, by wk 6 pH was significantly higher in the ziplock treatment (6.31) compared with the butcher paper (6.15). For color, the butcher paper (58.16) had significantly higher L* value (lighter) compare with the Ziplock (51.71) by wk 3. By wk 6, both the butcher paper (59.24) and the overlap (58.98) were significantly lighter than the Ziplock (54.93). There were no differences in sensory; however, using objective measurements of texture, the overlap was significantly tougher at wk 1 and 6 compared with the Ziplock which was significantly tougher than the butcher paper. Therefore, even though there are some significant differences in color, pH and texture, consumers (sensory) were not able to detect quality differences among the different packaging treatments.

Key Words: packaging, texture, breast fillets, freezing, sensory

48 Marination differences between fresh and frozen breast fillets. G. M. Nagel*SC, L. J. Bauermeister, A. Morey, and S. R. Mckee, Auburn University, Auburn, AL.

The rate of marinate pick-up and retention in frozen versus fresh breast fillets was determined, in addition to differences in cook-loss between the treatments. Broilers (Ross 708, 7 wks of age) were conventionally processed and chilled for 24 h. Butterfly breasts were deboned and split with the right fillet (control) being marinated fresh; whereas, the left fillets were frozen (37 d, −20°C), thawed (4°C for 48 h) and marinated. Additionally, fresh fillets and previously frozen fillets were tumbler marinated at 2 different temperatures 7.2°C and 18.3°C (n = 40 fillets per treatment per replicate). Two replicates were conducted. Green weights were recorded as a group for the 15 fillets added to each tumbler with 8 tumbler per treatment. A marinate solution (water, 0.45% phosphate and 1.4% salt) with a 15% target pick-up was added to each tumbler. Each batch was tumbled for 30 min. The fillets were removed from the tumbler, and a batch weight was recorded to calculate marinate uptake. The fillets were then placed in bags by treatment and stored on ice overnight. The following day, they were removed from bags and weighed to calculate marinate retention. To determine cook-loss, fillets were cooked in foil covered pans with wire racks to an internal temperature of 73.8°C, cooled and weighed. Results suggested that the previously frozen and marinated fillets at 18.3°C had the highest marinate pick-up of all the treatments, whereas the fresh marinated fillets at 18.3°C had the lowest pick-up. Likewise, the previously frozen and marinated fillets at 18.3°C had the highest marinate retention compared with the fresh marinated fillets at 18.3°C which had the lowest marinate retention. In addition, fresh marinated fillets at 18.3°C had the highest cook-loss while the previously frozen and marinated fillets at 7.2°C had the lowest cook-loss. This data suggests previously frozen fillets may pick up and retain marinate and have the lowest cook-loss, however, there is loss associated with freeze-thaw.

Key Words: marinated breast fillets, previously frozen fillets, marinate retention, marinate pick-up, cook-loss

49 Effects of genetic strain and sex on meat characteristics of broilers. K. P. Lopez*SC, M. W. Schilling, and A. Corzo, Mississippi State University, Mississippi State.

A randomized complete block design within a factorial arrangement of treatments was used to evaluate the effect of strain cross and sex on carcass characteristics, meat quality and sensory acceptability. Two broiler strains were reared, a commercially available strain (strain A), and a strain currently in the test phase (strain B) that has been genetically selected to maximize breast yield. Broilers were harvested in a pilot scale
processing plant using commercial prototype equipment at 42 d of age. Carcasses were deboned at 4 h post mortem. The left half of each breast was evaluated for pH, color, cooking loss, shear force, and proximate analysis. The right side of each breast was used for consumer acceptability testing. Thigh meat was evaluated for proximate composition. No gender x strain interactions were observed throughout the study. Male broilers had a higher (P<0.05) live body weight, carcass weight, breast weight and lower (P<0.05) dressing percentage and breast meat yield when compared with females. Broilers from strain B presented a higher (P<0.05) breast yield and dressing percentage than those broilers corresponding to the commercially available strain. At 24 h post mortem, female broilers presented a lower ultimate pH and higher CIE b* values (ventral side of the pectoralis major) when compared with male broilers. On average, no differences existed (P>0.05) among treatments with respect to pH decline, cooking loss, shear values, and proximate composition. In addition, no differences (P>0.05) existed among breast meat from the different strains with respect to consumer acceptability of appearance, texture, flavor and overall acceptability, but breast meat from strain B was slightly preferred (P<0.05) over strain A with respect to aroma. However, breast meat from both strains received scores in the range of: like slightly to like moderately. Overall data suggest that all treatments yielded high quality breast and thigh meat, and strain cross does not present variability in terms of consumer acceptability.

**Key Words:** strain, sex, meat quality

**50 Short-term divergent selection for muscle color in broilers.**

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Atypical poultry meat has become a significant consumer-related physiological abnormality. For product, meat quality is determined by physical properties such as palatability, texture, tenderness, taste, color, pH, and water-holding capacity. In the processing plant, meat is generally graded on aesthetic characteristics such as tears, bruises, discoloration, or missing parts. Demand for convenient, economical, and palatable products will continue to drive the limits of product functionality. A better understanding of the physical properties of meat is imperative. Studies designed to characterize atypical meat has led to inconsistent results. The current study was conducted to explore factors contributing to muscle quality through the creation of lines divergently selected for 6 week muscle color (L* value). L* value is correlated to physical properties of meat. Growth, processing yield, and muscle quality parameters were investigated in broilers selected 6 generations for high (HMC) and low (LMC) muscle color. Lines HMC and LMC and the random bred base population (RBC) were included in this study. Heritability estimates for L* value in the upward and downward directions were 0.40 ± 0.07 and 0.45 ± 0.06 respectively. The response to selection did not appear to be symmetrical. Line HMC increased 0.62 L* value units, whereas LMC decreased −0.04 units per generation. After 6 generations of selection the mean L* values for the HMC, RBC, and LMC lines were different, 58.34, 55.32, and 53.57 respectively. Lines HMC and RBC had higher live, WOG and breast weights than Line LMC. Lines HMC and LMC had higher moisture uptake than RBC. HMC exhibited higher drip loss (%) than Lines LMC and RBC. Intensive post slaughter pH measurements showed a common initial pH (pH15min). RBC and LMC lines had a relatively low rate of pH decline. Line HMC exhibited higher pH decline resulting in a lower ultimate pH (pH24h). Selection for muscle L* value impacted muscle color and quality. These resource lines provide a consistent source of genetic material to explore the genetic and environmental conditions contributing to its incidence.

**Key Words:** selection, broiler, PSE, DFD, muscle quality

**51 Occurrence of white striping in two different fast growing strains of broilers.**

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A phenomenon referred to as white striping has become a concern to some poultry producers in regards to the visual quality of chicken breast fillets. This study was designed to determine if there was any relationship between white striping and 2 fast growing strains of male broilers. Broilers, strain A (n = 640) and strain B (n = 640) were randomly placed in a completely randomized block design on the day of hatch. Chicks were fed basal diets (2 × 2 × 2 factorial arrangement) consisting of a corn soy diet or a corn soy diet with meat and feather meal, that were designed to be nutritionally equivalent. Broilers were grown out under normal rearing conditions and were conventionally processed at 8 weeks of age. Live weights and butterfly fillet weights were recorded and fillets were ranked visually (1 = normal fillets, 2 = mild, 3 = moderate and 4 = severe) based on severity of white striping for each breast fillet. From each white striping rank, meat samples were collected (n = 200) and preserved using a 10% formalin solution and stained for histological analysis. Diets had no effect on the carcass or fillet weights. There were no differences in carcass weights between strain A and strain B however; strain A had heavier breast fillet weights compared with strain B. Strain A had a higher occurrence of white striping in the moderate and severe categories than strain B. The average rank for white striping in strain A was higher than strain B. This data suggests that the white striping is associated with broilers that have heavier breast fillets weights.

**Key Words:** meat quality, white striping, breast fillets, broilers, fast growing

**52 Texture of chicken nuggets with methylcellulose added as a pre-dust coating.**

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Current trends indicate that consumers enjoy fried foods but are concerned about nutrition related to oil uptake. Methylcellulose used in a pre-dust for chicken nuggets has been shown to reduce oil uptake and decrease moisture loss. However, little research has been conducted on the effects of methylcellulose on the textural properties of chicken nuggets. Therefore, the objective of this study was to evaluate creep compliance in chicken nuggets treated with 5% methylcellulose added in the pre-dust. Chicken nuggets for this project were prepared specifically at a food processing company. The nuggets were battered, breaded and par fried at 350F or 375F for 26 to 30sec before frying at 350F or 375F for 0, 1, 2 or 4min. Following frying, a cylindrical portion from the nugget was separate followed by the separation of the crust (breading) and the core (meat). The creep compliance (μm²/N) was measured using Dynamic Mechanical Analysis Q800 at a stress of 0.01MPa and temperature of 30C, 110C and 190C. The sample was held by the equipment at isothermal condition for 1min, displaced for 2min and allowed to recover for 1min. The data were analyzed by ANOVA in a 2 (treatment) x 2 (frying temperatures) x 2 (portions- crust or core) x 4 (testing temperatures) x 3 (trial) factorial design. No significant difference was observed between the control and the methylcellulose treatments at all the testing conditions (P ≥ 0.05). These results indicate that the chicken nuggets prepared using methylcellulose require the similar amount of load to be deformed and may be associated with same texture. So, chicken nuggets may be prepared using methyl cellulose which reduces the oil uptake and retains higher amount moisture without disturbing the texture of the product.
**Key Words:** chicken nuggets, texture, creep compliance, methylcellulose

53 Comparison of hydrochloroperoxous acid with other commercially used chemicals for disinfection of broiler chicken carcasses applied during immersion chilling. S. M. Russell,* University of Georgia, Athens.

A study was conducted to determine the effect of hydrochloroperoxous acid (HCA-US Patent 6,866,870) on aerobic plate counts (APC), Escherichia coli (EC) counts, Salmonella (SAL), and Campylobacter (CAM) on broiler chicken carcasses. Twenty-five carcasses were separated into groups of 5 each and Campylobacter jejuni was applied to the breast of each one for 20 min. Groups were placed into containers with 40 gallons of the following solutions containing ice: 1) Control tap water (C), 2) bleach at 50 ppm (BI), 3) HCA at 50 ppm (HCA50 adjusted to 50 ppm free chlorine), 4) HCA at 100 ppm (HCA100 adjusted to 100 ppm free chlorine), and 5) peracetic acid at 50 ppm (PAA) and agitated for 1 h to mimic chilling. The carcasses were removed and carcass rinses were conducted using 400 mL of sterile buffered peptone broth with neutralizing agent. Carcass rinses were evaluated for APC, E. coli, Salmonella, and Campylobacter count. Three replicate trials were conducted. APC for C, BI, HCA50, HCA100, and PAA were 4.29, 3.47, 3.13, 2.89, and 3.13, respectively. EC for C, BI, HCA50, HCA100, and PAA were 2.13, 1.17, 1.28, 1.00, and 1.70, respectively. SAL for C, BI, HCA50, HCA100, and PAA were 100, 93.3, 60, 33.3, and 73.3%, respectively. CAM for C, BI, HCA50, HCA100, and PAA were 100, 100, 100, 46.7, and 93.3%, respectively. HCA100 reduced APC significantly (P < 0.05) more than BI or PAA by more than 0.5 log and by 1.16 log, when compared with controls. BI, HCA50, and HCA100 reduced EC significantly more than PAA and HCA100 reduced EC by 1.13 log, when compared with controls. HCA50 and HCA100 reduced SAL significantly more than PAA and HCA100 reduced SAL by 66.7%, when compared with controls. HCA100 reduced CAM significantly by 53.3%, when compared with controls, however the other chemicals had no impact. These data show that HCA is novel chemical that may be used to assist poultry processors in meeting the newly proposed USDA-FSIS Salmonella and Campylobacter performance standards.

**Key Words:** hydrochloroperoxous acid, E. coli, Salmonella, Campylobacter, chicken

54 Salmonella recovery following immersion chilling for matched neck skin and whole carcass enrichment sampling methodologies. J. M. Holmes*1SC, R. J. Buhr2, J. A. Cason2, N. A. Cox2, D. V. Bourassa2, L. L. Rigsby2, and P. F. Fedorka-Cray2, 1University of Georgia, Athens, 2USDA, ARS Russell Research Center, Athens, GA.

The prevalence and serogroups of Salmonella recovered following immersion chilling were determined for both neck skin and the matching whole carcass enriched samples. Commercially processed and eviscerated broiler carcasses were immersed chilled in ice and tap water for 40 min. Following immersion chilling, each carcass was hung by the wing for 5 min to allow water to drip. From each carcass, the neck skin (8.3 g) was removed and stomached in 83 mL 1% buffered peptone water. The remaining carcass was subjected to whole carcass enrichment in 400 mL 1% buffered peptone water. Both the neck skins and whole carcasses were incubated at 37°C for 24 h before aliquots were transferred to selective enrichment broths (RV and TT). Following incubation, BGS and MLIA plates were streaked and incubated at 37°C for 24 h. From each plate, 3 colonies displaying typical Salmonella characteristics were individually stabbed into TSI and LIA slants. For neck skin samples, 12/40 were Salmonella-positive with 11 identified as serogroup C, and 1 identified as serogroup B. For whole carcass enrichment, 37/40 were Salmonella-positive with 11 identified as serogroup B, 33 identified as serogroup C3, and 11 identified as serogroup D. Three different Salmonella serogroups were detected on 2 of the whole carcasses (C3/D/B) while no Salmonella was detected on the matching neck skin samples. Two different Salmonella serogroups were detected on 12 whole carcass samples either (C3/B) or (C3/D) while no Salmonella was detected on the corresponding neck skin samples. A representative group of D, B and C3 positive serogroups were stereotyped and found to be S. Typhimurium, S. Kiambi, and S. Kentucky respectively. Of the 3 Salmonella-negative carcasses; only one corresponding neck skin was Salmonella-positive. For the 28 negative neck skin samples, 26 had Salmonella-positive serogroups matching whole carcasses. In this study, the whole carcass enrichment was superior to neck skin, detecting Salmonella on 92% versus 30% of the samples, respectively.

**Key Words:** Salmonella, neck skin, whole carcass enrichment, immersion chilling


Eggs have been identified as a source of salmonellosis making the transmission of Salmonella to eggs of great concern to the poultry industry. The goal of this experiment was to determine the ability of Salmonella to penetrate the egg shell of 5 different breeds of non-commercial chicken and one commercial white egg layer (CL). The non-commercial breeds included Barred Rock (BR), White Leghorn (WL), Brown Leghorn (BL), Fayoumi (FY) and Light Sussex (LS). Egg weight, breaking force, shell weight and shell thickness measurements were taken for 30 eggs per breed. A hole (1 cm) was made on the narrow end of 30 additional eggs per breed. The eggs were drained of their contents and rinsed and left to dry. The shells were filled with plate count agar containing tetracycline and 0.1% 2, 3, 5 triphenyl terazolium chloride. Once hardened, the hole was sealed with paraffin wax. Agar filled eggs were submerged for 1 min in a solution containing tetracycline resistant Salmonella heidelberg and incubated at 37°C for 40 h. Eggs were candled and colonies that penetrated the shell were counted and reported as colony forming units (cfu) per gram of shell to account for size differences. Statistical analysis using SAS mixed model was used to evaluate differences between breeds for egg quality characteristics and the ability of bacteria to penetrate the shell. There were differences in shell measurements between breeds. The commercial layers (62.6g) and BR (61.5g) produced the largest eggs while the FY (47.1g) were the smallest (P < 0.05). The force to break the shell was lowest (P < 0.05) for BR (3.6kg) and greatest for CL (4.4 kg), WL (4.4kg) and FY (4.2 kg). The number of bacteria penetrating the shell was lowest (P < 0.05) for BR eggs (10.7 cfu/g) and highest for LS (27.7 cfu/g) and BL (27.2 cfu/g), with eggs from the other breeds falling in between. These results indicate that there are breed specific influences on the ability of an egg to resist Salmonella, which cannot be explained by the shell measurements used. Further investigations are warranted to determine the contributing factors to shell penetration by bacteria.

**Key Words:** Salmonella, egg shell, bacterial penetration, chicken breeds

56 Use of the agar diffusion assay to measure bactericidal activity of alkaline salts of fatty acids against bacteria associated with poultry processing. A. Hinton Jr* and K. Ingram, Russell Research Center, Athens, GA.
The agar diffusion assay was used to examine antibacterial activity of alkaline salts of caproic, caprylic, capric, lauric, and myristic acids. A 0.5 M concentration of each fatty acid was dissolved in 1.0 M potassium hydroxide (KOH), and pH of the mixtures was adjusted to 10.5 with citric acid. Solutions were filter sterilized by passage through 0.2 μm filters. Agar media was inoculated with 10^8 colony-forming-units/ml of *Acinetobacter calcoaceticus*, *Campylobacter jejuni*, *Enterococcus faecalis*, *Escherichia coli*, *Listeria monocytogenes*, *Pseudomonas aeruginosa*, *Salmonella Typhimurium*, or *Staphylococcus simulans*. Wells were made in solidified agar, and 0.1 mL of each solution was added to separate wells. Plates were incubated for 24–48 h aerobically at 35°C, except for *C. jejuni* plates incubated microaerobically at 42°C. Zones of inhibition of bacterial growth around the wells were measured. Results indicated that caproic acid-KOH inhibited growth of *C. jejuni* only. Caprylic acid-KOH inhibited growth of 3 of the Gram-negative isolates, and the relative size of the zones of inhibition of the isolates were *E. coli* < *P. fluorescens* and *C. jejuni*. Only caprylic-KOH and lauric acid-KOH exhibited antibacterial activity toward all 8 isolates. Size of the zones of inhibition produced by lauric acid-KOH was significantly larger than the zones for *S. simulans* and *P. fluorescens*. Myristic acid-KOH was only inhibitory toward the 2 Gram-positive cocci, and the size of the zones of inhibition for *E. faecalis* was significantly larger than the zones for *S. simulans*. Findings demonstrated that alkaline salts of FA possess antibacterial activity toward bacteria associated with poultry processing and that the agar diffusion assay can be used to screen antibacterial activity of these solutions.

**Key Words:** fatty acids, bactericidal, poultry processing

**57 Variations on standard broiler processing in an effort to reduce Campylobacter numbers on post-pick carcasses.** M. E. Berrang*1, D. P. Smith2, and R. J. Meinersmann1, 1USDA-Agricultural Research Service, Athens, GA, 2North Carolina State University, Raleigh.

Campylobacter numbers increase on broiler carcasses during defeathering due to leakage of gut contents through the vent. We tested several processing modifications designed to interfere with the transfer of *Campylobacter* from gut contents to carcass surface. Numbers of *Campylobacter* detected on breast skin of carcasses treated with each modification was compared with control broilers processed using a standard method. Filling the vent and colon with commercially available canned spray foam did not consistently form an effective plug and *Campylobacter* numbers increased during picking. Likewise, hanging carcasses with the vent pointed downward during defeathering was not effective to prevent the increase in *Campylobacter* numbers. Eviscerating carcasses by hand immediately before defeathering eliminated the increase in *Campylobacter* during automated feather picking. However, inadvertent contamination during hand evisceration led to higher numbers before feather removal. Therefore, we tested hand evisceration before scald, allowing the scald water to kill and wash away *Campylobacter* spilled on the carcass during evisceration. Pre-scald evisceration was effective to significantly reduce the increase in *Campylobacter* on broiler carcasses during automated defeathering. Changing the order of standard broiler processing may help to control contamination with *Campylobacter*.

**Key Words:** broiler, *Campylobacter*, processing, evisceration, defeathering

**58 Evaluation of the effect of an organosilane quaternary ammonium salt on biofilms of Listeria monocytogenes.** S. M. Russell,* University of Georgia, Athens.

A study was conducted to determine if electrostatic spray application (ES) of an organosilane quaternary ammonium salt (OQAS) to stainless steel coupons could prevent the formation of biofilms of *Listeria monocytogenes* (LM). Stainless steel coupons (15) were treated with OQAS, coating the coupon on both sides. Coupons were then allowed to dry for 5 min. Fifteen additional coupons were not treated and used as controls. All coupons were placed into a sterile bag for 3 weeks before testing to determine if OQAS was able to remain active. All 30 coupons were dipped into a 3-strain mixture of actively growing LM. LM were encouraged to form a biofilm by placing the coupons (individually in different containers) into sterile minimal media. After 12 h, the coupons were removed and the biofilms were recovered by placing the coupons into sterile urine sample cups with sterile glass beads and shaking. These samples were plated onto Modified Oxford Agar to recover LM. Colonies of LM were counted and the means for each group were evaluated statistically. The experiment was conducted 3 times. OQAS treated coupons had no visible biofilm on the surface and no turbidity in the medium, indicating little if any growth; whereas, the control coupons had a visible biofilm and the medium was turbid. LM recovered from untreated control coupons in Reps 1, 2, and 3 were 6.96, 7.27, and 7.21 log10 cfu/mL, respectively; however, LM recovered from OQAS treated coupons in Reps 1, 2, and 3, were 5.46, 5.55, and 5.77 log10 cfu/mL, respectively. These data demonstrate that OQAS was not only able to significantly (< 0.05) reduce LM growth and biofilm formation on the coupon (1.50, 1.72, and 1.44 log10 reductions in Reps 1, 2, and 3, respectively), but was also able to prevent growth in the surrounding medium, as indicated visually. This intervention may be useful for preventing the growth of LM on food contact surfaces, thereby preventing expensive recalls.

**Key Words:** biofilms, *Listeria monocytogenes*, stainless, food contact, recalls

**59 Prevalence of Salmonella following immersion chilling for matched neck skin, whole carcass rinse, and whole carcass enrichment sampling methodologies.** R. J. Buhr*1, J. M. Holmes2, J. A. Cason1, N. A. Cox1, D. V. Bourassa1, L. L. Rigsby1, and P. F. Fedorka-Cray1, 1USDA, ARS, Russell Research Center, Athens, GA, 2University of Georgia, Athens.

Salmonella prevalence and the serogroups recovered following immersion chilling were determined for matched enriched neck skin, whole carcass rinse, and whole carcass samples. Commercially processed and eviscerated broiler carcasses were chilled in ice/tap water 40 min with or without 20 ppm free chlorine. From each carcass, the neck skin (8.3 g) was removed and stomached in 83 mL 1% buffered peptone water (BPW). Next the carcass was rinsed in 430 mL 1% BPW for 1 min and 30 mL of rinseate collected. The carcass was then subjected to whole carcass enrichment in the remaining 400 mL 1% BPW. All samples were incubated at 37°C for 24 h before aliquots were transferred to selective enrichment broths (RV and TT). Following incubation, BGS and MLIA plates were streaked and incubated at 37°C for 24 h. From each plate, 3 colonies displaying *Salmonella* characteristics were individually stabbed into TSI and LIA slants from which *Salmonella* serogroups were identified by antibody agglutination. Among the non-chlorinated carcasses for neck skin samples, 10/20 were *Salmonella*-positive and were serogroups B or C3. For whole carcass rinse, 10/20 were *Salmonella*-positive and all were C3. For whole carcass enrichment, all 20 were *Salmonella*-positive.
and were B, C2, C3, or E. Among the chlorinated carcasses for neck skin samples, 7/20 were Salmonella-positive and were serogroups B or C3. For whole carcass rinse no samples were Salmonella-positive. For whole carcass enrichment 19/20 were Salmonella-positive and were B or C3. Salmonella serogroups B and C3 were detected on 4/17 Salmonella-positive neck skin samples and in 17/19 Salmonella-positive whole carcass enrichment samples, but only 2 carcasses had both serogroups recovered in both the neck skin and the matching enriched carcass samples. In this study, whole carcass enrichment detected Salmonella on 100 and 95% (nonchlorinated and chlorinated chilled, respectively) of the samples, versus 50 and 35% of the neck skin samples, or 50 and 0% of the carcass rinse samples.

Key Words: Salmonella, neck skin, whole carcass rinse, whole carcass enrichment, immersion chilling

60 Prevalence and relationship of Salmonella and Campylobacter on broiler carcasses at three different points along the processing continuum. R. H. Bailey*, J. A. Byrd‡, A. K. Daniel†, K. L. Hataway†, and R. W. Wills†, †Mississippi State University, Mississippi State, ‡SPARC, USDA ARS, College Station, TX.

The presence of pathogens on raw foods of animal origin following processing continues to be a major concern for the food industry and federal regulators alike. Performance standards for the prevalence of Salmonella at or below the rate of 12 out of 51 carcasses tested has been in effect since January 1998. Over the last 12 years, the broiler processing industry has implemented many different measures in an effort to control and reduce the prevalence of Salmonella on their products. However, new performance standards purposed by the Food Safety Inspection Service will soon reduce the allowed level of Salmonella to no more than 5 per 51 carcasses and will for the first time include performance standards for Campylobacter at 8 out of 51. A study was done to 1) investigate the prevalence of Salmonella and Campylobacter at different points along the processing continuum and 2) determine the relationship between the presence of Salmonella and Campylobacter on the same carcasses at the different points of processing. Carcasses were collected at 3 different points on the processing continuum; 1) at the re-hang station following de-feathering and removal of the feet, 2) following the final bird rinse cabinet, and 3) at the immersion chiller exit. Carcass rinses were collected and the samples were cultured for the presence of the pathogens. A total of 2469 carcass rinses was collected. For Salmonella, the overall prevalence at the first sampling point was 18.3%, the second sampling point was 17.8%, and the third sampling point was 6.5%. For Campylobacter the prevalence was 26.4%, 27.8%, and 4.0% at the first, second and third sampling points, respectively. The prevalence of carcasses where Salmonella and Campylobacter were both present was 8.0%, 7.0%, and 0.1% at the first, second, and third sampling points, respectively. The results of this work indicated that the prevalence of both pathogens dropped during processing.

Key Words: Salmonella, Campylobacter, processing, prevalence, carcass