435 Efficacy of the adsorbent AflaDetox in reducing the toxicity of dietary aflatoxin B1 in broilers. M. Denli*[1], J. C. Blandon[1], M. E. Guynot[2], S. Salado[2], and J. F. Perez[1], [1]*Animal Nutrition, Management and Welfare Research Group, Universitat Autònoma de Barcelona.*, *Barcelona, Spain*, [2]*Adiveter S.L. Agro-Reus*, *Tarragona, Spain*.

An experiment was conducted to evaluate the ability of AflaDetox as aflatoxin binding agent to reduce the deleterious effects of aflatoxin B1 (AFB1) in broiler diets. One hundred and twenty Ross 308 d-old male broiler chicks were individually weighed and assigned to eight treatments for 42 d. A 2 x 4 factorial arrangement of treatments was used. This involved the use of AFB1 at 0 or 1 mg /kg feed and AflaDetox at 0, 1, 2, and 5 g/kg feed. Animals were fed on the ground during the first 7 d, and in cages (3 chicks/cage; 5 cages/treatment) from 7 to 42 d. The BW, feed intake (FI), and feed conversion rate (FCR) were measured weekly. At the end of the experiment, blood samples were taken for serum analysis, the birds were sacrificed and the weights of liver and spleen were recorded. Dietary inclusion of AFB1 decreased ($P < 0.05$) BW (2,355 vs 2,049 g) and FCR (1.62 vs 1.78). It also resulted in a higher ($P < 0.05$) relative liver weight (2.09 vs 2.70%) and also higher ($P < 0.05$) serum activities of alkaline phosphatase (ALP; 2302 vs 3456 U/L) and aspartate aminotransferase (AST; 235.9 vs 314.5 U/L). A positive interaction ($P < 0.05$) was observed between AflaDetox and AFB1 contamination for most of the parameters studied. The addition of 1 g AflaDetox in the AFB1 contaminated diet increased ($P < 0.05$) BW and reduced ($P < 0.05$) the relative weight of liver (2.31%) and the serum activities of ALP (2103 U/L) and AST (257 U/L). Inclusion of AflaDetox at 2 or 5 g/kg feed in the AFB1-contaminated diets also improved ($P < 0.05$) FCR. The results indicated that inclusion of AflaDetox in contaminated diets may reduce the adverse effects of AFB1.

Key Words: Aflatoxin B1, Adsorbent, Poultry

436 Effect of OcraTox on the performance and egg quality of laying hens exposed to Ochratoxin A. M. Denli*[1], J. C. Blandon[1], M. E. Guynot[2], S. Salado[2], and J. F. Perez[1], [1]*Universitat Autonoma de Barcelona*, *Barcelona, Spain*, [2]*Adiveter, Agro-Reus, Tarragona*, *Spain*.

The efficacy of OcraTox (ADIVETER, S. L.) as an inhibitor of the deleterious effects of ochratoxin A (OTA) in laying hens was evaluated. A total of twenty-eight, 47-wk-old, Hisex-Brown laying hens, were divided into 4 groups (7 hens per group) with similar initial BW (1,793 ± 18 g) and egg production (99.8 ± 0.4%). Animals were distributed individually in cages and fed the following diets for 3 wk: 1) Control, 2) 5 g OcraTox/kg feed, 3) 2 mg OTA/kg feed and 4) 2 mg OTA/kg feed + 5 g OcraTox/kg feed. Daily feed consumption and egg weight were registered daily and feed efficiency was calculated as feed consumed per kg of egg. Percentage of egg production and egg mass (g/hen/d) were registered daily and calculated at the end of the study. Egg quality was studied by collecting the last 3 eggs produced by hen at the end of the trial. On day 21, blood samples were taken from all birds for analysis of serum biochemistry, the birds were sacrificed, and the weight of liver and spleen were recorded. Compared with the control, OTA decreased ($P<0.05$) feed consumption (127 vs 147 g/d), the egg mass (55.4 and 62.0 g) and albumen height (4.9 and 5.6 mm), yolk redness (18.8 and 20.1) and yellowness (44.4 and 46.3). Inclusion of OcraTox in the OTA diet increased ($P< 0.05$) feed consumption (136.7 g/d) and egg mass (59.4 g). It also alleviated ($P<0.05$) the negative effects of OTA on egg quality by improving albumen height (5.7 mm), yolk redness (20.7) and yellowness (46.0) to values no different ($P>0.05$) from control. Dietary inclusion of OTA decreased ($P<0.05$) serum concentrations of triglyceride, (785.2 and 1071.0 mg/dL), Ca (22.9 and 24.6 mg/dL), and P (4.1 and 5.7 mg/dL). It also increased ($P<0.05$)activity of alkaline phosphatase (1940.5 and 474.0 U/L). Inclusion of OcraTox in the diet ameliorated the negative effects of OTA on serum components that are usually altered by OTA. It is concluded that the use of OcraTox may diminish the deleterious effects promoted by OTA in laying hens.

Key Words: Ochratoxin A, Adsorbent, Laying Hens

437 Partitioning of external and internal bacteria carried by broiler chickens before processing. J. A. Cason*, A. Hinton, Jr., J. K. Northcutt, R. J. Buhr, K. D. Ingram, D. P. Smith, and N. A. Cox, *Russell Research Center*, *Athens, GA*.

Broiler chickens from the loading dock of a commercial processing plant were sampled to determine incidence and counts of index/indicator and pathogenic bacteria. Feathers were removed by hand from ten 6-wk-old chickens from each of seven different flocks and were rinsed in 400 mL of 0.1% peptone water. The heads and feet were removed and rinsed and the picked carcass was also rinsed (each in 200 mL of 0.1% peptone water). The ceca, colon, and crop were aseptically removed and stomached separately in 100 mL of peptone water. *Campylobacter* was present in six of the seven flocks. *Salmonella* was isolated from 50 of the 70 carcasses with at least two positive carcasses in each flock. More ($P < 0.05$) coliforms and *Escherichia coli* were found in the ceca than in the feather. Total external and internal counts were quite similar. Counts of *Campylobacter* were higher ($P < 0.05$) in the ceca and colon than in other samples. *Salmonella* was isolated in external samples from 46 of the 50 positive carcasses. *Salmonella* presence was approximately equivalent in all samples, indicating that contamination was distributed through all external and internal sampling sites. *Salmonella*-positive samples did not have higher counts of coliforms or *E. coli*. There were low correlations ($P < 0.05$) for counts of coliforms, *E. coli*, and *Campylobacter* in the ceca/feathers and ceca/colon comparisons, but not for *Salmonella*. The results emphasized that the pattern of bacterial contamination before processing is complex and highly variable.

Key Words: *Salmonella*, *Campylobacter*, Processing

438 *Campylobacter* colonization is reduced and gastrointestinal architecture is altered in turkey poults fed bacteriocins. I. Reyes-Herrera*[1], K. Cole[1], F. Solis de los Santos[1], A. M. Donoghue[2], N. J. Stern[3], E. A. Svetoch[4], B. N. Eruslanov[4], V. V. Perelygin[4], E. V. Mitsevich[4], I. P. Mitsevich[4], V. P. Levchuk[4], M. B. Farnell[2], P. J. Blore[1], and D. J. Donoghue[1], [1]*University of Arkansas*, *Fayetteville*, [2]*PPPSRU, ARS, USDA*, *Fayetteville, AR*, [3]*PMSRU, ARS, USDA, Russell Research Center*, *Athens, GA*, [4]*State Research Center for Applied Microbiology*, *Obolensk, Russian Federation*.

Campylobacter is a leading cause of foodborne illness in the U.S. Recent studies showed the reduction of *Campylobacter jejuni* in broiler chickens treated with bacteriocins produced by *Bacillus circulans* and *Paenibacillus polymyxa*. As *Campylobacter coli* is the most prevalent *Campylobacter* isolate recovered in turkeys, the objectives of this study were to evaluate the efficacy of these bacteriocins against *C. coli* colonization and the effect on the gastrointestinal architecture of young turkeys. In three separate trials, a total of 15-d-of hatch poults (n = 45/trial) were orally challenged on d 3 with approximately 10^6 cfu of a mixture of three *C. coli* isolates. Immediately before the bacteriocin treatment (d 10), cecal *Campylobacter* concentrations averaged 1.1 x 10^7 cfu/g of cecal contents (n = 15/trial). On d 10 to 12 posthatch, two treatment groups were given free access to feed supplemented with either one of two purified and microencapsulated bacteriocins, whereas the control group received untreated feed (n = 10/treatment group in each trial). After the 3-d dosing period, ceca and duodenal loops were collected. In each trial, we observed the elimination of detectable concentrations of cecal *Campylobacter* (detection limit, 1 x 10^2 cfu/g of cecal contents) vs the controls (1 x 10^6 cfu of *Campylobacter*/g of cecal contents). The evaluation of gastrointestinal samples showed a reduction ($P < 0.05$) in duodenal crypt depth and goblet cell numbers in the turkeys treated with either bacteriocin vs the controls. These modifications in gastrointestinal architecture may provide understanding of how bacteriocins inhibit *Campylobacter*.

Key Words: *Campylobacter*, Bacteriocin, Gastrointestinal Architecture

439 Litter treatment with aluminum sulfate produced a modest reduction in cecal *Campylobacter* colonization in chickens. M. L. Dirain, F. Solis de los Santos, I. Reyes-Herrera, P. J. Blore, and D. J. Donoghue*, *University of Arkansas*, *Fayetteville*.

Campylobacteriosis is a significant health problem worldwide and poultry products are a significant source of transmission. Treatment of poultry litter with aluminum sulfate (Alum) has been reported to reduce enteric *Campylobacter* concentrations in broilers. Little is known about how Alum reduces enteric *Campylobacter* concentrations. Therefore, this study was conducted to determine whether Alum reduces *Campylobacter* colonization in the ceca of broilers by reducing horizontal transmission between birds or by reducing *Campylobacter* concentrations in birds already colonized (therapeutic efficacy). Newly hatched broilers were reared in either no (controls), low (2.4 kg/3.0 m^2), or high (4.8 kg/3.0 m^2) levels of Alum (AlClear+). For the horizontal transmission group, *Campylobacter*-negative birds were reared with *Campylobacter*-positive ones that served as carriers. The carrier birds were fitted with leg bands to distinguish them from the rest of the birds in the pen. For the therapeutic efficacy group, all birds were inoculated with *Campylobacter* prior to placement in pens. During wk 1, 2, 4, and 6, cecal *Campylobacter* concentrations were determined in 10 birds from each treatment group. Furthermore, 20 g of litter were also collected once per week from each pen to monitor litter pH. For both the horizontal and vertical treatment groups, birds reared on high or low Alum also had lower ($P < 0.05$) cecal *Campylobacter* concentrations (approximately 2 logs) when compared with positive controls in pens not treated with Alum. The decline was similar for both groups. These changes were associated with a weekly reduction in litter pH in Alum treated pens when compared with the controls ($P \leq 0.05$). It is possible that the acidic environment of the litter reduces environmental *Campylobacter* levels and enteric recolonization via litter consumption (pecking). This may be the mechanism by which Alum reduces *Campylobacter* concentrations in poultry.

Key Words: *Campylobacter*, Colonization, Aluminum Sulfate

440 Effect of various concentrations of potassium hydroxide and lauric acid on native bacterial flora of broiler carcasses. A. Hinton Jr*, J. K. Northcutt, J. Cason, D. P. Smith, and K. D. Ingram, *Russell Research Center*, *Athens, GA*.

Experiments were conducted to determine the bactericidal effect of various concentrations of potassium hydroxide (KOH)-lauric acid (LA) solutions on native bacterial flora of broiler carcasses. A mixture of 1.0% KOH and 2.0% LA was prepared and filter sterilized. The 1.0% KOH-2.0% LA solution was diluted with sterile distilled water to prepare solutions of 0.25% KOH-0.5% LA and 0.5% KOH-1.0% LA. Eviscerated carcasses were washed twice in solutions of different concentrations of KOH-LA or in distilled water by shaking carcasses in 400 mL of the liquids for 1 min. Following each wash, a whole-carcass-rinse (WCR) was performed by using 400 mL phosphate buffer. Total plate count (TPC) of bacteria was performed. *Campylobacter* and *Escherichia coli* in the native bacterial flora were also enumerated by culturing the rinsates on plate count agar, *Campylobacter* agar, and 3M petrifilm *E. coli*/coliform count plates, respectively. Results indicated that fewer TPC bacteria were recovered from carcasses washed in either concentration of KOH-LA than from carcasses washed in distilled water. However, there was no difference ($P > 0.05$) in the number of bacteria recovered from carcasses washed in different concentrations of KOH-LA. While log 3.45 cfu/mL were recovered from carcasses washed in water, only log 1.43 cfu/mL were recovered from carcasses washed in 1.0% KOH-2.0 %. Additionally, there was no difference ($P > 0.05$) in the number of *Campylobacter* recovered from carcasses washed in water or in 0.25% KOH-0.50% LA. No *Campylobacter* were recovered from carcasses washed in 0.50% KOH-1.00% LA or 1.00% KOH-2.00% LA. There was no difference ($P > 0.05$) in the number of *E. coli* recovered from carcasses washed in water, 0.25% KOH-0.50% LA, or 0.50% KOH-1.00% LA. No *E. coli* were recovered from carcasses washed in 1.0% KOH-2.0 % LA. The results showed washing broiler carcasses in solutions of KOH-LA to have the potential to reduce bacterial contamination. The efficacy of these acids to induce a bactericidal effect, however, appears to depend on the concentration used.

Key Words: Poultry Processing, Lauric Acid, Potassium Hydroxide

441 Numbers of bacteria recovered from broiler carcasses and chiller water treated with hypochlorous and carbonic acids. J. K. Northcutt*[1], R. I. Huezo[2], K. D. Ingram[1], D. P. Smith[1], A. Hinton, Jr.[1], and J. A. Cason[1], [1]*USDA-Agriculture Research Service*, *Athens, GA*, [2]*The University of Georgia*, *Athens*.

A study was conducted to determine effects of treating poultry chiller water with a mixture of hypochlorous and carbonic acids. Broiler carcasses and chiller water were obtained from a commercial processing facility which had recently installed a TOMCO Pathogen Management System™ to recycle water in the middle compartment of a three-section chiller. Carcasses were sampled prechill and post-chill

during first and second shifts, while chiller water was sampled from the beginning and end of each of the three chiller compartments. Carcasses were subjected to a whole carcass rinse (WCR) in 0.1% peptone. Numbers of *Escherichia coli* (EC), coliforms (CF), and *Campylobacter* (CP) were determined from the WCR and chiller water samples. Prevalence of *Salmonella* (SAL) was also determined on the WCR and chiller water samples. Shift had no effect on numbers (EC, CF and CP) or prevalence (SAL) of bacteria recovered from carcasses or chiller water samples. On average, prechill levels of bacteria recovered from rinses were 2.6, 2.9 and 2.6 $\log_{10}$ cfu/mL for EC, CF and CP, respectively. Ten out of 40 (25%) prechill carcasses were positive for SAL. After chilling, numbers of EC, CF, and CP recovered from carcass rinses decreased by 1.5, 1.5, and 2.0 $\log_{10}$ cfu/mL, respectively. However, prevalence of SAL on post-chill carcasses (22% positive) was similar to prechill SAL prevalence. When chiller water samples were tested, EC, CF, and CP were recovered only in water collected from the first compartment of the chiller. Two out of four (50%) water samples collected from the entrance of the first compartment of the chiller tested positive for SAL. The results showed that a mixture of hypochlorous and carbonic acid can be used to recycle poultry chiller water and still achieve reductions in numbers of EC, CF, and CP and no increase in prevalence of SAL recovered from broiler carcasses.

Key Words: Poultry, Immersion Chilling, Carcass Bacteria

442 Effect of time and sand abrasion on recovery of aerobic bacteria, *Escherichia coli*, and coliforms from broiler carcasses. J. F. Hannah*[1], N. A. Cox[2], D. P. Smith[2], J. A. Cason[2], D. L. Fletcher[3], J. K. Northcutt[2], R. J. Buhr[2], and L. J. Richardson[2], [1]*University of Georgia*, *Athens*, [2]*USDA-ARS, Russell Research Center*, *Athens, GA*, [3]*University of Connecticut*, *Storrs*.

An experiment was conducted to determine effects of rinse time and sand abrasion on bacteria from whole broiler carcass rinses (WCR). Twelve eviscerated broiler carcasses were obtained from a commercial processing plant prior to chilling. Six carcasses were rinsed in 400 mL of 2.0% buffered peptone for 1 and 4 min in a mechanical shaker. The remaining carcasses were rinsed in the same manner, but with 100 g of sterile sand added to the rinse solution. Rinses were analyzed for aerobic bacteria (APC), *Escherichia coli*, and coliforms. For APC, *E. coli*, and coliforms, the levesl recovered from the sand rinses were higher ($P < 0.05$) than the levels recovered from the peptone rinses. The APC, *E. coli*, and coliforms collected from the peptone rinses were 4.0, 3.1, and 3.4 $\log_{10}$ cfu/mL of rinse, respectively. The APC, *E. coli*, and coliforms collected from the sand rinses were 4.6, 3.7, and 4.1 $\log_{10}$ cfu/mL of rinse, respectively. There were no differences ($P > 0.05$) in bacterial recovery between the two rinse times for either treatment. A secondary determination of treatment efficacy was conducted by swabbing a 25 cm^2 area of breast skin before and after rinsing. Using sand abrasion during WCR increased ($P < 0.05$) bacterial recovery and rinsing time was found to have no effect ($P > 0.05$)on such recovery. Additionally, WCR was a more sensitive method for recovery of bacteria than swabbing.

Key Words: Whole Carcass Rinse, Sand Abrasion, Bacteria

443 Bactericide and bacteriostatic activity of Chrysactinia Mexicana Gray in hens challenged with *E. coli* and *S. thypi*. J. C. Garcia-Lopez*, L. O. Hernandez-Artega, J. M. Pinos-Rodriguez, and B. I. Juárez-Flores, *Universidad Autónoma de San Luis Potosi*, *San Luis Potosi, S.L.P. México*.

Bactericide and bacteriostatic activity of Chrysactinia Mexicana Gray extract was evaluated in hens challenged with *S. thypi*, and *E. coli*. In the first part an in vitro trial five plant extracts were evaluated; aqueous, methylene chloride, ethanol and hexane. Zones of growth inhibition were measured for the bactericide trial and minimum inhibitory concentration (MIC) was determined. For the *in vivo* phase 30 Plymouth Rock Barred hens 21 weeks old (10 hens/treatment) were used with the following treatments: T1 control with no pathogen challenge and no plant extract; T2 pathogen challenged and ethanol extract of *C. mexicana* and; T3 pathogen challenged and bacitracin zinc. Colony-forming units (CFU) were counted in gizzard, crop, duodenum and cecum contents. There were differences ($P<0.05$) in the zones of growth inhibition of aqueous extract for *S. thypi* with the highest inhibition growth at a concentration of 20 mg/ml. In *E. coli* no differences were observed ($P>0.05$). For the chloride methylene extract, no differences ($P>0.05$) were found between the concentrations used in both pathogens. In the ethanolic extract there were differences ($P<0.05$) in the two bacteria with different concentrations being 20 mg/ml where the highest zones of growth inhibition hales were found. For the hexane extract there were differences ($P<0.05$) only for *S. thypi* with 20 mg/ml. The results for the minimum inhibitory concentration obtained for the ethanolic extract of *C. mexicana* showed a MIC for S. typhi of 0.025 mg/ml and *E. coli* 0.020 mg/ml. In the second phase the in vivo trial showed differences ($P<0.05$) for gizzard, crop and duodenum contents with a decreased number of CFU with the C. mexicana extract than those found with the use of bacitracin zinc. The number of CFU cecum content were similar ($P>0.05$) for the plant extract and the antibiotic. Results show that plant extract may be used to help to increase health status in hens in the backyard production systems in rural areas.

Key Words: Chrysactinia Mexicana, *E. coli*, Hens

444 Reduction of *Salmonella* in whole and ground turkey meat at refrigerated and elevated temperatures using lactic acid bacteria. J. Johnson*, C. Z. Alvarado, and M. M. Brashears, *Texas Tech University*, *Lubbock, TX*.

Lactic acid bacteria (LAB) are inhibitory against various pathogenic bacteria during growth and storage of ground meat. Thus, addition of LAB to turkey meat could provide an inhibitory effect on pathogens such as *Salmonella* due to production of inhibitory compounds. Three experiments were conducted with ground turkey (stored at 5°C) and portioned whole turkey meat (stored at either 5 or 37°C). Ground turkey was inoculated with 1 x 10^4 cfu/g of a 4-strain *Salmonella* cocktail. The two treatments included control (no LAB) and 1 x 10^6 cfu/g cocktail mixture of the 4 strains of LAB. The samples were stored in tray packs for 5 d at 5°C and were tested on d 0, 1, 2, and 3. Initial *Salmonella* counts on d 0 were similar but on d 3 the LAB-treated samples had a 2 log reduction in total *Salmonella*. In experiments 2 and 3, whole turkey breast lobes were inoculated with 1 x 10^4 cfu/g of the *Salmonella* cocktail. The two treatments included control (no LAB) and 1 x 10^6 cfu/g cocktail mixture of the 4 strains of LAB. The samples were stored in tray packs at either 5°C for 0, 1, 2, and 3 d or at 37°C for 0, 1, 2, and 4 h. In the 5°C study, there was a 2 log reduction by d 3 in the LAB-treated samples. In the elevated temperature study

(37°C), there were no differences in *Salmonella* at 0 or 1 h. However, by 2 h post-inoculation there was a 1.5 log decrease in the LAB-treated samples. By 4 h post-inoculation, there was a 2 log decrease in *Salmonella* recovery in the LAB-treated samples. Thus, our LAB cocktail appears to reduce growth of *Salmonella* in ground and whole turkey meat at refrigerated and elevated temperatures.

Key Words: *Salmonella*, Lactic Aid, Turkey Meat

445 Evaluation of serum as an indicator of antibiotic residues in edible poultry tissues. I. Reyes-Herrera*, V. Aguiar, M. L. Dirain, F. Solis de los Santos, J. H. Metcalf, P. J. Blore, and D. J. Donoghue, *University of Arkansas*, *Fayetteville*.

The FDA and USDA monitor food products, including poultry, to detect and prevent unsafe residues (e.g., drugs or pesticides) in the food supply. Monitoring procedures often require analysis of specific edible tissues (e.g., muscle). A potentially better option would be to evaluate blood samples collected directly from the processing line. Blood samples are usually easier to obtain and less expensive to analyze, do not require destruction of the carcass, and would represent any residue in the entire flock as opposed to an individual sample. However, it is unknown if residues in blood are correlated with residues in edible tissues. The objective of this study was to determine if antibiotic residue concentrations in blood are predictive of their concentrations in muscle tissues. The model antibiotic tested in this study was enrofloxacin. In this study, 5-wk-old broiler chickens (n = 156) were divided into two treatment groups and were dosed with either 25 ppm/3 d or 50 ppm/7 d of enrofloxacin (Baytril) in the drinking water. Blood and breast muscle samples were collected from six birds/group at 0, 1, 3, 6, 12, or 24 h during the first day of dosing and then every 48 h during the dosing period and every 12 h during the withdrawal period for up to 60 h post-withdrawal. Enrofloxacin was detectable within 1 h of dosing, reaching its plateau phase at 12 h (234 and 122 ppb for muscle and serum, respectively, for the 12-h sample from the 25 ppm/3 d dosing group), and was detectable for 36 h after drug withdrawal in both serum and muscle tissues. For all collection periods, enrofloxacin concentrations in blood (serum) were approximately half of those in muscle tissues. Because of this consistent relationship, monitoring blood samples may be an effective method to estimate antibiotic concentrations in edible tissues.

Key Words: Enrofloxacin, Edible Tissues, Poultry

446 Effects of blood in egg albumen on *Salmonella* survival and growth. D. P. Smith* and M. T. Musgrove, *USDA, Agricultural Research Service*, *Athens, GA*.

Two trials were conducted to determine effects of blood in table egg albumen on survival and growth of *Salmonella*. White-shell table eggs with blood spots were collected from a commercial egg processing plant after candling. In each trial eggs were broken out and approximately 4 mL of clear albumen (CLEAR) and 4 mL of bloody albumen (BLOOD) from each of 10 eggs were placed in sterile test tubes and inoculated with a nalidixic acid-resistant *Salmonella* Typhimurium. For inoculation, 0.1 mL of a *Salmonella* suspension (containing 2.9 log cfu/mL in Trial 1 and 7.1 log cfu/mL in Trial 2) was added to each tube. Tube contents were mixed and incubated at 22°C for 24 h. Immediately after inoculation and again after 24 h, 0.1 mL from each tube was plated onto brilliant green sulfa agar with nalidixic acid and incubated at 37°C for 24 h. Results were reported as log cfu/mL albumen. No differences ($P > 0.05$) in mean *Salmonella* counts were found for CLEAR or BLOOD samples in Trial 1 (averaging 1.6) or in Trial 2 (averaging 4.6) immediately after inoculation. In Trial 2, CLEAR samples had lower ($P < 0.05$) counts of *Salmonella* than BLOOD samples (4.8 vs 5.2) after 24 h. A vaild test was not appropriate for Trial 1 (24 h samples) because of reporting negative results due to the low inoculation level. Incidence of positive *Salmonella* samples in Trial 1 after 24 h was 3/10 for CLEAR samples and 8/10 for BLOOD samples. Results indicated that *Salmonella*, at the low inoculation level, appeared to survive somewhat better in bloody albumen than in clear albumen. At the high inoculation level, *Salmonella* numbers increased slightly in albumen without blood, but higher numbers were detected in bloody albumen. Thus, blood in the albumen of table eggs appears to support survival and growth of *Salmonella*.

Key Words: Table Eggs, Blood Spots, *Salmonella*

Forages and Pastures - Livestock and Poultry: Understanding Diet Selection in Temperate Biodiverse Pasture Systems

447 Dietary selection: The current state of knowledge. A. J. Rook*, *Private Consultant*, *Okehampton, UK*.

The current state of knowledge regarding dietary selection will be reviewed with particular emphasis on implications for temperate biodiverse pasture systems. It will be contended that dietary selection is not only key to optimising animal performance in these systems but also to minimising environmental impacts, whether through enhancing biodiversity and thus ecosystem functionality, minimising the impacts of animal excreta or reducing the carbon footprint of these production systems. Consideration will be given to progress made and key gaps in knowledge with respect to 5 questions. What do animals choose to eat? Where do they choose to eat? When do they choose eat? What mechanisms do they use to achieve these choices? Finally and most crucially, why do they make these choices? Methodological barriers to progress and the potential of new technologies to overcome them will be considered. Emphasis will be given to the importance of interdisciplinary collaboration and research at disciplinary interfaces. Key advances in recent years include the recognition of the importance of partial preferences, the complexity of spatial and temporal patterns in dietary choices, the role of social behaviour in modifying foraging decisions and the phenotypic plasticity in responses consequent upon learned behaviours from the dam or other conspecifics. However, most of this progress has been made using simple model and often artificial systems. In many cases we know the limits of the animals abilities in key traits but not how they interact in real world situations. Other key issues identified for further research include: 1) a better identification of the currencies that animals use to make their foraging decisions and the trade off between these currencies and with other behavioural needs; 2) a better understanding of the interplay between genetic,