tillers dried grains plus soluble (DDGS) was used resulting in 12 diets. The low protein diets were formulated to have a 7% reduction in crude protein, Lys, Met, TSAA, Thr, Val, Ile, Arg, Trp. Diets were formulated to be isocaloric and isonitrogenous within either the control and low protein series. At 21 d of age, BW and FC were determined. Excreta were collected from 20 to 21 d of age, stored for 14 d and analyzed at collection and then at 7 and 14 of storage. Upon analysis of diets, protein, A and protease were similar to formulated levels. There was a protein level and protease effect on BWG and FCR in Exp 1. Decreasing protein resulted in impaired BWG and FCR (1.33 vs. 1.43 in the control and low protein diets, respectively). There was a protein protease interaction for BWG and FCR with the protease having a greater impact when low protein diets were fed. Apparent N digestibility was affected by protein level and there was an interaction of protein and protease with the protease improving N digestibility in the low protein diet but not in the control diet. There was a main effect of protein level on excreta pH. N loss during storage of excreta was not affected by protein or protease. In Exp 2 there was a main effect of protein level, protease, and ingredient on BWG and FCR and protein level and source interactions were seen for BWG and FCR. FCR was 1.459 and 1.380 for low protein diet with SBM without and with protease, respectively while it was 1.524 and 1.456 for the low protein diet with MM without and with protease, respectively. For the low protein diet with DDGS FCR was 1.423 and 1.380 in the diets without and with protease. For excreta pH there was a main effect of protease with the Trt with protease having a higher pH (at excretion pH was 6.29 vs. 6.51 in diets without and with protease, respectively). N loss during excreta storage was affected only by ingredient with both DDGS and MM inclusion reducing percent loss from 0 to 14 d of storage. Loss was 65.4, 59.6, and 58.3% for the SBM, MM and DDGS containing diets, respectively. In summary, the protease allowed for the feeding of low protein diets without negative impacts on performance. The low protein as well as diets with DDGS and MM resulted in lower N volatilization. 

Key Words: Excreta nitrogen, protein concentration, protease, broiler, ingredients

M78 The effects of Saccharomyces cerevisiae fermentation products on broiler breeder and progeny performance Wallace Berry, S Oates, J Hess, Jonathan Broomhead Auburn University, Auburn, AL

Commercial strain heavy broiler breeder females were fed Saccharomyces cerevisiae fermentation products to determine the effects of supplementing breeder diets on subsequent progeny performance. 1140 Cobb breeders from 45 to 62 weeks of age were used. Photostimulation began at 21 weeks of age. Dietary treatments continued during the breeder phase. There were 10 reps/treatment with 37 hens/rep and 4 males/rep placed with the hens. Chicks were produced from these hens and placed on litter in 9 reps/breeder dietary treatment and 21 chicks/rep. Progeny were processed for carcass data at 42 days of age. Progeny performance was measured as feed conversion ratio, body weight, and yield of carcass and parts. Through 43 weeks of age, egg production was numerically greater (P < 0.06) in the treatment diets (XPC=70.4±0.8% and Ultra=71.1±0.8%) in contrast to the Controls (Con=68.8±0.8%). Over the 18 weeks of egg production, this would result in approximately 2 or 3 more eggs per hen for XPC or Ultra treatments, respectively, versus Control hens. Progeny body weights tended (P < 0.17) to be higher at 42 d in the treatment diets (XPC=2547±40g and Ultra=2552±40g) versus Controls (Con=2479±40g). Breast meat yields (g/bird) were greater (P < 0.05) in the treatment diets (XPC=591±15g and Ultra=599±15g) in contrast to the Controls (Con=554±15g). Carcass yields at 42 days of age (g/bird) were numerically higher (P < 0.09) in the treatment diets (XPC=1851±38g and Ultra=1862±38g) versus Controls (Con=1772±38g).

Key Words: Saccharomyces cerevisiae, broiler breeder, progeny performance

M79 A dosimetry study of the effects of canthaxanthin in broiler breeders from 45 to 62 weeks of age J. Brake* North Carolina State University, Raleigh, NC

Ross 344x708 broiler breeders that had been exposed to hot summer conditions were distributed into four treatment groups and given diets containing 0, 3, 6, or 9 mg canthaxanthin per kg diet from 45 to 62 wk of age. Average hatchability and fertile hatchability of the flock was 87.6% and 92.6%, respectively, at 44 wk of age. Approximately 56 females and 5 males were present in each of 16 slut-litter pens at 45 wk of age. Males and females were fed sex-separately a 15% CP, 2.9 kcal ME/g, 2.7% calcium diet amended with canthaxanthin with four replicates per dosage. Eggs were collected twice daily and 60 eggs per pen were incubated weekly. All unhatched eggs were examined macroscopically to determine fertility and/or stage of embryo death. From 45 to 62 wk of age, percentage hen-day production (49.1, 49.3, 51.6, 50.9), percentage fertility (94.7, 94.9, 95.3, 93.1), and percentage fertile hatchability (94.0, 95.2, 96.2, 95.3) exhibited a dose-related increase from 0 to 6 mg canthaxanthin per kg diet followed by a decrease at 9 mg/kg. These data suggested that the optimum dosage of canthaxanthin to support reproductive performance in older broiler breeders was approximately 6 mg/kg diet of both males and females.

Key Words: breeder breeders, hatchability, canthaxanthin, egg production, fertility

M80 Energy use in growing broiler feed increasing levels of dried distillers grains with solubles R.S. Gomez1, M.L. Angeles1, R.E. Ramirez2, R.M.A. Islas2 CENIDFyMA-INIFAP, Ajuhichitan, Queretaro, Mexico; 2FES-Cuatitlan-UNAM, Ajuhichitan, Queretaro, Mexico

A balance trial and slaughter experiment were carried out to evaluate the nutrient retention, apparent metabolizable energy corrected to zero nitrogen retention (AMEn) and the energy used for protein and fat deposition (net energy: NE) in broiler chickens fed diets based on sorghum (S) or corn (C) and four increasing levels of dried distillers grains with solubles (DDGS). Fifty four male Ross B308 broilers from 28 to 42 d of age were used. Six broilers were slaughtered at the beginning of the study and the remaining 48 were assigned to the treatments in a complete randomized design with a factorial combination of the type of cereal and DDGS level. The experiment lasted 14 d during which 80 g of feed/bird per day were offered. The DDGS were included in the diet using the substitution methodology. The last four days of the study, total excreta were collected. At the end, birds were killed to determine deposition rate and the energy retained in protein and fat. Broilers killed at the beginning of the trial were used to correct for the initial composition. There were six birds per treatment and results were subjected to ANOVA. The results indicate that the nitrogen retention was higher (P < 0.01) for S than for C, but the daily protein deposition rate (P < 0.05), the total protein content, the energy retained in protein and the efficiency of energy retained were higher (P < 0.01) for C. As the level of dietary DDGS increased, the excreted dry matter, nitrogen and energy increased (P < 0.01) but their retention linearly decreased (P < 0.01). The AMEn was also lower (P < 0.01) as the level of dietary

Nutrition III
M81 Broiler responses to reduced protein and energy diets supplemented with lysine, methionine and threonine. A. Abudabos. King Saud University, Riyadh, Riyadh, Saudi Arabia.

This study was performed to evaluate the effect of supplementation of low crude protein (low-CP) corn-soybean meal (corn-SBM) diets which contained low ME levels with lysine (Lys), methionine (Met) and threonine (Thr) above that recommended by the National Research Council (NRC, 1994) on broiler performance, carcass characteristics and serum constituents from 12 to 33 d of age. A total of 100 Ross chicks were randomly distributed in a randomized complete block design among 20 cages with 5 replicate cages/treatment with four dietary treatments: T1 = Control diet (21% CP and 3150 kcal/kg ME); T2, T3 and T4 contained 19.5% CP and 115% of Lys, Met and 108% of Thr compared to the NRC requirements; T2, T3 and T4 contained 3100, 3100 and 3050 kcal of ME/kg, respectively. Cumulative feed intake, body weight gain (BWG) and feed conversion ratio (FCR) from 12 to 33 d of age was not affected by treatment. Birds which had received T2 and T3 had a higher dressing percentage compared to those which had received T1. Breast muscle yield followed the same trend; heavier breasts were obtained from birds which had received T2 and T3. Serum total protein and total lipid concentrations were significantly affected by treatment. Serum from birds which had received the control diet had the lowest total protein and highest lipid concentrations as compared to all other treatments. Serum uric acid concentration was influenced by treatment; it was significantly higher for birds which had received the control diet compared to all other treatments. Based on presented evidences, it can be concluded, that by fortifying crystalline amino acids (AA) to broiler diet at this stage of production, dietary CP and ME could be reduced to 19.5% and 3050 kcal/kg, respectively.

Key Words: Broiler, Performance, Serum metabolite, Lysine, Methionine.

M82 Standardized Ileal Amino Acid Digestibility of Feed Ingredients in Laying Hens and Broilers. Sunday Adedokun1, Patricia Jaynes1, Robert Payne2, Todd Applegate1. 1Department of Animal Sciences, Purdue University, West Lafayette, IN, 2Evonik-Degussa Corporation, Kennesaw, GA.

The objective of this study was to determine standardized ileal amino acid digestibility (SIAAD) of 5 bakery by-product (BBB), 3 corn, 3 soybean meal (SBM), and 1 wheat middling (WM) samples in 21-d-old broilers and young (YLH, 30 wk-old) and old (OLH, 50 wk-old) laying hens (Hyline W36). Standardization was by correcting for basal endogenous amino acid (EAA) losses using a nitrogen-free diet (NFD). There was no difference \( P > 0.05 \) in ileal endogenous amino acid flow between 21-d-old broilers, YLH, and OLH. Broilers were reared in cages from 0 d to 16 on a standard broiler starter diet after which they were randomized to treatments using a randomized complete design with 6 replicate cages of 8 birds/cage per diet. Each feed ingredient was the sole source of amino acids in each semi-purified diet which was fed for 5 d. Broilers had higher \( P < 0.05 \) SIAAD in 2 of 5 BBP while there was no difference \( P > 0.05 \) in SIAAD values between 21-d-old broilers and YLH. Broilers had higher \( P < 0.05 \) SIAAD for Met, Thr, Val, Ala, Cys, Gly, and Ser compared to OLH in 2 of the 3 SBM samples. Standardized IAAAD was higher \( P < 0.05 \) for all AA in one of the 3 corn samples while SIAAD was higher \( P < 0.05 \) for His, Leu, Met, Phe, Val, Cys, Glu, and Pro in broilers relative to digestibility in OLH in the remaining 2 corn samples. There was no difference \( P < 0.05 \) in SIAAD values in birds fed diet containing WM. Considerable differences were noted in crude protein (CP) digestibility between broilers and laying hens. The range of CP digestibility values, percentage unit difference, was between 0.06 and 12.32 (BBP), 1.35 and 2.50 (SBM), 0.35 and 8.60 (corn). Generally, broilers had 4.42%-units (BBP), 3.6%-units (corn), and 2.1%-unit (SBM) more CP digestibility than laying hens. Results from this study confirm the initial observation from previous studies that AA digestibility from the same feed ingredient in broilers may be different from that of laying hens. Secondly, variations in digestibility values within each feed ingredient underscores the fact that same feed ingredient from different sources may not be similar.

Key Words: amino acid digestibility, bakery by-product, broilers, laying hen, SIAAD.

M83 Effects of calcium and phosphorus levels on Heritage broilers from 50 to 63 days of age. E.O Oviedo-Rondón1, M.R. Dalmagro1, M.J. Da Costa1, P.L. Mente2, K.N. Claasen1, A. Mitchell3, H. Engster4, R. Mitchell4. 1Department of Poultry Science, North Carolina State University, Raleigh, NC, 2Department of Biomedical Engineering, NC State University, Raleigh, NC, 3USDA, ARS, ANRI, Beltsville, MD, 4Perdue Farms Inc., Salisbury, MD.

A study was conducted to evaluate the effects of calcium (Ca) and phosphorus (nP) levels during the withdrawal phase (50 to 63 d) on performance, bone traits and leg abnormalities of Heritage broilers. Common starter, grower and finisher corn-soybean diets were fed from 1 to 17, 18 to 35 and 36 to 49 d of age, respectively. 16 experimental diets were formulated to contain combinations of 4 levels of Ca (0.52, 0.64, 0.76, 0.88%) and 4 levels of nP (0.18, 0.26, 0.34, 0.42%). There were 6 replicate pens per treatment, and each pen had 7 male and 7 female broilers during the withdrawal phase. BW gain, FI, and FCR were assessed at the end of each dietary phase. At 59 d of age, Ca and P retention was evaluated. Leg abnormalities were evaluated at 63 d of age by assessing the prevalence of valgus/varus, crooked toes, and twisted legs. Legs were collected and shanks used for bone mineral content and density (BMC and BMD). Bone strength evaluation in 3-point bending and tibial discochondroplasia (TD) scores were recorded. Thighs were mechanically deboned. Data were analyzed as a completely randomized block design by response surface methodology. Male BW gain was affected by the interaction of Ca and P levels, while females BW gain was affected quadratically (\( P \leq 0.05 \)) by Ca levels during the withdrawal phase. Ca had a quadratic effect (\( P \leq 0.05 \)) on FI and FCR during the treatment phase. Male BMD was affected linearly (\( P \leq 0.01 \)) by Ca and P, and BMC quadratically (\( P \leq 0.01 \)) by Ca. Quadratic effect (\( P \leq 0.05 \)) of P was observed in female BMD. Ca retention was affected quadratically (\( P \leq 0.01 \)) by Ca; however, no treatment effects were observed in P retention. Female bone strength in 3-point bending was affected (\( P \leq 0.05 \)) positively by raising Ca levels. On leg abnormalities, valgus prevalence was affected by Ca and P levels quadratically (\( P \leq 0.05 \)). The incidence of total bone breakage on mechanical deboning was affected quadratically (\( P \leq 0.05 \)) by P levels. These results led to the conclusion that Ca and P levels in withdrawal diets influence live performance, bone mineralization and strength, Ca retention, and valgus prevalence.

Key Words: Calcium, Phosphorus, Live performance, Mechanical deboning, Leg health.
Two studies with 21-d-old (n=432) or 42-d-old (n=288) Ross-308 male broilers were performed to evaluate changes on the ileal energy contribution of substrates in response to xylanase and amylase without (XA), or with protease (XAP) in four diet types. Studies had a 2 x 2 x 3 factorial arrangement of treatments with two base grains (corn-soy or wheat-soy diets); two levels of fibrous protein ingredients (without or with 10% com-DDGS and 5% canola meal); and three enzyme levels. At 12 d or 32 d, three enzyme levels were applied: a negative control with 500 FTU/kg phytase (NC); NC with XA, or NC with XAP (Axtra XAP™, Danisco Animal Nutrition). At 21 d or 42 d, birds were euthanized; ileal digesta were collected and analyzed to determine apparent digestibility of energy, starch, fat, and protein. Data were analyzed with a generalized linear model. Significant differences were assessed at P<0.05. Across diet types, starch digestibility increased with XA (97.8% at 21 d; 96.6% at 42 d) and XAP (97.9% at 21 d; 97.0% at 42 d) compared to the NC (96.3% at 21 d; 93.4% at 42 d), but no differences were observed between XA and XAP. XA (84.4%) and XAP (85.8%) increased (P<0.05) protein digestibility at 21 d (NC=82.7%); but only XAP (85.1%) increased (P<0.05) protein digestibility compared to the NC (82.4%) at 42 d. Both XA (83.3%) and XAP (84.0%) increased fat digestibility compared to the NC (80.2%) at 21 d. At 42 d, XA (87.9%) increased fat digestibility compared to NC (86.6%); and XAP (89.4%) further increased fat digestibility compared to XA. Compared to NC (3,199 or 3,417 kcal/kg DM), XA increased ileal digestible energy (IDE) by 52 or 87 kcal, and XAP increased it by 104 or 152 kcal/kg DM at 21 d or 42 d, respectively. Enzyme x protein ingredient interactions were not evident for starch, fat, or protein digestibility. Enzyme x grain interactions were present for starch digestibility at 21 and 42 d, and for fat digestibility at 21 d. Nonetheless, enzyme x grain, and enzyme x fibrous protein ingredient interactions were not observed for IDE. Energy digestibility effects of enzymes observed across diet types were consistent.

Key Words: ileal digestibility, protein, enzyme

M85 NIRS calibrations for total and phytate P in poultry feed ingredients
Muhammad Tahir*1, Mi Yeon Shim2, Nelson Ward3, Gene Pesti4 1Department of Animal Nutrition, Agricultural University, Peshawar, Khyber Pakhtunkhwa, Pakistan, 2University of Georgia, Athens, GA 3DSM Nutritional Products Inc, Parsippany, NJ

An attempt was made in this study to calibrate an NIR spectrometer for total and phytate P of common poultry feed ingredients. Samples were obtained from the USA and Canada (133 corn, 114 soybean meal (SBM), 89 distiller’s dried grains with solubles (DDGS), 95 bakery by-product meal (BBPM), 22 wheat, 31 wheat middlings, 21 canola meal and 15 wheat shorts). NIRS predicted phytate P much better than total P. One minus the variance ratio (1-VR) was positive for all calibrations except for total P in SBM and canola meals. It demonstrates that using the NIRS estimate is better than using the average analyzed value for any given sample. The NIRS estimate to laboratory analysis relationships for total P ranged from RSQ=0.93 for SBM to 0.85 for BBPM. For phytate P they ranged from 0.64 (wheat) to 0.89 (BBPM). The average values for the laboratory determinations versus NIRS predictions were all within 0.030 for total P and 0.012 for phytate P. The standard errors of predictions (SEP’s, %) for total P and Phytate P were: corn (0.083 vs 0.014); SBM (0.049 vs 0.009); DDGS (0.027 vs 0.023); BBPM (0.082 vs 0.018); wheat (0.044 vs 0.024); wheat middlings (0.142 vs 0.017); canola meal (0.088 vs 0.012) and wheat shorts (0.087 vs 0.013). These SEP’s may be sufficiently precise for most nutritionists to use the NIRS predictions to estimate how much of the P in their ingredients was not available to their birds (without supplemental phytase). The prompt and accurate estimate of phytate P in feed ingredients should allow for more efficient feed formulation and mixing, lowering feed costs and reducing the amount of residual polluting P in poultry excreta.

Key Words: NIR, Calibration, Phosphorus, Phytate P, Feed Ingredients

M86 Effect of adding dietary guar bean, guar meal and guar gum on productive performance of broiler chicks
Sherif Hassan1*, S. M. Hassan and Y.M. Al-Yousef 1Assistant Professor, 2Animal and fish production Department, King Faisal University, Al-Hufuf, Al-Hassa, 31982, Saudi Arabia.

Two hundred forty one-d-old broiler chicks were randomly distributed among 4 treatments with 3 replicates of 15 chicks per replicate. Chicks were assigned to one of the following treatments: 1) chicks fed broiler starter control diet, 2) chicks fed diet containing 2.5% guar meal, 3) chicks fed control diet containing 1.35% guar gum, and 4) chicks fed control diet containing 3.8% guar bean. Weekly body weight, body weight gain, feed intake, feed conversion, and mortality rate were recorded from 0 to 28 d of age. Body weight and body weight gain of chicks fed guar gum were significantly higher than control chicks at 7d. Feed conversion of chicks fed guar gum was significantly higher than other treatment groups at 14 d. Mortality rate of chicks fed guar bean was significantly higher than chicks fed guar gum and control chicks during 2 wk of age. Feed intake of chicks fed guar gum was significantly higher than other treatment groups during 2 wk of age, while chicks fed guar bean increased feed intake compared with the other treatment groups during 3 and 4 wk of age. Results suggest that guar gum and unknown compound in guar bean and guar meal rather than residual guar gum were responsible for some adverse effects observed when guar meal was fed for broiler chicks.

Key Words: broiler, guar bean, guar gum, guar meal, growth

M87 Nitrogen and mineral balance in broiler chickens fed diets supplemented with organic copper
O.L.A. Rodriguez1*, A.M.J. Gonzalez1, R.S. Gomez2, M.L. Angeles2 1Universidad Autonoma Chapin- go, Ajuchitlan, Queretaro, Mexico, 2CENIDFyMA-INIFAP, Ajuchitlan, Queretaro, Mexico

An experiment was carried out to evaluate the nitrogen (N), Copper (Cu), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), iron (Fe), manganese (Mn) and zinc (Zn) content, deposition and efficiency of use in broilers chickens supplemented with organic Cu. Ross B308 broilers were reared in floor pens from 1 to 49 d of age. Diets were formulated following the nutrient recommendation for starter (1-14 d), grower (15 to 28 d) and finisher (29 to 49 d) broilers. In each phase, diets were supplemented with 3 increasing level of organic Cu (0, 100 and 200 ppm in the feed). Each treatment was applied to two female and two male replicates with 26 birds in each. At the end of the experiment, two broilers from each pen were slaughtered by cervical dislocation to analyze the ileal content and mineral use were estimated for all the experimental period. Results were subjected to ANOVA with four female and four male replicates for each treatment. The results show that the N concentration and the K deposition in the carcass was higher (P < 0.05) for Cu0. The content and deposition of Cu were linearly increased as the dietary Cu increased (P < 0.05). The content and deposition of Cu were significantly higher than other treatment groups during 2 wk of age, while chicks fed guar bean increased feed intake compared with the other treatment groups during 3 and 4 wk of age. Results suggest that guar gum and unknown compound in guar bean and guar meal rather than residual guar gum were responsible for some adverse effects observed when guar meal was fed for broiler chicks.

Key Words: broiler, guar bean, guar gum, guar meal, growth
N use (P < 0.01) and greater (P < 0.05) deposition and efficiency of K, Fe, Cu and Zn use than females. The results show that the efficiency of Cu, P and Fe were improved by organic Cu, however these improvements were override because of the low overall efficiencies estimated for Cu= 1.18, P= 29.5, K= 17.1, Ca= 31.6, Mg= 0.12, Fe= 3.8, Mn= 0.66 and Zn= 8.1% indicating that the high mineral concentration in the diet was the main cause of the greatest excretion and the lowest mineral retention in the carcass of broilers.

Key Words: Broilers, Organic copper, Nitrogen efficiency, Mineral efficiency

M88 Effect of in ovo selenium injection of broiler breeder eggs on tissue selenium concentration, lipid peroxidation, immune response and post hatch development Lizza Macalintal, Austin Cantor, Anthony Pescatore, Karl Dawson, James Pierce, Michael Ford, Tuoying Ao, H. David Gillespie, Amber Meredith Alltech-University of Kentucky Nutrition Research Alliance, Lexington, KY

The effects of injecting graded levels of selenium (Se) as seleno-L-methionine (Se-Met) or sodium selenite (Na2SeO3) in the yolk of fertile broiler breeder eggs after 10 d of incubation on tissue Se, lipid peroxidation, immune response and post hatch development were investigated. Eggs were injected with 0.1 ml of a phosphate buffered saline solution containing 0, 2.5, 5, 10, 20 or 40 µg Se as either Se-Met or Na2SeO3. Two replicate groups of 25 eggs were allotted for each dose per Se source. Embryo viability assessed by candling ranged from 58 to 91% at 18 d and from 52 to 87% at 20d and was not affected by treatments. Lipid peroxidation in samples collected at 20d of incubation was decreased (P <0.005) in lung and heart, but not liver and breast muscle, in chicks from the Se-Met treatment. Hatchability of fertile eggs was higher (P < 0.007) for Se-Met than for Na2SeO3 treatments. At day of hatch, four replicate groups of six chicks per injection dose from each Se source were placed in cages and fed a corn-soybean meal diet without Se or vitamin E supplementation. Mean BW at 1, 7, 14 and 21 d of age was not significantly affected by treatments (P > 0.05). At 7d of age, chicks from the Se-Met injection treatments, in contrast to those from the Na2SeO3 treatments, showed higher (P <0.01) Se concentrations in the lung, heart, but not liver. The elevated tissue Se due to injecting Se-Met was also seen after 14 and 21 d in the lung (P <0.005), but not in other tissues. Antibody titers were not different at 7d post primary and 4d post secondary SRBC injection. The results of this study showed that in ovo Se-Met injection resulted in higher hatchability, reduced lipid peroxidation in the lung and heart muscle and Se concentrations in heart and breast muscle through 7d and lung though 21d of growth.

Key Words: in ovo injection, selenium, SRBC, lipid peroxidation, broilers

SCAD/Avian Diseases II

T89 Investigating the turkey gut virome and its role in enteric disease J. Michael Day USDA-ARS, Athens, GA

The information regarding the complete viral constituency in the poultry gut is lacking. For decades, researchers have investigated the possible etiologic agents associated with the recognized enteric disease syndromes and concomitant performance problems in chicken and turkey flocks. Several viruses with possible roles in enteric disease have been described, but no single virus has been definitively implicated as the sole causative agent of the syndromes such as Runting-Stunting Syndrome (RSS) in broiler chickens or Poult Enteritis Complex (PEC) in young turkeys. Attempts to re-create these syndromes with isolated viruses in experimental birds often fail to reproduce all the signs noted in affected flocks in the field. Recently, we have begun using ultra high-throughput nucleic acid sequencing (Roche/454 GS-FLX pyrosequencing platform and associated protocols) to prepare viral metagenomes representing the complex viral community in the turkey gut. These investigations have identified novel enteric RNA viruses that may play roles in the enteric diseases and performance problems noted in the field, leading to new molecular diagnostic assays for certain viruses. Subsequent investigations in our laboratory have focused on comparative metagenomic analyses designed to identify disease-associated viruses and genes. The present report will focus on the novel and unique poultry enteric viruses we have identified using this and similar approaches, and will provide details on the bioinformatic workflow developed to analyze the extensive sequence data generated during our comparative investigations.

Key Words: turkey gut virome, enteric disease

T90 Rapid and cost-effective molecular Salmonella serotyping assay utilizing Lumines® multiplexing technology. Gunjot Rana, Michaela Hoffmeyer, Brad Mire, Douglas Waltman Lumines Corp., Austin, TX Georgia Poultry Lab Network, Oakwood, GA

Salmonella infections are among the leading bacterial cause of illness in the United States, with poultry being a major global reservoir of Salmonella. Because of health concerns and the cost burden associated with Salmonella infections, regulations require reporting of Salmonella serotypes for detected cases. Traditionally, Salmonella serotyping has been done manually by tube agglutination. This process is time consuming, subjective and expensive. We propose a CDC and NVLS validated, rapid molecular method capable of completely serotyping 95% of the isolates received by an average laboratory in 3.5 hours while providing partial results for most other serovars. The advantages of using a molecular approach include ability to serotype rough and problematic isolates, no phase inversions, improved reliability, high throughput, increased time efficiency, decreased cost, all while yielding results that mirror traditional serotyping methods. In a blind study, this assay was tested on 139 samples obtained from the Georgia Poultry Lab Network and results were compared to classical agglutination. Samples with discrepant results were tested by NVSL. These results demonstrate excellent correlation between serotyping via classical agglutination and the xMAP Salmonella serotyping assay proving that molecular serotyping is an accurate and rapid alternative to traditional serotyping. Adoption of this method will lead to decreased serotyping cost for egg and poultry producers and increased ability to control outbreaks.

Key Words: Salmonella, Luminex, molecular, serotyping

T91 Comparative Efficacy of Citrex Liquid (drinking water ) or Citrex Powder (feed additive ) for the Reduction of Salmonella in Broiler Chickens Greg Mathis, Brett Lumpkins, Charles Hofacre, Manuel Contreras Southern Poultry Research, Inc., Athens, GA University of Georgia, Athens, GA, Citrex, Inc., Miami, FL

The objective of the study was to evaluate the reduction of Salmonella when Citrex, an organic antimicrobial, was administered in the drinking water and/or feed. This antimicrobial is a complex obtained from the physical reaction between ascorbic, lactic, and citric acids combined with glycerin. A 42 day floor- pen study with coccidia vaccinated and Salmonella heidelberg challenged Cobb-male broilers was conducted using a randomized block design with 4 treatments and 6 replications of 50 birds/pen. Treatments were the following: 1. Non medicated (NM), 2. Citrex liquid (CL) 1000 ppm (D39-42) administered through water,