and disposal birds at approximately 70 wk of age) and 2 sexes, in 10 replications. Data were submitted to ANOVA and means were compared by Tukey test (5%). The breast meat of disposal birds showed higher WHC (72.73%), lower CWL (23.12%) and higher SF (3.764 kgf/cm^2) than the meat of broilers in ideal age to slaughter (63.81%, 30.50% and 3.213 kgf/cm^2, respectively). Males, regardless of age, showed breast meat with higher SF (3.758 kgf/cm^2) than females (3.220 kgf/cm^2). The breast meat from males and females did not show significantly differ to the WHC (68.47% and 68.07%, respectively) and CWL (26.44% and 27.19%, respectively). The aging of the bird promotes muscle changes favoring a lower leakage of water through the cells which, possibly, would result in a juicier meat. However, this would not provide a soft meat as the breast of birds slaughtered at 42 d of age. We suggest further studies regarding these muscle changes, so that the cause of such benefits to the meat, with the aging of the bird, can be better explained.

Key Words: breeder hen, cock, disposal bird, quality

491P Attributes related to juiciness and tenderness of breast meat in broilers of two lineages. J. L. M. de Mello, A. Giampietro-Ganeco*, A. B. B. Rodrigues, F. B. Ferrari, H. Borba, L. D. do Carmo Vieira, and R. A. de Souza, *Universidade Estadual Paulista, UNESP, Jaboticabal, São Paulo, Brazil.*

The aim of this study was to evaluate how the lineage and sex of the bird can influence the water-holding capacity (WHC), cooking weight loss (CWL) and therefore the tenderness of the breast meat of broilers. The *Pectoralis major* muscle from deboned carcasses, purchased from a commercial slaughterhouse was used. The WHC was determinate using 2 g of deboned muscle, placed between 2 filter papers and acrylic plates, and submitted to the pressure exerted by a weight of 10 kg for 5 min. To determine the CWL, samples were cooked in a water bath (85°C) for 30 min. The WHC and CWL were determined by difference between initial and final weight of samples. From cooked samples were obtained subsamples with known area (cm^2), submitted to cut in Texture Analyzer TA-XT2i texturometer, which determined the shear force (SF) in kgf. For statistical analysis a completely randomized design in 2x2 factorial was used with 2 sexes and 2 lineages, in 10 replications. Data were submitted to ANOVA and means were compared by Tukey test (5%). There was no significant interaction between lineage and sex of birds for WHC and CWL. The breast meat of birds of slow growing lineage (free range poultry) showed higher WHC (65.33%) and lower CWL (28.39%) than the meat of birds of fast growth lineage (63.81% and 30.50%, respectively). Males and females, regardless of lineage, showed no significant difference to the WHC (64.48% and 64.65%, respectively) and WCL (29.95% and 28.94%, respectively). There was a significant interaction for shear force. Males of fast growth lineage showed breast meat more tender (3.399 kgf/cm^2) than males of slow growth lineage (4.942 kgf/cm^2). Females of slow growth lineage showed breast meat more tender (3.113 kgf/cm^2) than males of the same lineage (4.942 kgf/cm^2). The lineage of the bird influences the juiciness and tenderness of the breast meat. Males have breast meat less tender than females.

Key Words: free-range poultry, sex, quality, shear force

492P Effect of antemortem heat stress and prolonged holding time on the physicochemical and quality characteristics of chicken meat. A. S. Hernadez-Cazares*[1], Y. Bautista-Martinez[2], A. Pro-Martinez[2], E. Sosa-Montes[3], N. Real-Luna[1], J. Velasco-Velasco[1], A. Contreras-Oliva[1], and C. Narciso-Gaytan[1], [1]*Colegio de Postgraduados Campus Cordoba, Amatlan de los Reyes, Mexico,* [2]*Colegio de Postgraduados Campus Montecillo, Montecillo, Mexico,* [3]*Universidad Autonoma Chapingo, Chapingo, Mexico.*

In the present study, ante-mortem heat stress and prolonged holding time were evaluated for effects on the quality characteristics of chicken meat. Ninety broilers of 42 d of age were randomly assigned to 3 treatments with 5 replications, with 6 broilers each, using a completely randomized block design. Broilers were feed withdrawn for 8 h, then placed into plastic cages and subjected to different holding time with or without heat stress; 2 h holding (2H, control 24°C), 2 h holding with heat stress (2HS, 40°C), and 8 h holding (8H, 24°C). Broilers were slaughtered and processed under commercial-like conditions. After 5 h post-mortem, carcasses were cut and breast meat was collected and analyzed for color (L*, a*, b*), pH, drip loss, water holding capacity, and Warner-Bratzler shear force. Breast fillets were cooked in a convection oven up to an internal temperature of 74°C, wrapped in aluminum foil, cooled at room temperature for 1 h and refrigerated (4°C) for 4 h before texture analysis. The results showed significant ($P < 0.05$) differences between treatments in most of the variables analyzed. The 2HS treatment induced a lower pH value (5.64), while the 8H treatment caused a higher pH value (6.34), compared with the control treatment (6.05). Meat from the 2HS treatment showed higher L* and b* values, and lower a*, while the opposite effect was observed in the 8H treatment. Additionally, the meat from the 2HS had higher shear force values and the 8H lower shear force values compared with the control treatment. Water holding capacity and cooked yield were lower in the 2HS meat than in the control treatment, but no differences were detected between the 2H and 8H treatments. In conclusion, exposure of broilers to antemortem heat stress and prolonged holding time induces changes in the physicochemical and quality characteristics of the meat. Meat from broilers exposed to heat stress develops the Pale Soft and Exudative meat condition, while meat broilers held 8 h develop the Dry Firm Dark meat condition.

Key Words: heat stress, meat quality

493P Optimizing thermophilic *Campylobacter* isolation in enriched cultures from retail chicken. J. S. Pozza[1], D. Voss-Rech[2], L. S. Lopes[2], and C. S. L. Vaz*[2], [1]*Universidade do Contestado, Concordia, SC, Brazil,* [2]*Embrapa-Brazilian Agricultural Research Corporation, Concordia, SC, Brazil.*

Thermophilic *Campylobacter* species are commonly found in broilers gut and might contaminate carcasses at processing. Although surveillance of *Campylobacter* in chicken is crucial to assess its potential for causing human campylobacteriosis, isolation of *Campylobacter* from foods is difficult because of its fastidious behavior and competing microflora. This study was undertaken to optimize *Campylobacter* isolation in chicken samples. A total of 37 retail packs of fresh chicken portions were purchased between 2012 and 2013 from local stores in Southern Brazil. At the laboratory, samples were individually rinsed with buffered peptone water and 10 mL of the initial suspension was added to 90 mL of Bolton broth that was incubated at 37°C for 4–6 h and then at 41.5°C for either 24 h and 48 h following plating onto modified charcoal cefoperazone deoxycholate agar (mCCDA) and Preston agar (PA) at 41.5°C for 44 h (±4 h). Gram-negative colonies exhibiting curved or spiral rods were presumptively identified as *Campylobacter* and subcultured for testing for production of catalase, oxidase, and hydrolysis of hippurate and indoxyl acetate. In addition, 34 non-*Campylobacter* strains that overgrew *Campylobacter* cultures onto selective media were randomly subcultured and further analyzed by standard biochemical procedures. Higher numbers of *Campylobacter*-positive samples were found using enrichment for 24 h before plating onto PA (19/37, 51.3%) compared

with mCCDA (1/37, 2.7%; $P < 0.0001$). However, there was no statistical difference between enrichment of samples for either 24 h or 48 h. The majority of strains isolated were identified as *C. jejuni*, while *C. coli* was found only in 2 samples. Moreover, all contaminant strains analyzed were recovered from cultures plated onto mCCDA and were phenotypically characterized as *Proteus mirabilis*. This study suggests that enrichment in Bolton broth for 24 h following plating onto PA not only allows shorter and reliable isolation of thermophilic *Campylobacter* from chicken, but also avoids *P. mirabilis* spreading. Yet, further studies are still needed to validate this culture-based protocol.

Key Words: *Campylobacter jejuni*, *Proteus mirabilis*, selective culturing, food safety

494P Cheap extraction of bioactive compounds of berry pomace and their mode of action against *Campylobacter jejuni*. S. Salaheen*, C. Nguyen, D. Hewes, and D. Biswas, *University of Maryland, College Park, MD.*

Berries are rich in several phytochemicals such as phenolic acids, proanthocyanidins, anthocyanins and other flavonoids and these compounds exhibit a wide range of biological effects including antioxidant, antimicrobial, anti-inflammatory and vasodilator. This study was designed to develop economically feasible bioactive extracts from the extremely cheap byproducts of blackberry and blueberry known as pomace and evaluate their effective roles in reduction of *Campylobacter jejuni* colonization in poultry gut. Different ratios of ethanol and water were used as solvents for phenolic extraction from berry pomaces. The extracts were then used to test their roles in inhibition and host cell-*C. jejuni* interactions using cell culture model. Our results indicated that 0.6 mg GAE/mL of blackberry or blueberry pomace extracts reduced the growth of *C. jejuni* significantly ($P < 0.05$) at 24 h. These bioactive extracts also altered the physicochemical properties of *C. jejuni* such as cell surface hydrophobicity and autoaggregation of this bacterial pathogen. Swimming and swarming motility were reduced by 85 to 90% and 30 to 40% due to exposure to blackberry and blueberry pomace extracts, respectively. qRT-PCR data suggested that blackberry pomace extract induced the expression of *C. jejuni* virulence gene *flaA* (flagellar filament-A) by 3- to 5-fold. Moreover, attachment of *C. jejuni* to chicken fibroblast cells (DF1) was reduced by ~30–40% in the presence of berry pomace extracts. These findings suggest that bioactive extracts of both blackberry and blueberry pomaces might be effective feed additive or water supplement in reducing *C. jejuni* shedding and its cross-contamination into poultry and poultry products.

Key Words: pomace, *Campylobacter jejuni*, phytochemical

495P Evaluation of methods and plating media for detection of *Campylobacter* in ceca from 66 different broiler flocks across 11 months. M. E. Berrang, N. A. Cox, R. J. Meinersmann, B. B. Oakley, and D. E. Cosby*, *USDA-ARS Russell Research Center, Athens, GA.*

Due to high numbers of other bacteria, detecting *Campylobacter* in cecal contents can be challenging. On each of 66 sample days from April 2013 through February 2014, a single cecum was collected from a commercial broiler evisceration line. Cecal contents were expressed, diluted, blended and plated on each of 3 different media: Campy-cefex agar (CCA), Campy-Line agar (CLA) and RF *Campylobacter jejuni*/*C. coli* chromogenic agar (RFCA). Each plating medium was inoculated using 2 methods: directly onto agar or through a 0.45µm nitrocellulose filter laid on the agar surface and removed once all liquid had passed through. Because of a high number of non-*Campylobacter* background colonies on media without filters, counting *Campylobacter* colonies was not always possible. Therefore plates were scored categorically by a single observer where 0 indicated no colonies and 1, 2 and 3 were assigned for low to high numbers of *Campylobacter*; a second score was assigned in the same way for numbers of non-*Campylobacter* colonies. *Campylobacter* was detected in 32 of 66 flocks (48.5%). *Campylobacter* was detected in each month and on all media. CCA plates had more non-*Campylobacter* background growth than the other plates (mean count score of 2.86), making observation of characteristic colonies difficult. RFCA and CLA both had lower average count scores for number of background colonies (1.86 and 2.00 respectively). RFCA scored highest on detection of *Campylobacter* colonies with a mean count score of 1.14 compared with 0.43 for both CCA and CLA. Filter use was completely effective for control of non-*Campylobacter* background colonies. Zero non-*Campylobacter* colonies were detected from any filtered sample regardless of medium. Likewise, plating medium did not affect detection of *Campylobacter* colonies from filtered samples; the mean *Campylobacter* colony count score from each medium was 1.00. In general, RFCA performed better than CCA and CLA for detection of *Campylobacter* from cecal samples. However, the filter method was the most effective means tested for control of non-*Campylobacter* background colonies regardless of medium used.

Key Words: *Campylobacter*, broiler ceca, plating media, detection method

496P Diversity of *Campylobacter jejuni* strains from broiler chicken farms in Brazil. C. S. L. Vaz*[1], D. Voss-Rech[1], J. S. Pozza[2], and G. L. Mattos[1], [1]*Embrapa-Brazilian Agricultural Research Corporation, Concordia, SC, Brazil, Concordia, SC, Brazil,* [2]*Universidade do Contestado, Concordia, SC, Brazil.*

Broilers are a potential reservoir for *Campylobacter jejuni* strains, which are responsible for the majority of human campylobacteriosis cases. Currently there are no fully effective strategies to prevent broilers of *C. jejuni* colonization. However, subtyping of strains might offer further insight in *Campylobacter* epidemiology at farm level. This study aimed to evaluate the genotypic patterns of *C. jejuni* isolated from broiler flocks. A total of 178 strains obtained from 2010 to 2011 were analyzed. Strains were isolated from cloacal swabs, feces, drag swabs, litter, darkling beetles (*Alphitobius diaperinus*) and drinking water taken from 23 broiler flocks in 4 Brazilian broiler producing companies. Whole DNA from *C. jejuni* strains was digested by *Sma*I followed by pulsed-field gel electrophoresis analysis (PFGE). Similarity of PFGE profiles was calculated by the Dice coefficient and a dendrogram was generated by cluster analysis using the unweighted pair group method with arithmetic averages. *C. jejuni* ssp. *jejuni* ATCC 33560 and *Arcobacter skirrowii* ATCC 51132 strains were used as controls. In total, 33 PFGE profiles could be distinguished within the *C. jejuni* isolates analyzed. Distinct patterns were found in the control strains. Furthermore, only one PFGE profile was shared by strains from 2 broiler companies, whereas the remaining genotypes comprised profiles unique to each given broiler producing company. Interestingly, the majority of strains isolated from *Alphitobius diaperinus* showed 100% similarity to the strains isolated from broilers in the flock, which may indicate a particular significance of darkling beetles as vectors and reservoir of *C. jejuni* in broiler houses. Although broiler flocks were colonized by a variety of *C. jejuni* strains, the predominance of unique genotypes in each studied broiler producing company suggests that particular sources might be involved on the transmission of *C. jejuni* in broiler farms.

Key Words: *Campylobacter*, PFGE, food safety, *Alphitobius diaperinus*