provide at least 600 FTU/kg. Calcium was fed at the same concentration for Trt 2-4 which provided a 2:1 Ca:P ratio for Trt 3. Feed analysis of total P (tP) showed that dietary tP was consistently lower than formulated for Trt 1 except in the final phase and was not different from other trts from 6-9 wks. Excreta samples were collected at 15 wks, and litter samples at the end of the study for tP analysis. At 115 d, six birds per pen were killed to obtain leg and wing bones from one side of the carcass for bone strength analyses. Final average BW was 16.45 kg and was not affected by corn type (YDC=3390 kcal/kg, NDLP=3430 kcal/kg ME).

Nutrition B

171 The Effect of Feeding Hemp Seed Meal to Laying Hens. F.G. Silversides1,2, M.R. Lefrancois2, 1Crops and Livestock Research Centre, Charlottetown, Prince Edward Island, Canada, 2University of Saskatchewan, Saskatoon, Saskatchewan, Canada.

In Canada, it has been legal to grow cannabis cultivars with low levels of tetrahydrocannabinol since 1998. Hemp is grown for fibre or for seed, which is rich in long chain unsaturated fatty acids. Pressing the seed leaves a high protein meal (HSM) containing variable amounts of oil. Ninety-six DeKalb Sigma hens caged two to a cage in blocks of three cages were fed diets containing 0, 5, 10, or 20% meal for 4 wk starting at 43 wk of age. The HSM was obtained by cold-pressing seed of the cultivar Unica-b, which is normally grown for fibre. Diets were formulated to be isonitrogenous and isoenergetic, with the HSM assumed to contain 0.90 kcal/kg AME (estimated based on 16.4% lipid) and 30.7% crude protein (measured). Hens were weighed at the start and end of the trial. Egg production was recorded daily, and feed consumption and egg quality were recorded weekly. At sampling, eggs were weighed and broken onto a flat surface where the height of the albumen was measured. Yolks were weighed, shells were dried and weighed, and weights of albumen were obtained by difference. Eggs were collected for fatty acid analysis in the fourth wk of feeding experimental diets. No significant differences were found between feed treatments for egg production, feed consumption, feed efficiency, body weight change, or egg quality. The lipids in the HSM were made up of 60% linoleic acid and 12% α-linolenic acid, with 16% oleic acid, and lesser amounts of palmitic, stearic, and γ-linolenic acid. Eggs produced by hens fed increasing levels of HSM had lower levels of palmitic (29% without HSM, 25% with 20% HSM) and higher levels of linoleic (15% without HSM, 22% with 20% HSM) and α-linolenic acid (2% without HSM, 1.2% with 20% HSM). The HSM provided useful amounts of energy and protein in layer diets and feeding it altered the fatty acid composition of eggs produced.

Key Words: Hempsed meal, Egg production, Egg quality

172 Utilization of Different Soy Products Affected by Age in Chicks. Amy Batal1 and Carl Parsons2, 1The University of Georgia, 2University of Illinois.

Two experiments were conducted to evaluate the utilization of several different soy products at different ages in New Hampshire X Columbian male chicks. Six pens of eight chicks were fed dextrose-protein source diets (23% CP) containing one of 10 different protein sources from 0 to 21 d of age. Excreta were collected at 0-2, 3-4, 7, 14, and 21 d of age and apparent metabolizable energy (MEa) and amino acid (AA) digestibility were determined using acid insoluble ash as a marker. Protein sources evaluated were: Experiment 1 - casein, soybean meal (SBM), soy protein concentrate (SPC), and soy protein isolate (SPI); Experiment 2 - raw soyflakes, SBM, Williams 82 soybeans, heated Williams 82 soybeans, Kunitz-free soybeans, lectin-free soybeans, and Kunitz and lectin-free soybeans. In Experiment 1, chicks fed the dextrose-SBM diet had the highest (P < 0.05) weight gains at the end of three wk. When comparing the MEa and AA digestibility values among diets at the same age, the ranking (from highest to lowest) of the four diets was: casein, SPI, SPC, SBM. The MEa values increased (P < 0.05) with age for all four diets, with the increase being much smaller for the casein diet (3%) than the soy diets (mean increase 11%). In Experiment 2, the SPC diet yielded the highest (P < 0.05) growth performance, MEa, and AA digestibility values. The MEa and AA digestibility values of the Williams 82 soybeans, Kunitz-free soybeans, and lectin-free soybeans were quite low. In general, the Kunitz and lectin-free soybeans yielded higher growth performance and MEa values than the Williams 82 soybeans, Kunitz-free soybeans, and lectin-free soybeans. The MEa values increased with age for most diets and AA digestibility increased with age for the soyflakes and Kunitz and lectin-free soybean diets. Our results suggest there may be some potential benefits of feeding SPC or SPI during the first 1 to 3 wk posthatching and that underprocessed (under heated) soybeans should definitely not be included in the diet of the very young chick.

Key Words: Soybean meal, Soybeans, Amino Acid digestibility, Metabolizable energy

173 Effect of soybean lecithin on growth and nutri-

tent digestibility in turkey poult. Y.O. Fasina1, J.D. Garlich2, H.L. Classen1, H.E. Swaisgood2, P.R. Ferket2, G.B. Havenstein2, and J.L. Grimes1, 1University of Saskatchewan, Saskatoon, Saskatchewan, Canada, 2North Carolina State University, Raleigh, NC, USA.

Soybean meal is the major protein supplement in poultry diets. Levels of antinutrients such as lectins are reduced by the desolventization-toasting process during commercial meal production. However, Maenz et al. (1999) observed a considerable range of residual lectin activity (0.2 to 0.6 mg SBL/g meal) in commercially processed soybean meals. Because the meal is usually included at high levels (30 to 50%) in young turkey diets, residual lectin levels in these diets may become high enough to cause antinutritional effects. An experiment was conducted to investigate the effect of soybean lecithin (SBL) on performance characteristics and nutrient digestibility in turkey poult. Soybean lecithin was purified by affinity chromatography, and incorporated into a casein-corn starch based semi-purified diet at 0.00 and 0.048% level. The two semi-purified test diets were compared to a corn-soybean meal diet to make a total of three dietary treatments. All diets contained 0.5 % titanium dioxide as an indigestible marker. Each treatment was fed to 56 poult in four pens (14 poult per pen) from 0 to 14 d of age. Body weight gain, feed intake and feed efficiency (gain-to-feed ratio) of birds were recorded on days 7 and 14. Fecal samples were collected during days 5 to 7 and days 12 to 14 of the experiment. Weight gain and feed efficiency of poult fed the semi-purified diets were comparable to those of birds fed the corn-soybean meal diet. Soybean lecithin had no effect (p > 0.05) on weight gain, but improved feed efficiency (p < 0.05). In addition, poult fed the lectin-containing purified diet absorbed more fat (p < 0.05) and did not differ in starch digestibility, when compared to poult fed the lectin-free purified diet. It was concluded that the presence of SBL up to 0.048% level of the diet is not harmful to turkey poult.

Key Words: Soybean lecithin, Soybean meal, Turkey poult.


Guar meal contains high concentrations of protein and indigestible galac-
tomannan polysaccharide. Two experiments examined effects of guar meal fractions (hull and germ) and beta-mannanann enzyme (Hemicell18) on growth performance and intestinal viscosity in broiler chicks. In Experiment 1, 360 day-old birds were randomly assigned to six six-bird replicates per treatment group fed diets containing 0, 2.5, 5.0, 7.5 and 10% of either guar fraction. At 20 days, three birds from each replicate were weighed, and liver, gizzard, bursa, pancreas, spleen, and intestines removed. Each organ and intestinal segment, duodenum, jejunum, ileum,
175 Evaluation of nine commonly used fat sources for inclusion in broiler diets. J. Brake, B. Lenfesty*1, and P. Greenberg2, 1 North Carolina State University, Raleigh, NC USA, 2Bedson Business Group, Guatemala City, Guatemala.

Broiler diets around the world use a large variety of fat sources. Availability and cost determine the types of fat used. There has been concern regarding the relative nutritional values of these fat sources. Therefore, it was of interest to compare fat sources that are commonly used. This experiment was designed to evaluate the growth, feed efficiency (FCR), and livability of Cobb 500 male broilers fed corn-soy diets containing one of the following fat sources (ME formulation value, kcal/g): yellow grease/animal fat/vegetable oil combination (blend) (8600), fish oil (8400), yellow grease (8600), lard (8600), lecithin (7500), poultry fat (8800), palm oil (8600), soy soapstock (6200), or beef tallow (7500). There were four replicates per dietary treatment with 25 birds per pen. ME values of the starter, grower, and finisher diets were 3.10, 3.15, and 3.12 kcal/g, respectively. Kemin Orogrow2 pigment was included in the grower and finisher feeds to stimulate pigmentation. At 49 d of age, the birds fed the diets containing blend, yellow grease, poultry fat, lard, and beef tallow had significantly higher body weights (3425 g, 3413 g, 3413 g, 3430 g, and 3388 g, respectively) than those of the fish oil diet treatment (3248 g) with the soy soapstock, palm oil, and lecithin treatments being intermediate. Lard and yellow grease treatments had a significantly improved FCR at 49 d of age (1.93 and 1.90 g/g) compared to poultry fat and lecithin (2.12 and 2.13 g/g). The color fan, shank color was measured visually to indicate pigment deposition. The deepest pigment (11) was measured in the yellow grease and lard treatments with the least color (9) in the poultry fat and soy soapstock treatments. These results indicate that fat source does affect the performance of male broilers, but the differences are relatively small when diets are formulated using the values shown above.

Key Words: Dietary Fat, Pigmentation, Fat, Grease, Oil

176 Effect of germinated barley on growth performance and viscera weight of broiler chicks. T. Ao1, C. R. Richardson2, A. H. Cantor3, K. A. Dawson4, A. J. Pescatore1, and M. J. Ford1, 1University of Kentucky, Lexington, KY USA, 2Texas Tech University, Lubbock, TX USA, 3Altech, Inc., Nicholasville, KY USA.

Germinated (malted) barley contains high levels of endogenous enzymes that can affect its digestibility. The objective of this study was to compare the effects of feeding germinated and ungerminated barley on growth performance and viscera weight of broiler chicks. Treatments consisted of feeding diets containing 40, 45, or 50% of either germinated or ungerminated barley in a 3 X 2 factorial arrangement. Diets containing 40% barley contained 10% sand and met or exceeded NRC (1994) requirements for protein, amino acids, minerals and vitamins. Additional barley was added at the expense of sand. At 10 days of age, 210 male chicks were uniformly distributed by weight to provide six replicate cages of six chicks per treatment. After 14 days of feeding, germinated barley (vs. ungerminated) significantly (P < 0.05) increased BW (647 vs. 622 g), decreased feed conversion of broilers fed both total feed intake (3018 vs. 1067 g) and adjusted feed intake (feed minus sand) intake (966 vs. 1013 g), and lowered both feed to gain ratio (1.58 vs. 1.72) and adjusted feed to gain ratio (1.50 vs. 1.63). Increasing the level of barley (40, 45 and 50%) significantly decreased feed intake (1068, 1050 and 1101 g) and the feed to gain ratio (1.74, 1.66, and 1.55), but increased adjusted feed intake (961, 971, and 1001 g, respectively). Viscera were measured in two birds per cage at the end of the study. Germinated barley (vs. ungerminated) significantly decreased absolute gizzard weight (18.3 vs. 21.7 g), relative gizzard weight (as % of BW) (2.11 vs. 2.62%), absolute pancreas weight (2.59 vs. 2.93 g), relative pancreas weight (0.30 vs. 0.35%) and relative proventriculus weight (0.56 vs. 0.60%). Relative pancreas weight was significantly decreased with increasing levels of barley (0.34, 0.33, and 0.31% for 40, 45 and 50% barley, respectively). The results demonstrate that the use of germinated barley (vs. ungerminated) improves growth performance and reduces viscera weight of growing broilers.

Key Words: Guar Meal, Broiler, Beta-mannanase, Viscosity

177 True Metabolizable Energy and Amino Acid Availability of Three Drought Tolerant Barley Varieties. A. H. Darwish1, M. T. Farran2, G. W. Barbou3, N. Usaryan3, H. H. Marzouk4, M. G. Uwajian1,4, and V. M. Ashkarian5, 1Lebanese Agricultural Research Institute, 2American University of Beirut, 3Lebanese University.

An experiment was conducted to determine the TME, TMEa, AME, and AMEa, and apparent and true amino acid availability of three drought tolerant barley varieties. Forty intact mature Babcock 508 roosters were raised in individual metabolism cages with common trough waterers. Thirty two roosters were precision fed 40 g corn and barley varieties of Litani (L), Rihan (R), and Pamir (P) after a fasting period of 48 h. A group of eight roosters was precision fed 40 g of glucose instead of no feed in order to correct for nitrogen endogenous losses. Each feed ingredient was randomly distributed among 8 birds. The crude protein content of corn, L, R, and P were 10.45, 15.16, 15.46, and 15.35% on DM basis, respectively. The amino acid concentrations were similar among the three barley varieties but higher than that of corn. The AMEa and TMEa values (in parentheses) of L, R, and P were 2898 (3224), 2926 (3253), and 3093 (3419) kcal/kg DM, respectively. Although not significantly different from each other, the AMEa and TMEa values of all barley varieties were lower than those of corn (P<0.05). True availability of valine and isoleucine in L and leucine in L and R were lower than those of corn (P<0.05). The current study showed that metabolizable energy values of L, R, and P were comparable but lower than that of corn. The true availability of some amino acids, however, was lower in L and R only.

Key Words: TME, TMEa, True Amino Acid Availability, Barley varieties

178 Muscle Fatty Acid Composition and Thio-bitaric Acid Reactive Substances of Broilers Fed Different Cultivars of Sorghum. G. Cherian*, R.K Selvaraj1,2, M.P Goeger3, and P.A Stitt1, 1Oregon State University, Corvallis, Oregon, 97331-6702, 2ENERCO, Wisconsin, 54220.

Two experiments were conducted to evaluate the production parameters, muscle fatty acid composition and lipid stability of broilers fed four different cultivars of sorghum. A total of 900 birds were used for the two trials. Experiment 1 used ruby red and valpo red and experiment 2 used kinsman and mason cultivars of sorghum. The basal diet consisted of a corn, soy, fish meal and sorghum cultivars were substituted at 10 or 5% in experiment 1 and 2. No significant difference was observed for body weight, feed consumption or feed efficiency (P>0.05). The total lipids and polyunsaturated fatty acids were lower than those of corn (P<0.05). The total lipid concentration, muscle and liver were significantly higher in the leg muscle of birds fed kinsman cultivar when compared to Kinsman or control diet. The content of n-3 polyunsaturated fatty acids were higher (P<0.05) in the breast and leg muscle of birds fed ruby red, kinsman and mason cultivars of sorghum. The results from the present study demonstrate that sorghum could replace corn up to 10% in broiler rations without affecting production parameters. The meat quality with
179 Global Corn Quality Variance. T.H. D’Alfonso*1, and K. McCracken2, 1Finifeds International, Ltd., 2Queens University of Belfast.

Commercial corn samples (N=95) were obtained from 15 countries. In-vitro measurements included total starch, amylozy, amylodextrin, rate of starch digestion (RSD) at time intervals up to 120 minutes, and protein dispersibility index (PDI) in potassium hydroxide. Samples were used in corn-soybean meal starter diets for male broilers to compare rate of growth, feed consumption and feed conversion (FCR) at 28 d. There were significant differences (P < 0.01) among countries in all in-vitro measurements and in rate of gain and feed consumption, and in FCR (P < 10). There were strong co-variances among in-vitro measurements, and some measurements were more variable than others. The coefficient of variation (CV = sd / mean) for starch was only + 3% (63%–74%), mean = 68%, sd = 2%); however, while the total starch remained relatively constant, amylodextrin varied from 11% to 21% (mean = 16%, sd = 2%), and amylopectin varied from 48% to 50% (mean = 52%, sd = 3%). The correlation between amylozyme and amylopectin was .66 (co-variance = −3.8%), which explains why the variance of starch is less than the sum of variance of amylozyme and amylopectin. The RSD (percent of starch degraded) was measured in intervals starting at 7 minutes, where the amount varied from 17% to 37% (mean = 28%, sd = 4%), and ending after 120 minutes where the RSD ranged from 68% to 87% (mean = 80%, sd = 4%). PDI ranged from 41% to 75% (mean = 64%, sd = 7%) and was positively correlated with RSD at 120 minutes (r = +.40). Protein was negatively correlated with total starch, but not strongly (r = -.17). Rate of gain was associated with feed intake (r = +.72), starch (r = -.63), amylopectin (r = -.41). PDI (r = +.45), while feed intake was related to starch (r = -.52), amylopectin (r = -.45), dry matter (r = -.28) and PDI (r = +.42). Dry matter and protein were significantly correlated with improvements in FCR (r = -.68, -.21, respectively).

Key Words: Corn, Variability, Amylopectin, Amylose, Digestibility

180 The effect of a new variety of triticale (Bogo) on the performance of broilers and layers. James C. Hermes* and Rebecca C. Johnson, Oregon State University, Corvallis, OR.

Two trials were conducted to determine the feeding value of triticale (Bogo) for broiler and laying type chickens. In trial 1, diets were formulated to contain 0, 5, 10, or 15 percent triticale while maintaining the appropriate nutritional requirements for broilers from hatch to 6 weeks of age. One thousand two hundred commercial broiler chicks were randomly divided into 12 groups with 100 birds in each group, which provided 3 replicates for each dietary treatment. The birds were placed in temperature and light controlled floor pens, on fir shavings. Feed and water were available ad libitum. Birds and feed were weighed at the conclusion of the trial to determine body weight gain and feed consumption. Mortality was recorded for each pen on a daily basis. In trial 2, 192, 51 week old Dekalb XL layers were housed in individual cages and divided into 12 groups of 16 birds and randomly assigned to one of 3 replicate treatments of 4 diets. The diets consisted of 0 or 30 percent triticale (Bogo) and either 0 or 0.05 percent Avizyme 1202 Finn Feeds in the diet. Body weight, feed consumption, and egg production were measured at 0, 14, and 28 days as were egg traits such as egg weight, albumen height, and yolk color. The results indicated that there was no significant difference in performance of broilers fed the various levels of triticale in the diet compared to the control. In layers, only yolk color show a significant difference due to the diet with the birds fed triticale having paler yolks compared to the control diet. This work shows that triticale (Bogo) can be fed to either broiler or layer chickens without affecting their performance. Longer term feeding for a layer flock, through an entire egg production cycle, may be warranted to determine the limit of yolk color change that would result from feeding triticale (Bogo) long term.

Key Words: Triticale, Chicken, Broiler, Layer, Performance

181 Toasting at low moisture prevents browning and protein damage in canola meal. R.W. Newkirk1 and H.L. Classen*1, 1University of Saskatchewan, SK, Canada.

The commercial desolventization/toasting process used during pre-press solvent extraction of canola can cause browning and reduced amino acid content and availability in the meal. After solvent extraction the meal contains approximately 40% moisture which is then injected into the meal during desolventization increasing the moisture content to between 14 and 18% and increasing the temperature to between 100 and 115°C. Maillard reactions, which appear to be responsible for the reduced nutritional value of the meal, require heat and some moisture to proceed. Therefore it was hypothesized that reducing the temperature or moisture content during desolventization/toasting of canola meal may reduce Maillard reactions, and losses in its nutritional value. To test the effects of moisture and temperature during toasting on the nutritional value of canola meal, air desolventized, commercially extracted canola white flake, was toasted for 10 minutes in a 4 x 4 factorial experiment with four levels of moisture (7, 10, 14 and 18%) and four temperatures (100, 105, 110 and 115°C). There was a main effect of moisture on the color, amino acid and NDIN content of the meal. The meal became darker in color (decreased reflectance at 420 nm), contained less Lys, Arg, Cys, His, Leu, Lys, Met, Phe, Thr and Val and more NDIN with increasing moisture. Similarly there was a main effect of temperature on the appearance and nutritional value of the meal, which decreased at elevated temperatures. There were interactions between temperature and moisture level for color, amino acid content and NDIN level in the meal. At low moisture content, temperature had little affect on these parameters, while at elevated moisture content, the meal became darker, contained lower levels of amino acids and more NDIN with increasing temperature. Therefore it is concluded that reducing the temperature and especially the moisture content during desolventization/toasting of canola meal should result in a lighter colored meal with higher nutritional value.

Key Words: Toasting, Canola meal, Amino acid
183 Financial impact of removing health-promoting antibiotics from US broiler diets. S. Shane*, 1, 1, North Carolina State University.

Regulatory authorities in the USA are contemplating withdrawing approval of feed-additive growth and health-promoting antibiotics in broiler diets. Two compounds with proven efficacy against Gram-positive intestinal flora have been used for over 25 years without adverse reaction and with consistent activity. Neither product has been scientifically proven to be responsible for transferable drug resistance to human pathogens. Neither compound has an exclusive human therapeutic analogue. The banning of four feed-additive antibiotics by the EU in 1998, was not based on a scientific, structured, and comprehensive risk assessment incorporating appropriate factors and costs. The potential loss to the US Broiler Industry was projected applying current production values and costs. Deterioration of 0.05% in feed conversion ratio (FCR), corresponding to a decline of 0.017, was calculated as the breakeven value following antibiotic deletion, assuming a delivered feed cost of $140/tom, antibiotic medication at $1.25 ton, 5.2 lb live-weight, 1.95 FCR and 160 million broilers/week. With a realistic 5% deterioration in FCR attributed to antibiotic withdrawal, as verified by field studies, the US Industry could incur an additional annual feed cost of $294 million. A benefit to cost ratio of 5.5 was calculated for the two approved antibiotic additives. The additional cost resulting from decreased livability and growth consequential to clostridial infections, including necrotic enteritis, botulism and dermatitis, will exceed $108 million, for each 1% decline in output, assuming a live bird cost of 25c/lb. The incremental consumption of feed as a result of inferior FCR corresponds to an additional 1.5 million tons of corn and 0.6 million tons of soybeans annually.

Key Words: Antibiotics, Financial cost, Broilers


Brown algae (class Phaeophyceae), sea plants, including Ecklonia cava, Sargassum fulvellum, Undaria pinatifida, and Hizikia fusiforme growing well in the coast of Korean Peninsula are known to be abundant in immune modulators. The aim of this study was to investigate the effects of the dietary brown algae on immune responses and growth in experimental animals, mice and chicks. In the first experiment, water soluble extracts (WSE) from two of the brown algae, Ecklonia cava and Sargassum fulvellum were carried out to examine the cellular and gut immune responses with macrophages and small intestinal epithelial cells. To approach these tests, the techniques of ELISA, immunoblotting, and RT-PCR were used. The results showed that WSE significantly induced secret tumor necrosis factor (TNF-) and interleukin-1 (IL-1) from the macrophages. This results found out by the ELISA technique was also confirmed by the techniques of immunoblotting and RT-PCR. These data suggested that WSE had a possibility to be used as the cellular immune reinforcement. Since gut immune response is very important in animal, it was examined whether WSE would regulate small intestinal epithelial cells or not. WSE significantly induced productions of the IL-1 and IL-6 from small intestinal epithelial cells which is the one of the most important cell in the gut immune system. These data made us hope for the agent that strengthen cellular and gut immune system, so as like oral agents. The second experiment was conducted to investigate how the dietary seaweeds affect performances of broiler chicks. Ecklonia cava was dried, ground by use of hammer mill, and supplemented into broiler diets at the levels of 0, 0.1, 1.0 and 3.0%. The dried algae contained TMEn of 2020 kcal/kg, 9.0-11.3% CP, 35.4% of availability of amino acids. The body weight gain and feed conversion rates were improved by its dietary supplementation at all the levels significantly (p < 0.05). Any negative responses in broiler performance were not found upon their dietary supplementation

Key Words: Brown algae seaweed, Water soluble extract, Mice, Chicks, Cellular and gut immune responses

185 Efficacy of esterified glucomannan to counteract mycotoxicosis in broilers fed with naturally contaminated feed. K. L. Aravind, G. Devegowda*, and V.S. Patil, University of Agricultural Sciences, Bangalore, India.

An experiment was conducted in broiler chickens to evaluate the efficacy of esterified glucomannan (EGM) (Mycosorb, Alltech, Inc.) in ameliorating adverse effects of various mycotoxins present in naturally contaminated diet. The basal diet was prepared to contain no mycotoxins at detectable levels. The naturally contaminated diet was formulated to the nutrient specifications similar to the basal diet by replacing basal diet corn with the naturally mycotoxin-contaminated corn. The contaminated diet was found to contain 168 ppb aflatoxin, 8.4 ppb ochratoxin, 54 ppb zearalenone and 32 ppb T-2 toxin. Two hundred and eighty day-old broiler chicks were randomly allotted to four dietary treatments of seventy chicks each: 1) basal diet; 2) basal diet + EGM (0.05%); 3) contaminated diet; and 4) contaminated diet + EGM (0.05%). Treatment effects on performance, organ weights, and serum biochemical variables were evaluated.

Contaminated diet significantly (P < 0.05) decreased the body weight (9.51%), feed consumption (7.09%) and resulted in poor feed efficiency (2.35%) when compared to control. Supplementation of esterified glucomannan at 0.05% to the contaminated diet improved (P < 0.01) the weight gain (9.7%), feed intake (5.32%) and feed efficiency (3.15%). Significant increase (P < 0.05) in the weights of liver (24.9%) and gizzard (12.06%) was observed in chicks fed contaminated diet. EGM supplementation to the contaminated diet did not decrease (P < 0.05) the organ weights. Furthermore, feeding contaminated diet was associated with significant decrease (P < 0.05) in uric acid levels (24.25%) and increase in gamma glutamyl transferase activity (9.63%); however, urea nitrogen concentration was improved (14.3%) with the addition of EGM. These results indicate that EGM at 0.05% level considerably prevented the growth inhibitory effect of mycotoxins in naturally contaminated feed.

Key Words: Mycotoxicosis, Contaminated feed, Esterified glucomannan, Broilers

Physiology

Reproduction II

186 Inhibitory and stimulatory effects of serotonin (5-HT) on prolactin (PRL) secretion in the turkey. O.M. Youngren and M.E. El Halawani*, Department of Animal Science, University of Minnesota, Saint Paul, MN.

Serotonin has been shown to have stimulatory influences on PRL secretion in avian species. This effect is mediated centrally via a pathway that includes dopamine (DA) and vasoactive intestinal peptide (VIP). However, microinjections of 5-HT (50-200 ng) into the ventromedial nucleus of the hypothalamus (VMN) or into the preoptic area (POA) appeared to cause a small but gradual inhibition of PRL secretion. Results of a recent study from our laboratory indicated the presence of a monosynaptic DAergic pathway from the POA to the infundibular nuclear complex (INF) that is stimulatory for PRL secretion. The present study was designed to investigate the interaction between the stimulatory DAergic pathway and the inhibitory effect of 5-HT on PRL secretion in the turkey. When 5-HT microinjections in caudal VMN were combined with low-level electrical stimulation (ES; 50 microamps) of the POA, the ES failed to increase PRL secretion to the same degree as in vehicle-injected controls. Conversely, microinjections of 5-HT into the rostral VMN enhanced ES-induced PRL secretion, even though it had no effect on its own. Serotonergic inhibition of PRL secretion could be effected by decreasing DAergic stimulation of VIP, or by increasing DA release from the median eminence to the anterior pituitary, where it is known that DA inhibits PRL secretion by antagonizing the effect of VIP. The data implies that 5-HT may play a dual role in the avian hypothalamus regarding the regulation of PRL secretion. USDA Grant No. 00-02127

Key Words: Serotonin Inhibition, Dopamine Stimulation, Vasoactive intestinal peptide, Avian Prolactin regulation, Turkey Hypothalamus