stress caused reduced feed intake, egg productions egg weights in heat-stressed birds receiving 20 and 65 IU vitamin E/kg of feed. Heat-stressed birds supplemented with 120 IU/kg vitamin E maintained egg production and feed intake similar to 20 IU/kg at 25°C. A decline in vitelline membrane strength was detected in heat-stressed birds receiving 20 and 65 IU/kg vitamin E, while 120 IU/kg vitamin E maintained vitelline membrane strength similar to 65 IU/kg at 25°C. No significant changes were observed in Yolk pH, yolk viscosity and albumen pH regardless of heat stress or vitamin E supplementation. Emulsification capacity, and angel cake volume increased with vitamin E supplementation in heat-stressed birds but showed a decline in comparison to birds at 25°C. Haugh units, yolk index, and % solids declined during heat stress regardless of vitamin E supplementation. On the other hand, foam stability increased with an increase in level of vitamin E supplementation regardless of heat stress. This study suggest that vitamin E supplementation in hens diets may reduce egg quality deterioration associated with heat stress.

Key Words: Vitamin E Supplementation, Heat Stress, Egg Quality, Yolk membrane Strength, Layer diet


A total of 180 chicks (one day old) were investigated in this experiment. Sulfadiazine (SQO) was administered by the same way of the system adopted in the field for protection or as a therapeutic against Eimeria infection. The results of this study revealed a significant decrease in the hematological parameters (RBCs count, Hb concentration and PCV percentage). Also, observations of a significant decrease in levels of total protein, albumin and globulin were followed by an increase in A/G ratio. An increase in ALT, AST, GGT, creatine, and uric acid levels were recorded. SQO residues in all investigated tissues (muscle, kidney, and liver) and serum were gradually increased during the whole period of the experiments. However, it’s level was restored after stoppage of the experiments. The withdrawal period was 15 days. Hepatosis and nephrosis were detected in histopathological examination. Our results revealed that there are serious hazardous effects on both broiler chickens and the human consumer, and this system must be changed.

Key Words: Sulfadiazine, Therapy, Eimeria infection


Campylobacter spp. gastroenteritis in humans is the number one cause of food borne illness surpassing infection by Salmonella spp. Within the United States an estimated two to four million such cases occur annually. Mishandling and/or improper preparation of poultry and poultry products appear to contribute to this health concern. Although Campylobacter gastroenteritis is typically short-lived, when treatment is indicated the drug of choice is Erythromycin. Fluoroquinolones may also be prescribed because of their wide spectrum of activity. Antimicrobial resistance results from the National Antimicrobial Resistance Monitoring Program. Enteric Bacteria (NARMS) indicate that resistance occurs in greater than 11% of isolates tested in 1998 for the following antimicrobials: Azithromycin, Ciprofloxacin, Clindamycin, Erythromycin, and Tetracycline. All of the NARMS isolates were from poultry and originated in 1998. In this study we tested isolates (n=95 to date; predominately from poultry) collected prior to 1998 for resistance to the same antimicrobials used in the NARMS. All testing was done using the E test (AB Biodisk) as per manufacturer’s direction. No resistance was observed for Chloramphenicol, Clindamycin, and Gentamicin. In contrast to the 1998 results, only one antimicrobial, Tetracycline, had resistance above 11% (actual percent resistance = 56.8%; actual percent resistance in 1998 = 59.1%). Percent resistance to the other antimicrobials was as follows: Azithromycin (2.1%), Ciprofloxacin (7.4%), and Erythromycin (2.1%). These results suggest that most of the resistance in Campylobacter isolates has emerged over the past few years. Factors that may contribute to this emergence of resistance include increased use of antimicrobials in animal production, exposure to antimicrobials from other sources including environmental and human use, or other unknown factors. Further analysis of these isolates may provide information as to this evolution.

Key Words: Campylobacter, Antimicrobials, Resistance


Poultry feed may be contaminated with various mycotoxins that may affect performance and perhaps, susceptibility to enteropathogens such as salmonellae. Newly hatch chickens are more susceptible to colonization by salmonellae than older chickens due to the lack of native microbiota. Researchers have established a correlation between elevated concentrations of propionic acid and total volatile fatty acids (VFA) and Salmonella colonization. Disruption of the native microflora by toxins could alter the concentrations of VFA and possibly affect Salmonella colonization. Day-of-hatch broiler chickens were placed in batteries and fed control diets or diets containing 300 mg/kg fumonisin B1 (B1), 1 present in Fusarium moniliforme culture material, 100 mg/kg moniliformin (M) from Fusarium fujikuroi culture material, or 300 mg FB1 and 100 mg MKg of diet for 10 days. The chicks were challenged orally with 106 CFU of Salmonella typhimurium on day 3. The concentrations of acetic acid, propionic acid, and total VFA in the ceca were determined at 3, 5, 7, and 10 days of age. Body weights and cecal Salmonella colonization were determined at day 10. At day 3, acetic acid was significantly decreased in chicks fed the M diet or the combination diet and total VFA were decreased in chicks fed the M diet. There were no other significant changes in VFA during the study. Body weights were significantly reduced in only chicks fed the combination diet; however, the incidence and numbers of Salmonella were not increased by any of the mycotoxin treatments. These results indicate that FB1 and M did not increase susceptibility to Salmonella typhimurium.

Key Words: Salmonella, Broiler chicks, Mycotoxins, Cecal bacteria, Volatile fatty acids


The prevalence of an antibiotic resistant strain of Salmonella Typhimurium DT104 has increased dramatically in recent years resulting in increased morbidity and mortality in both animals and humans. Colonization and shedding of S. Typhimurium DT104 was studied in broiler chickens. Day-of-hatch chicks (n=60 per treatment, n=30 per rep) were challenged with 106 CFU S. Typhimurium DT104 (wild type isolate from poultry), or were commingled with a challenged seeder chick. A control group was not exposed to S Typhimurium DT104. At hatch all groups were colonized with naturally occurring S. Senftenberg and S. Mbandaka infections prior to introduction of S. Typhimurium DT104. Twenty chicks per treatment were necropsied weekly and their cecal contents were cultured. Composite fecal samples were evaluated twice weekly for levels of Salmonella shedding. Throughout the study, the level of Salmonella shedding in feces did not differ among groups (means 3.7, 3.5 and 2.8 log10 CFU per g feces for challenged, seeder and control groups respectively). Colonization of S. Typhimurium DT104 remained constant at high levels in the challenged group (mean 87%), increased over time in the seeder group (10% to 50%, p = 0.02) and was not recovered from the control chicks. Salmonella Mbandaka colonization remained unchanged in all groups (means equal to 3%, 35% and 33% for challenged, seeder and control groups respectively); while S. Senftenberg colonization levels tended to decline (p = 0.58) over time in the challenged group (20% to 0), decreased (p<0.01) over time for both the seeder (80% to 0) and control chicks (85% to 20%). Introduction of S. Typhimurium DT104 by
commingling with one infected chick may induce colonization resulting in persistent high levels of shedding in flocks simultaneously with other Salmonella species.

**Key Words:** Salmonella, Salmonella typhimurium DT104, Poultry, Colonization, Shedding

### 374 Effect of selected organic acids on the control of Salmonella in market-age broilers during feed withdrawal. J. A. Byrd*, D. E. Corrier, D. J. Caldwell, R. H. Bailey, R. L. Brewer, L. H. Stanker, and B. M. Hargis. 1 USDA-ARS, FFSRU, College Station, TX, 2 Texas Agricultural Experiment Station, College Station, TX, 3 Mississippi State, MS, 4 USDA-FSIS, Washington, DC.

The crop is a known source of Salmonella and Campylobacter contamination. Presently, we evaluated the use of selected organic acids (0.5%; acetic, lactic, or formic) in the drinking water during a simulated 8 hr pre-transit feed withdrawal (FW). All broilers were challenged with 10^9 Salmonella typhimurium (ST) by oral gavage 24 to 48 hours prior to FW in a total of 5 experiments. ST was recovered from 53/100 (53%) control crops and from 45/100 (45%) of crops from acetic acid-treated broilers. However, treatment with either lactic (31/100; 31%) or formic (28/76; 36.8%) acids caused significant (P<.05) reductions in recovery. Reductions in recovery incidence were also associated with reduced numbers of ST recovered (e.g. control: log 1.45 cfu/crop; lactic acid: 0.79 cfu/crop). In an additional on-farm commercial study, broilers were provided 0.44% lactic acid during a 10 h FW (4 hours on the farm and 6 h transport), and pre-FW crop, post-FW crop, and pre-chill carcass wash samples were collected for Campylobacter and Salmonella detection. Crop contamination with Salmonella was significantly reduced by lactic acid treatment (2/50; 4%) as compared to controls (23/50; 46%). Importantly, Salmonella isolation incidence in pre-chill carcass rinses was significantly reduced by almost 10-fold, but Campylobacter isolation incidence was only reduced by 25% by pre-harvest lactic acid treatment. These studies show that incorporation of some organic acids in the drinking water during pre-transit feed withdrawal may reduce Salmonella contamination of crops and broiler carcasses at processing. Further studies regarding optimal concentrations, ratios and duration of administration are in progress.

**Key Words:** Salmonella, Campylobacter, Crops, Acids

### 375 The effect of feeding broilers tall fescue grass seed (Festuca arundinacea) containing the endophyte toxin, ergovaline, on ascites syndrome parameters, particularly blood oxygenation. A. Shlosberg1,3, J. C. Hermes*, A. M. Craig1, and L. SmithWood1. 1 College of Veterinary Medicine, Oregon State University, 2 Department of Animal Sciences, Oregon State University, 3 Kimron Veterinary Institute, Israel.

The ascites syndrome (AS) in broilers develops with constriction of pulmonary arterioles, is manifested by hypoxemia and is precipitated most often by cold exposure. Tall fescue grass seed (TFG - Festuca arundinacea) may be infested with an endophyte fungus that produces toxic ergot alkaloids, principally ergovaline (EV), EV causes vasoconstriction and so may intensify a state of incipient hypoxemia present in rapidly growing broilers, and so could exacerbate the development of the AS. This work examined this hypothesis. Broilers (n=100) grown to 20 d were fed thereafter TFG-incorporated mash feed formulated to contain 0, 500, 1000 and 1500 µg/kg EV. Replicate groups were given a severe cold exposure (0 and 1500 µg/kg) or were brooded normally. Weekly measurements were made of body weight, skin and body temperature, hematocrit (HCT), oxygen saturation of hemoglobin in arterial blood (PaO2), and heart rate (HR) using a veterinary oximeter. The trial was terminated on day 49, when the birds were euthanized and necropsied. The weights of the right ventricle (RV), and both ventricles + septum (TV) were noted. Despite the severe exposure to cold, there were no indications of development of AS (cyanosis, mortality, necropsy findings, elevated RV:TV, elevated HCT, reduced PaO2, reduced HR). PaO2 was extremely high on all measurements, and in all groups. This could be due to a lower body weight, but in other experiments, birds of similar weights, exposed to a similar cold regimen, had PaO2 levels of only 72%, compared to 96% in this trial. The uniquely high PaO2 recorded in this trial could have been connected with some compound(s) in the fescue seed that prevented the typical hypoxemia and the consequent development of the AS.

**Key Words:** Broilers, Ascites, Blood oxygenation, Tall Fescue, Endophyte

### 376 Toxicity of the fumonisins in chicken embryos. M. H. Henry* and R. D. Wyatt. Department of Poultry Science, The University of Georgia, Athens, Georgia.

Three mycotoxins, fumonisin B1 (FB1), fumonisin B2 (FB2), and fumonisin B3 (FB3), are produced by Fusarium moniliforme in various grains and have been associated with numerous diseases in both humans and animals. The toxicity of purified (>98% pure) FB1, FB2 and FB3, individually and in combination (3:1:1 ratio), were evaluated with regard to their toxicity to chick embryos by injection of the toxins into the air cell of fertile eggs after 72 hours of incubation. Embryonic mortality, gross structural abnormalities, hatchability, and body weight of hatched chicks were recorded for the entire incubation period. Under these conditions, FB1 at doses of 0, 2, 4, 8, 16, 32, and 64 µg/egg resulted in embryonic mortality of 5%, 12.5%, 17.5%, 20%, 52.5%, 77.5%, and 100%, respectively. The LD50 for FB1 in embryos at embryonating eggs was determined to be 18.75 µg/egg. A comparison of the toxicity of FB1, FB2 and FB3, individually and in combination (3:1:1 ratio), at doses of 16 µg of total fumonisin/egg, indicated that the toxicity differ, with FB1 being the most toxic and FB2 and FB3 having similar toxicity. Embryonic mortalities were 4.5%, 50%, 18.4%, 14.6%, and 34% for control, FB1, FB2, FB3, and the combination at 16 µg/egg, respectively. Mortality of these embryos occurred within 7 days of injection. microscopic examination of the chicken embryos exposed to fumonisin did not reveal any gross structural abnormalities. However severe hemorrhage of the head, neck and thoracic area of dead embryos were evident. Body weights of the 18 day-old embryos exposed to fumonisin was not significantly different from that of the control. These data suggest that fumonisins are toxic to chick embryos with the primary manifestation of the toxicity being extensive hemorrhage of the embryo. Furthermore, possible transfer of fumonisin or its metabolites to eggs from the hen could result in low hatchability.

**Key Words:** Fumonisin, Mycotoxins, Embryos, Fusarium moniliforme, Molds


T-2 toxin is one of the most commonly reported mycotoxins and is a major contributor to reduced animal performance. An experiment was conducted to determine the ability of live-yeast culture (LYC) to reduce T-2 toxicity in male broiler chickens. Chicks were fed diets supplemented with two levels of T-2 toxin (0 and 8 mg/kg), and 2 levels of LYC (0 and 0.1% of feed) in a 2 x 2 factorial designed experiment from day of hatch to 21 d of age. The toxin and LYC were added to a corn-soybean basal diet formulated to contain 22% crude protein (CP) and 3300 Kcal/kg of feed. Parameters measured weekly were body weight (BW) and feed consumption. At the end of the experiment changes in selected relative organ weights and serum chemistry values were obtained. The results showed that chicks fed T-2 toxin weighed 114 g compared to 114 g for the control at 1 wk of age. The inclusion of LYC in the T-2 toxin treatment increased the BW of the chicks to 122 g and at 2 wk of age from 245 g to 283 g. By 3 wk of age BW of chicks fed T-2 toxin feed with the addition of LYC increased from 435 g to 486 g. Feed consumption per bird was significantly reduced in the T-2 toxin treated group compared to the control which was improved with the addition of LYC. The elevated relative organ weight from the birds fed T-2 toxin were lowered with the inclusion of LYC. Serum concentration of total protein, albumin, cholesterol, and calcium were reduced, while whole serum concentration of urea nitrogen and creatine kinase activity were increased in the T-2 toxin fed chicks. These values were restored to the control values with the addition of LYC.

**Key Words:** T-2 toxin, Live-yeast culture, Toxicity, Broiler