strains 0157H7. Also, EYA when added in small amounts to food products such as hamburger have the potential to inhibit ETEC, Salmonella, and other microorganisms. Therefore, EYA can be used to control a wide range of intestinal pathogens in domestic animals, pets and humans, and those present in foods. The cost of treatment with EYA will be inexpensive as it can be produced abundantly and only a small amount is required. Also the treatment is safe, environmentally friendly, and sustainable. In addition, EYA should provide one of the best alternatives to antibiotics as many microorganisms have developed multiple antibiotic resistance and many are currently or will be banned as feed or food additives. In the future, additional research must be carried out to exploit the full potential of EYA as therapeutic and preventative agents for the control of disease-causing organisms in animals, humans and food products.

Key Words: antibodies, enteropathogenic E. coli, Salmonella, yolk, food products.

Environment & Management

Broilers


The performance of commercial broilers reported by broiler production units in the USA from 1997 to 2001 has been evaluated. There was a linear decrease in calorie conversion and the number of days to produce a 2.27 kg bird but no change in per cent mortality. By contrast, there was a linear increase in final bird weight during this period. There were no differences in calorie conversion or days to produce a 2.27 kg bird during the first half of the year (January to June) but these traits showed a significant increase in July followed by a steep decline during August, September, and October. Final weight was similar from January to June but showed a significant decrease in July. No consistent variation in monthly mortality was noted. It is concluded that improvements in the productivity of broilers have been achieved during the period from 1997 to 2001, but that more attention should be given to the problem of broiler management during the summer months.

Key Words: Broiler production unit, Performance, Season

Broiler hatch weights over the past 25 years. J. P. Thaxton*, Mississippi State University, Mississippi State, MS.

Determination of individual starting weights of chicks is standard procedure practiced by many Poultry Scientists, this author included. These starting weights are always recorded in the experimental records, but seldom reported in print. Therefore, the purpose of this work was to evaluate records of initial weights of broilers over the past 25 years (1975-2000) and determine if weights have changed. Straight-run weights representing birds produced by a single primary breeder were selected for presentation. Results suggest a mean decrease of 0.67g/chick/year from 1975 through 2000.

Key Words: Broilers, Newly hatched, Hatchability


The broiler breeding industry has experienced remarkable progress in body weight (BW) gain and feed efficiency in the past 30 years. These annual improvements have changed age to market and led product development based on new genotypes that yield high amounts of breast meat. The objective of this project was to quantify the extent to which breeder companies have changed their management recommendations for BW targets of parent stock, considering these broiler growth potential changes. Broiler breeder management guides spanning 1972 to 2001 were examined in regard to target BW recommendations. The breeders studied included Cobb, Hubbard Farms and Arbor Acres Farms. In Cobb males, the 30-wk BW has not changed, although the 24-wk BW has been increased resulting in a more linear growth target. Overall, the Hubbard target has varied in 18-wk BW and 28-wk BW, but not in 20-wk BW, suggesting that different growth curves before and after 20 wk have been tried. In Arbor Acres males, 24-wk BW was increased by 14.0% from 1980 to 2000. Cobb female BW targets after 18-wk have been greatly increased since 1978 (21.7% increase in 24-wk BW in 2001). A similar increase in 24-wk BW is apparent with Hubbard BW targets since 1976 (13.5% increase at 24-wk BW in 2001). By contrast, the 2000 Arbor Acres growth curves were identical to the 1985 values at 24 wk. Hubbard breeder management guides (1974-1997) were used to compare the stated growth potential of male and female broilers. The value for female BW as a percentage of male BW changed slightly from 84.3% (1974) to 82.0% (1989-1997). The change over time fit the linear equation (r² = 0.9761) as y = 0.042x + 1.355 for males, and (r² = 0.9692) as y = 0.0331x + 1.135 for females. The third investigation considered the relationship between 42 d-BW in Hubbard parent stock and offspring. The ratio of broiler breeder target BW expressed as percentage of broiler stated potential BW was calculated for males was as follows: 1979 (51.9%), 1989 (38.1%), 1991 (40.1%) and 1997 (36.1%). The similar values for females were: 1979 (52.5%), 1989 (39.3%), 1991 (36.1%) and 1997 (30.3%). Both sexes of breeder parents are currently considerably more restricted than they were in 1979 (males: 15.8%; females: 22.2%).

Key Words: Broiler, Broiler breeder, Growth rate, Target body weight
222 Influence of dietary methionine source on volatile sulfur compounds in broiler excreta. C. Chavez1*, C. D. Coufal1, J. B. Carey1, R. C. Beier2, and J. A. Zahn3, 1Department of Poultry Science, Texas A&M University, College Station, TX, 2USDA/ARS Southern Plains Research Center, College Station, TX, 3National Swine Research Center, USDA/ARS, Ames, IA.

To evaluate the impact of methionine source on volatile sulfur compounds in broiler excreta a trial was conducted using straight run broiler chicks raised in battery cages. Chicks were randomly distributed into 3 replicates of 5 treatment groups with 16 birds per pen. The treatment groups were dry methionine hydroxy analogue (Dry MHA), sodium methioninate aqueous solution (Na Methionine), liquid methionine hydroxy analogue (Liq MHA), dl-methionine, (DL Methionine) and no supplemental methionine (control group). The methionine activity of each methionine source was 52, 45.9, 88, and 98% respectively. All diets were formulated to contain 0.8% total methionine activity (except control group, 0.35% methionine activity) and otherwise met NRC nutrient requirements. Diets were fed ad libitum from day 1 to 6 weeks of age. Feed consumption was measured daily and all birds were weighed weekly. There were no significant differences in body weight, feed consumption or feed conversion among the treatments. All excreta were collected in litter pans lined with aluminum foil. At week 6, broiler excreta were collected for a 24 hour period, 4.5 grams of the broiler excreta of each treatment group was collected into 15 ml headspace vials. Samples were analyzed by gas chromatograph/mass spectrometer. Volatile sulfur compounds that were identified and quantified in the broiler excreta were: hydrogen sulfide (H2S), carbonyl sulfide (COS), methyl mercaptan (CH3SH), dimethyl disulfide (CH3SSCH3), dimethyl trisulfide (CH3SSSCH3). Na Methionine had significantly highest concentrations of H2S, COS, and CH3SSCH3 compared to all other treatment groups. Liq MHA had significantly lowest concentrations of H2S, COS, CH3SH and CH3SSCH3 compared to the other treatment groups. Dry MHA had the significantly highest concentrations of CH3SH, DL Methionine had the significantly highest concentration of CH3SSCH3, and lowest concentration of H2S. The control group had significantly lowest concentrations of CH3SH, CH3SSCH3, and CH3SSSCH3 than the other treatment groups. These findings demonstrate that methionine source significantly influences volatile sulfur compound concentrations in broiler excreta

Key Words: Methionine, Broilers, Sulfur

223 Characterization of the Salmonella status of broiler houses using different environmental sampling and isolation techniques. M.L. Rybolt1*, R.W. Wills1, T.P. Dole1, J.A. Byrd2, and R.H. Bailey1, 1Mississippi State University, Mississippi State, MS, 2USDA-ARS-Southern Plains Agricultural Center, College Station, TX.

Proper sampling for risk analysis of food safety hazards within farm production environments is challenging. The sensitivity, specificity, and repeatability of sampling techniques for foodborne pathogens are not well documented. Consequently, four different methods of Salmonella isolation were compared. Tetrahionate broth, Rappaport-Vassiliadis R10 broth, Dynabeads anti-Salmonella, and secondary enrichment methods were tested. Evaluations were carried out using pure culture, inoculated samples, and field samples obtained from several broiler houses. Variability in sensitivity of the different methods was observed. However, in this study the incorporation of a secondary enrichment procedure allowed for a higher Salmonella isolation rate. More fully characterized sampling and isolation techniques need to be developed to investigate the ecology of the pathogens on the farm so that effective food safety risk management strategies can be developed and assessed.

Key Words: Salmonella, Risk assessment, Sampling, Isolation techniques

224 Nutrient buildup in sand litter over time. B.D. Bowers*, J.B. Hess, S.F. Bilgili, J.P. Blake, and M.K. Eckman, Auburn University, Auburn, AL, USA.

There has been an increasing need for alternative litter sources for broilers. Sand has been evaluated as a potential litter source. One problem that might be encountered using sand could be excessive buildup of nutrients, since broilers are typically reared on sand longer than other materials without complete removal all litter. High levels of nutrients in poultry litter could create environmental problems when applied to pastures or agronomic crops. This study was designed to quantify the progression of nutrient level buildup sand litter from flock to flock. Pooled litter samples were taken after each flock from broiler houses using sand. The samples were evaluated at the Soil Testing Laboratory at Auburn University. Results are reported on a dry-matter basis. Nutrients were measured and minerals were evaluated using the Jarrel-Ash ICAP 9000 Spectrometer. Nitrogen was measured in a LECO CN-200 module. Results showed a significant increase (P<0.05) in nutrient content in sand houses over time (N 0.74 and 3.54%; P 0.32 and 1.52%; K 0.44 and 2.58%, for flocks 1 and 22, respectively), whereas pine shavings showed no significant difference in nutrient levels between flocks (N 3.19 and 3.11%; P 2.19 and 1.94%; K 3.04 and 3.28%, for flocks 1 and 9, respectively). There was a significant difference in nutrient content of sand litter when compared to pine shavings in flocks 1 through 5. As a result of organic matter build up in sand, there were no significant differences in flocks 6 through 9 with the nutrient content in sand remaining consistent with that of pine shavings. After 5 flocks, results indicate that levels of N, P, K and Ca remained similar to pine shavings. Some mineral levels, (N, P, K, Mn, Cu, Zn) consistently increased to higher levels than those of pine shavings after many years of use.

Key Words: Sand, Litter, Pine shavings, Nutrient levels, Broilers

225 Quantification of nutrients in recycled rice hull broiler litter. C. D. Coufal*, C. Chavez, and J. B. Carey, Texas A&M University, College Station, Texas.

The amount of nutrients in broiler litter is an important concern to broiler producers when making waste management decisions. Cost and availability of new litter for broiler housing influence producers decisions on what type of litter to use and whether to clean out or recycle litter after each flock. However, as the litter is recycled from flock to flock, the accumulation of nutrients in the litter needs to be taken into consideration when the litter is finally disposed. Therefore, an experiment was conducted to quantify nitrogen content of recycled broiler rice hull litter. Broilers were reared in four concrete-floored experimental pens under simulated commercial conditions. Three flocks were reared in succession on recycled rice hull litter, with the first flock starting on litter that had been used for one flock previously. Beginning rice hull litter depth was approximately 8-10 cm. Commercial broiler feed was provided ad libitum, as was water via nipple drinkers. Caked litter was separated from loose litter in each pen after removal of the flock at 40-41 days of age. The wet weight, moisture content and nitrogen content of all birds, feed, litter and caked litter were measured. Day-old chicks and feed accounted for all nitrogen entering the pens. At the end of each trial, residual nitrogen not accounted for in marketed broilers, mortality, litter or caked litter was assumed to have dissipated as dust or ammonia. Over the three flocks, the percent of total nitrogen in each trial represented by marketed broilers, litter and mortality varied significantly. However, the percent nitrogen represented by caked litter (5.66, 6.59, and 5.69%) and residual loss (20.6, 19.38, 17.25%) did not differ significantly between flocks. The wet weight, dry matter content and percentage of the litter significantly increased from flock to flock as litter accumulated in the pens. This data demonstrates the accumulation of nitrogen in recycled broiler litter, as well as quantifies the amount of nitrogen in caked litter for use by producers in waste management planning. Additionally, the partitioning of nitrogen through the broiler production process is quantified.

Key Words: Litter, Nitrogen, Broilers

226 Effect of pH and experimental chloride compound (ECP) in the drinking water on Salmonella contamination of market-age broilers. J.A. Byrd*, R.W. Moore1, K.D. Knape2, J.L. McReynolds3, R.C. Anderson1, L.F. Kubena1, and D. J. Nisbet1, 1USDA-ARS-SPARC, Food & Feed Safety Research Unit, College Station, TX, 2Texas A&M University.

Our laboratory has previously reported that organic acids and chloride compounds reduce food-borne pathogens in poultry. Organic acids added in the drinking water reverse the increase in the crop pH associated with feed withdrawal. Chlorate compounds combined with organic acids should maximize the effects of these compounds. The following studies were performed to investigate the combined effects of ECP and crop pH on Salmonella typhimurium (ST) recovery from market-age broilers. Market-age broilers were obtained from a commercial processing plant and then assigned to a control (non-treated), ECP-treated (ECP is equivalent to a 15 mM chlorate ion concentration), acidic ECP-treated (pH 4.00) or basic ECP-treated (pH 9.00) groups. Immediately upon arrival and 1 day prior to termination of the experiment broilers

Key Words: Salmonella, Risk assessment, Sampling, Isolation techniques
were challenged by crop gavage with 108 ST. Twenty-four hours after ST challenge, broilers were killed for crop and ceca ST enumeration following standard methods. Broilers provided basic ECP in the drinking water 48 hours prior to slaughter were found consuming slightly more ECP-water than broilers provided distilled water. Treatment with ECP or basic ECP caused a significant decrease (P < 0.05) in the incidence of ST in crop contents (0%) as compared to the controls (20%). Similarly, basic ECP or normal ECP treatment (0.0 Log10 ST/g crop content) caused a significant decrease (P < 0.05) in the number of ST recovered in the crop compared to the controls (0.45 Log10 ST/g). A mean numerical reduction of ST recovered from the ceca was also observed in the basic ECP-treated group compared to controls. This study suggests that incorporation of chlorate in the drinking water 48 hours prior to slaughter can reduce Salmonella contamination in market-age broilers.

**Key Words:** Salmonella, Crop, Ceca, Chicken, Chlorate

227 The effect of perches and stocking density on tibial dyschondroplasia and bone integrity as measured by bone ash in broiler chickens. N.L. Tablante*, I. Estevez, and E. Russek-Cohen, University of Maryland, College Park, MD.

Exercise through perching has been suggested as a method to reduce the incidence of leg problems in broiler chickens. It is possible that higher stocking densities may motivate birds to perch more, and perhaps reduce some of the detrimental effects to broiler health seen at high stocking densities. The goal of this research was to determine the effects of stocking density and perch treatments on the incidence of tibial dyschondroplasia (TD) and the level of bone ash in broiler chickens. Mixed sex broilers were assigned to 36 pens in a four perch treatment x three density factorial with three replications for each treatment/density combination in a randomized complete block design. Pens were assigned to one of four perch treatments: control (no perches), horizontal (three horizontal perches), angled (three 10° angled perches), or mixed angle (one horizontal, one 10° angled, and one 20° angled perch), at each of the three densities (10, 15, and 20 birds/m²). The incidence of TD was lowest in birds reared at stocking densities of 20 birds/m² followed by 15 birds/m² and highest at stocking densities of 10 birds/m². This pattern corresponds positively with the chickens’ perching frequency as reported previously. Except for controls which had no signs of TD, TD incidence was lowest in birds that were given access to horizontal perches which were used most by the birds. TD incidence was highest in the mixed treatment which was used least by the birds. These differences approached statistical significance (p=0.0525). Percent bone ash was significantly lower in birds with TD compared to those without TD (p=0.0426). The difference in TD incidence between males and females was not statistically significant (p>0.05). However, percent bone ash was significantly lower in males than in females (p=0.0123). Bone ash was similar for all birds reared at different stocking densities and perch treatments (p>0.05).

**Key Words:** Tibial dyschondroplasia, Perches, Bone ash

228 Effect of the interaction between season and stocking densities on broiler performance and carcass quality under Upper Egypt. Talaat M. El-Sheikh*, 1 South Valley University, Faculty of the Agriculture.

Effect of the interaction between season and stocking densities on broiler performance and carcass quality under Upper Egypt T.M. El-Sheikh Dept. of Animal & Poultry Production, Fac. Of Agriculture, Sohag, South Valley University, Egypt Abstract A total of 15000 birds were housed by 8, 10 and 12 birds/m² (three replicates per density either during winter or summer) from hatch to 7 weeks of age. A sample of 10% per pen were used to determine body weight at the different ages. Feed consumption and feed efficiency were determined per pen. At time of slaughter carcasses were graded in a commercial processing plant according to Canadian grade standards. The number of carcasses graded into the different grade classes was determined, and these data were used to calculate the percent Grade A carcasses. Carcasses from each house were dimensioned and were down-graded because of breast blisters, incidence of scabby hip syndrome and vent sores. The two seasons clearly different in ambient temperature at broiler house, and consequently, body weight at 7 weeks was significantly lower in summer than in winter in all stocking density with an average reduction of 14.2%. The season effect was largest (14.5%) on BW gain from 0 to 7 weeks, along with 7 and 15% reduction in feed consumption and efficiency, respectively, during these 3 weeks. No significant interactions between season and density were observed up to 3 weeks of age, while there was a significant interaction at 6 and 7 weeks of age. During the winter no significant differences in body weight and body weight gain among the three flocking densities, while during summer body weight decreased significantly as density increases. Feed consumption was significantly decreased during summer season compared to winter season during all periods. This decrease was about 7.2%, 6.1 and 7% during the periods from 0-3, 3-7 and 0-7 weeks of age. Under 8 birds/m², a higher percentage of breast blisters, scabby hip syndrome and vent sores (35%) was observed than at other densities. The corresponding value was 42% during summer than winter. The 7-wk H/L ratios were significantly higher during summer than winter and with high density. The optimum profit potential was observed in winter than summer. It increased with in increased density during winter while the opposite trend during summer.

**Key Words:** Season and density interactions, Flocking density, H/L ratio, breast blisters, broiler, Scabby hip, Vent sores


The increase in mortality during live haul indicates that the process is stressful to broilers. Flock health and physical injury contribute to the incidence of DOA; thermal stress and chemical stress may be the leading cause of broiler DOA during live haul. Characterization of temperatures experienced by poultry during the live haul process would reveal points at which appropriate measures might be taken to reduce DOAs induced by thermal stress. Temperature recording devices were developed to make continuous measurements of temperature in the midst of the broilers during catching, transportation and holding at the processing plant. Initial data recorded during warm weather indicate that catch, cooping and when held on the trailer in the processing plant yard are primary stages where heat stress may occur. Loss of evaporative cooling and crowding of birds prior to catch can lead to heat stress early in the live haul process. Increases in house temperature of 8-10°C due to evaporative cooling loss at the time catch begins have been observed. This increase in house temperature is further compounded by an additional 3-5°C increase in temperature among the birds due to pre-catch crowding. Thus, birds can experience temperatures 10-15°C above what is considered to be acceptable. Even on mild days, conditions within the house can cause high temperatures at bird level. During hot weather, strategies to alleviate temperature stress such as by curtailing in-house crowding, reducing effective temperature at the catching site, ventilating trailers prior to departure from the farm, and improving the holding shed environment may be necessary to prevent heat stress. Preliminary investigation of cooled bird ventilation using fan trailers has shown effective cooling within transport coops awaiting departure from the farm. Continued evaluation of thermal stress during the live haul should shed light on procedures that can assist poultry companies to reduce DOA losses in all seasons.

**Key Words:** Heat stress, DOA, Broiler

230 Quantified detriment of ammonia to broilers. D.M. Miles*, 1 S.L. Branton*, B.D. Lott*, and J.D. Simmons*, USDA-ARS Poultry Research Unit, Mississippi State, MS/USA, 1 Mississippi State University, Mississippi State, MS/USA.

Ammonia levels in broiler houses can reduce bird performance, increase susceptibility to disease and increase subsequent mortality. House management, season, humidity, stocking density, and litter properties influence ammonia concentrations. Though it is widely known that ammonia is detrimental to poultry welfare, the quantified effect of ammonia on broiler performance is of practical importance to the poultry industry. Genetically, today’s broiler is different than the broiler three decades ago, and literature providing quantified effects of ammonia is based on the older genetic stock. Ammonia levels are highest during the first few weeks of growth, but as the birds grow larger, ventilation rates are increased and the levels decrease. The house descriptors that described ammonia levels for broiler houses are less than 50 ppm. It is common for ammonia levels in commercial houses to exceed 50 ppm. Each of five environmental chambers housed 60 commercial male broilers on 10 cm of pine shavings for four weeks. The treatments for the chambers included four ammonia levels: 0 ppm (two chambers at this level), 25 ppm, 50 ppm, and 75 ppm. The birds in each chamber were weighed weekly and were supplied basal diets under continuous lighting. Ammonia levels
were monitored daily. At the end of four weeks, broilers subject to 0 ppm ammonia had body weights of 1460 g. All levels of ammonia exposure reduced body weights. The 25 ppm concentration reduced body weights a maximum of 1.7% at 3 wks, while 50 ppm exposure reduced body weight most significantly at 4 wks by 12.3%. At the 75 ppm level of ammonia, body weights were reduced by 4.8%, 17.8%, 25.4%, and 22.6% for weeks one through four, respectively.

Key Words: Ammonia, Broilers, Performance

231 Cotton nematode control by broiler litter. Y Vizzier Thaxton*, G. W. Lawrence, and C. L. Balzil, Mississippi State University.

Poultry litter has been identified as a valuable source of nitrogen, phosphorus, potassium, calcium, magnesium, and micro-nutrients. In addition to the fertilizer benefits, previous research demonstrated that pre-plant application of poultry litter decreases soil-borne plant pathogens including plant-parasitic nematodes. Nematodes were responsible for yield losses greater than 762,520 bales of cotton across the cotton-belt in 1999. The reniform nematode was first described as a pathogen of cotton in 1940, and by 2000 it infested over 48 percent of the U.S. cotton acreage. Since there are no commercially available cotton cultivars with resistance to the reniform nematode, application of chemical nematicides are the most common method of control. These chemicals do not provide long term management and must be used annually. Poultry litter may contain constituents that stimulate the development of nematode-suppressive microbial populations. Actinomycetes from poultry litter have been demonstrated to control a variety of plant diseases. Furthermore, Actinomycetes have been identified as controlling parasitic nematodes. Poultry litter, litter compost, and fecal material commonly contain Actinomycetes. This study utilized field mini plots to evaluate specific microbiological changes in the soil as the result of application of broiler litter compared to no litter and commercial fertilizers. There were 6 treatments and 2 controls. Litter was applied at rates ranging from 0.4 to 2.4 tons per hectare. Results indicate that the poultry litter regardless of quantity stimulated growth of Actinomycetes, while time decreased the numbers of Staphylococi, coliforms, molds and yeasts. The total number of organisms remained stable regardless of treatment or sampling time. 

Key Words: Broiler litter, Actinomycetes, Nematode, Cotton, Microbiology

232 Presence of Salmonella in broiler feed. J. A. deGraft-Hanson*, D. Jackson1, and M. Biru1, University of Maryland, Princess Anne.

Feed from hoppers and feeders from 2 broiler houses were aseptically collected every 2 weeks from placement till birds went for processing for a period of 2 years. Samples were collected with sterile scoops from multiple points from 2 hoppers in each house and from multiple feeders into whirl paks. These were transported on ice to the lab and analyzed within 24 hours. After mixing to effect homogeneity, samples were pre-enriched 1:10 in BPW at 35 C overnight, enriched in TTH at 42 C overnight and then in RV at 35 C overnight. Samples were plated unto XLT-4, BSGA and MLIA at 37 C/24-48 hours. Three presumptive positive colonies from each plate were picked for biochemical screening on TSI and further characterization. A total of 282 samples were collected of which 120 were from hoppers and 162 from feeders. The overall rate of isolation of Salmonella was 25.53%, with rates of isolation of 21.7% and 28.4% from hoppers and feeders respectively. The rates of isolation in House A were 25% and 32.5% for hoppers and feeders respectively and for House B these were 15% and 17% respectively. House A had an overall higher rate of isolation from various environmental samples than from House B but chickens in House A also had a greater frequency of jumping into and contaminating feeders. Serogroups isolated were usually groups B and C.

Key Words: Salmonella, Broiler, Feed

ABSTRACTS OF PAPERS


This experiment was conducted to study energy metabolism parameters, and protein and fat retention curves of broilers fed diets varying only in lysine (LYS) and methionine (MET) levels. For this purpose, 61 male Ross broilers were used, from 21 to 42 days of age. Five animals were slaughtered at the beginning of the experiment (21 d) for initial body composition. Eight broilers were fed the basal diet (86% of NRC 1994 levels of LYS and MET) in metabolism cages. The remaining 48 birds were also placed in individual metabolic cages for testing the factorial effects of LYS and MET level (92, 100, 108 and 115% of NRC 1994 level of LYS and/or MET) and relation (NORMAL, with the above levels for LYS and MET; PLUS LYS, with 15% more LYS over the above levels and PLUS MET, with 15% more MET over the above levels) with four replicates for each combination. Experimental data were generated by comparative slaughter technique and total fecal collection. Data were submitted to factorial design analysis of variance and regression analysis on LYS and MET intake. Treatments had no effect on carcases and total body energy retention. Broilers fed the PLUS LYS diets retained more (p<0.05) carcass protein and had less (p<0.06) carcass fat than NORMAL diets, with intermediate results for PLUS MET diets. Viscera protein and fat retention were not affected by the factors tested. Carcass protein and water retention were quadratically affected by amino acid levels, showing maximal response to occur around 115% level. Regression analysis on LYS and MET intakes showed that LYS intake explained most of the response on protein and water retention. These results showed that at least the LYS level in broiler diets, compared to NRC 1994 requirement, should be higher for maximal carcass muscle growth.

Key Words: Leanness in broilers, Lysine intake, Efficiency

234 Lysine and Methionine Needs of Broilers Fed at Commercial Feed Change Intervals. M.B. Cafe*, C.A. Fritts*, and P.W. Waldroup1, Universidade Federal de Goias, Goiania, Brazil, 2University of Arkansas, Fayetteville, AR.

Current NRC recommendations for Met and Lys are based on feeding intervals that are not congruous with current industry feeding patterns. A study was conducted to evaluate needs for these amino acids in feeding periods consistent with industry. Diets were formulated using corn, soybean meal, and corn gluten meal to meet NRC recommendations for protein and amino acid requirements. These diets were fed for 0 to 14 and 14 to 35 d. Aliquots of the test diet were supplemented with combinations of DL-Methionine and L-Lysine HCl to produce diets with Met levels of 72, 82, 92, 102, and 112% and Lys levels of 100, 110, and 120% of NRC for a 3 x 5 factorial arrangement. Benchmark diets contained fixed CP levels of 23 and 20% with estimated values; basal Lys levels were about 0.10% higher than estimated values; basal Lys levels were about 0.10% higher than estimated values; and Lys levels were about 0.10% higher than estimated values. Performance on the test diets supplemented with Met and Lys equaled that obtained on the benchmark diets. There were few interactions between Lys and Met levels. When fed at the intervals in this study Met levels greater than NRC were required for maximum BW, FCR, and BY. Lys levels of 110% improved BW but not FCR or BY at 35 d; because initial Lys levels were 6 treatments and 2 controls. Litter was applied at rates ranging from 0.4 to 2.4 tons per hectare. Results indicate that the poultry litter regardless of quantity stimulated growth of Actinomycetes, while time decreased the numbers of Staphylococi, coliforms, molds and yeasts. The total number of organisms remained stable regardless of treatment or sampling time. 

Key Words: Broiler litter, Actinomycetes, Nematode, Cotton, Microbiology

Nutrition B

Energy & Amino Acids II

234 Lysine and Methionine Needs of Broilers Fed at Commercial Feed Change Intervals. M.B. Cafe*, C.A. Fritts*, and P.W. Waldroup1, Universidade Federal de Goias, Goiania, Brazil, 2University of Arkansas, Fayetteville, AR.

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Key Words: Broilers, Lysine, Methionine, Feeding Programs