to the egg and chicken prices have reduced in real terms over the last decade.

In Mexico per-capita consumption of chicken has increased from 15.83 kg in 1994 to 25.8 kg. In 2012, for 2013, it is estimated that chicken consumption reaches 25.9 kg.

The main consumer of egg in the world is Mexico. The Mexican per-capita consumption is 20.8 kg egg, almost an egg a day. In second place is China with 20.4 Kg thirdly Singapore with 18.8 kg; Japan fourth with 16.3 kg, and the fifth United States with 15.5 Kg. But the important question is whether this trend will keep 2025 and relevant activities or strategies, this is obtained by econometric modeling technique, and the variables that can positively or negatively alter this trend.

Approaches to economical forecasting

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T116 Evaluation of the efficacy of smectite clays, yeast cell walls and activated beta glucans on the toxicological effects of aflatoxins, fumonisins, and T-2 toxin in broiler chickens Coen Smits*, Anna-Katharina Oudshoorn, Yanning Han Nutreco Research & Development, Boxmeer, Netherlands

A mycotoxin toxicity experiment was carried out with broiler chickens to evaluate the efficacy of an anti-mycotoxin additive (AMA) consisting of smectite clays, yeast cell walls and activated beta glucans. The study was conducted by Instituto SAMITEC (Brazil). The aflatoxins (B1, B2, G1 & G2), fumonisins (B1 & B2), and T-2 toxin used in the study were produced by fungi of Aspergillus parasiticus, Fusarium moniliforme, and Fusarium sporotrichioides, respectively. A total of 300 1-day-old male chicks were used in five dietary treatments with six replicates each (10/pen). The treatments included (1) control, (2) control + AMA (0.5%), (3) control + 2.8 ppm of Aflatoxins, 100 ppm of fumonisins, and 1.5 ppm of T-2 toxin, (4) Treatment 3 + AMA (0.25%), and (5) Treatment 3 + AMA (0.5%). The birds received feed and water ad libitum. At day 21, the birds were slaughtered to determine the relative liver weight, total plasma proteins, and sphinganine/sphingosine ratio. Compared to the control animals, the mycotoxins significantly and severely reduced 21-day body weight (-69.34%), feed intake (-65.42%), and total plasma proteins (-44.44%), while increasing the relative liver weight (+72.72%) and the sphingamine/sphingosine ratio (+492.22%). However, addition of the AMA significantly improved all the parameters above, with the efficacy more pronounced at 0.5%. Compared with birds with mycotoxins alone, AMA at 0.5% increased 21-day body weight (+29.20%), feed intake (+28.47%), and plasma protein (+53.88%), while significantly decreased relative liver weight (-12.21%) and the sphinganine/sphingosine ratio (+40.15%). It was concluded that the AMA, consisting of smectite clays, yeast cell walls and activated beta glucans, significantly decreased relative liver weight (-12.21%) and the sphinganine/spingosine ratio (+492.22%). It was concluded that the AMA, consisting of smectite clays, yeast cell walls and activated beta glucans, significantly decreased relative liver weight (-12.21%) and the sphinganine/spingosine ratio (+492.22%).

Key Words: Broiler, poultry, nutrition, econometric, formulation

T117 Supplementation of broiler diet with a mixed enzymes and direct fed microbial combination improves litter quality and reduces foot pad lesion score Yueming Dersjant-Li*, Karin van de Belft*, Jan Dirk van der Klis*, Ajay Awati* Danisco Animal Nutrition/Dupont, Marlborough, United Kingdom; Schohorst Feed Research B.V, Lelystad, Netherlands

This study determined the response of broilers fed a diet containing mixed enzymes (xylanase, amylase and protease) and direct fed microbial (DFM, containing three Bacillus strains) under commercial production settings. Two dietary treatments including a control and a test diet (control diet supplemented with test products) were used in a completely randomized block design with five replicate pens per treatment. A total number of 7000 day-old male broilers (Ross 308) were distributed over 10 floor pens (700 birds per pen) with fresh wood shavings as bedding material. Pelleted diets were fed at ad libitum in a three-phase feeding program and water was freely available. The test treatment significantly improved litter dry matter content and litter score. This was associated with low water to feed ratio and high ileal digesta DM content in the test group. As a result, a reduced foot pad lesion score was found in the test group (Table 1). Moreover, the supplementation of the enzymes and DFM combination reduced Ca (P=0.057) and soluble P (P<0.05) content in the litter on dry matter basis. Numerically lower C. perfringens population was observed in the ileal (log 7.2 vs 8.3) and cecal (log 8.8 vs log 9.7) digesta of broilers fed the test diet when compared to the control. In conclusion, this study showed that supplementation of xylanase, amylase, and protease enzymes in combination with Bacillus DFM to broiler diet resulted in improved animal welfare parameters as indicated by improved litter quality and reduced foot pad lesion score in broilers under commercial production settings.

Table 1. Effect of enzymes and DFM combination on litter composition and foot pad lesion score in broilers produced under commercial production settings

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Control + additive</th>
<th>SEM</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water/feed-ratio</td>
<td>1.84±</td>
<td>1.79±</td>
<td>0.01</td>
<td>0.016</td>
</tr>
<tr>
<td>Ileal digesta DM, % d41</td>
<td>16.6</td>
<td>17.3</td>
<td>0.58</td>
<td>0.39</td>
</tr>
<tr>
<td>Litter quality score, d 21</td>
<td>5.3±</td>
<td>6.5±</td>
<td>0.41</td>
<td>0.026</td>
</tr>
<tr>
<td>Litter dry matter, % d 41</td>
<td>45.5±</td>
<td>50.3±</td>
<td>1.31</td>
<td>0.006</td>
</tr>
<tr>
<td>Litter Calcium, % on DM basis d 41</td>
<td>13.58</td>
<td>12.62</td>
<td>0.34</td>
<td>0.057</td>
</tr>
<tr>
<td>Litter soluble P, % n DM basis d 41</td>
<td>2.32±</td>
<td>1.84±</td>
<td>0.19</td>
<td>0.04</td>
</tr>
<tr>
<td>Foot pad lesion score, d 41</td>
<td>2.47±</td>
<td>2.06±</td>
<td>0.14</td>
<td>0.04</td>
</tr>
</tbody>
</table>

a,b: Means in a row without a common superscript differ significantly (P<0.05);
Ammonia volatilization from poultry litter often leads to a high concentration of atmospheric ammonia that negatively impacts bird performance, increases susceptibility to respiratory diseases in poultry, and is also harmful to farm workers and the environment. Litter amendments for reducing ammonia volatilization, such as aluminum sulfate treatment, can only be applied when the house is empty, reducing their effectiveness and increasing down time of the house. Direct-fed microbials (DFM) are naturally occurring beneficial microorganisms shown to have positive effects on animal health and performance when given in appropriate quantities. DFM have been shown to improve overall bird gut health and performance, reduce incidences or food safety associated pathogens and necrotic enteritis, and can be easily and continuously administered via feed. In this research a Bacillus spore-based DFM (Sporulin®; Pacific Vet Group, USA Inc.) was shown to reduce ammonia volatilization from feces of treated birds. Broiler chicks were raised in isolator units and fed a diet containing 10⁶ spores/g for two weeks, after which the feces were collected and analyzed for ammonia volatilization, spore concentration, and water content. Feces from the treatment group were found to have a >75% (P<0.01) reduction in total ammonia volatilization over a 48H time period as compared to the control group. The fecal water content of the treatment group was reduced 30% (P<0.01) as compared to the control group, likely explaining part of the reduction in ammonia volatilization. A 3 log increase in fecal spore concentration was also seen in the treatment group (P<0.01), possibly contributing to the lower ammonia emissions. This research indicates that some DFM, such as Sporulin, can provide a potent and continuously administered method of controlling ammonia volatilization in poultry litter.

Key Words: direct fed microbial, Bacillus, probiotic, ammonia, litter

Organic poultry farming is one of the fastest growing segments of the poultry industry. The increase demand of organically grown poultry has led to the increased concern of increases in foodborne pathogens on these products. With the increase demand for poultry and poultry product that are raised on organic feedstuffs, this study was conducted to evaluate the effects of lactose (LO), caprylic acid (CA), or both for reducing Salmonella Typhimurium and Clostridium perfringens in chicks fed organically certified feedstuffs. One hundred commercial day-old non-vaccinated chicks were randomly divided into four groups of 25 birds each: control (no LO or CA), 2.5% LO, 0.7% CA or a diet containing 2.5% LO and 0.7% CA. Water and feed were provided ad libitum. On day 3, birds were inoculated with 6.0 log CFU of Salmonella Typhimurium by crop gavage. On days 17, 18 and 19 birds were inoculated with 7.0 log CFU mixture of four Clostridium perfringens strains by oral gavage. On day 21, twenty birds from each group were euthanized, Salmonella populations in the cecum, Clostridium populations in the small intestine were enumerated, necrotic enteritis lesion scores and weigh changes were determined. The study was replicated three times. Feed intake and body weight did not differ between the groups. LA supplementation consistently increased (P < 0.05) Salmonella populations recovered from the LA only treated birds versus the controls. CA or CA +LO supplemented birds were not significantly different than the non-supplemented control birds for Salmonella. No differences in Necrotic enteritis lesion scores were observed in chickens supplemented with any treatment. Clostridium perfringens counts in the small intestine of CA, LO, and LA + CO supplemented birds were significantly lower than those of control birds on day 23. The results suggest that prophylactic LO or CA supplementation through feed can reduce Clostridium perfringens concentrations in the gastrointestinal tract of chicks and may be a useful treatment for reducing Clostridium perfringens carriage in chickens fed organic feedstuffs.

Key Words: Broiler, Direct-fed microbial, Bacterial chondronecrosis and osteomyelitis, Performance

Research was conducted to investigate the effects of feeding Original XPC™ and bacitracin or virginiamycin to broilers during a necrotic enteritis challenge. Jonathan Broomhead¹, Don McIntyre¹, Greg Mathis², Brett Lumphkins². Pacific Vet Group, USA Inc, San Antonio, TX, 2Southern Poultry Research, Inc., Athens, GA

Research was conducted to investigate the effects of feeding Original XPC (a Saccharomyces cerevisiae fermentation product) alone, or in combination with virginiamycin (VIR) or bacitracin methylene disaccharide (BMD) during a necrotic enteritis (NE) challenge caused by Clostridium perfringens. Cobb chicks (n=448) were divided into 7 treatments at 1 d of age, with 8 replicate pens per treatment and 5 birds per pen. The treatments were: 1) non-treated, non-infected (NC), 2) non-treated,
infected (PC), 3) XPC treated, infected (XPC), 4) VIRA treated, infected (VIR), 5) XPC plus VIRA treated, infected (XPC-VIRA), 6) BMD treated, infected (BMD) and 7) XPC plus BMD treated, infected (XPC-BMD). Additives were fed from 1 to 28 d, with dietary inclusion rates of VIR, BMD and XPC at 22.55 and 1250 g/metric ton, respectively. At 14 d, all birds received 5000 oocysts of Eimeria maxima via oral inoculation. At 19, 20, and 21 d, birds in all treatments except NC were inoculated with 10^6 cfu of C. perfringens. On 21 d, 6 hr after the final dose of C. perfringens was administered, all birds were weighed and 3 birds per pen were euthanized and intestines scored for NE lesions. The challenge (PC vs. NC) increased (P < 0.05) mortality, NE lesions, and feed conversion (FCR; 14-21 d and 0-21 d) and decreased (P < 0.05) body weight gain (BWG; 14-21 d) significantly. During the week of the challenge (14-21 d) lesion scores and FCR were lower and BWG greater in all treated groups compared (P < 0.05) to PC. Lesion scores, 14-21 d BWG and 0-21 d FCR were statistically similar (P > 0.05) between NC and XPC-VIR, indicating a beneficial additive effect of combining XPC and VIR. Overall, XPC, VIR or BMD reduced NE lesions and the negative performance effects of the C. perfringens. The combination of XPC and VIR resulted in the best performance and lesion reduction during the NE challenge.

**Key Words:** broilers, Original XPC, Clostridium perfringens, necrotic enteritis

### T122 Efficacy of a feed additive blend containing coated butyrante, mannobiose and either medium chain fatty acids or essential oils in reducing Salmonella enteritidis transmission in broilers chickens

Coen Smits1, Alfredo Corujio Fernández, Petra Roubos, Yarning Han Nutreco Research & Development, Boxmeer, Netherlands

This experiment was set up to study the effect of blends of coated butyrante, mannobiose in combination with essential oils or medium chain fatty acids on transmission of *Salmonella enteritidis*. The experiment was performed with 1500 male broilers at the Nutreco Poultry Research Centre in Spain. The animals were randomly distributed in 30 floor pens (50 birds/pen). The treatments included (1) control, (2) a blend of butyrante, mannobiose and essential oils (1.5 kg/tomne from 0 to 42 days, (3) as (2) but given at a higher dose of 3.0 kg/tomne in from 0-21 days and at 1.0 kg/tomne from 22-42 days, (4) as (2) but the essential oils were substituted by medium chain fatty acids, (5) as (4) with the dosing of treatment 3. The essential oils contained encapsulated thymol and cinnaimaldehyde. There were 6 replicates per treatment. Three birds were infected per pen by oral gavage with 1 ml inoculum (Salmonella enteritidis 10^6 cfu/g) at days 7 and 8 and served as seeder birds, with the other birds not infected. In total, ten non-infected birds were randomly selected from each pen at day 21, 30 and 40 to determine the individual Salmonella status in the caeca. The results demonstrated that all treatments 2, 3, 4 and 5 with either essential oils or medium chain fatty acids had a lower Salmonella prevalence at day 21, 30 and 42 days compared to the control pens. The most pronounced and significant effect was found with the blend of butyrante, mannobiose and medium chain fatty acids. Furthermore, the reduction of colonization was more pronounced when a higher dose was used in the starter phase, than using the same dose all over the experimental period. It can be concluded that the transmission of *Salmonella enteritidis* may be effectively reduced by a combination of coated butyrante, mannobiose and medium chain fatty acids.

**Key Words:** Broiler chickens, Salmonella, transmission, feed additives

### T123 Improved layer performance by dietary supplementation of a mixture of medium chain fatty acids

Katrien Deschepper1, Renato Costa1, Rob Goegebeure1, Ine Kempen2, Johan Zoons2 1Nuscience, Drongen, Belgium; 2PDLT, Geel, Belgium

With the ongoing genetic improvements in commercial layers to breed for longer production cycles, the importance of maintaining a good laying persistency and a good egg quality is increasing. Production and egg quality are affected by the health and immune status of the hen. Therefore, the effect of a gut stabilizing mixture of activated medium chain fatty acids (MCFA) (Shellbiotic) on layer performance was examined.

The experiment was carried out with Lohmann Brown hens that were housed in enriched cages (20 hens/cage, 108 cages). From 59 weeks onwards, one group received a dietary supplementation of 1kg/ton Shellbiotic. During this trial hen day production, mortality, egg weight and egg quality parameters (second grade eggs, broken eggs and dirty eggs) were measured until 85 weeks of age. Also the effect on the albumen quality was measured by determining the Haugh Units at the beginning and at the end of the trial. The eggs used for this analysis were 3 days old and stored in the cold storage.

The control group started off at a higher laying percentage (1.45%) but decreased stronger than the Shellbiotic group. After two weeks, week 61, the production curves cross, resulting in a higher laying percentage for the Shellbiotic group which stays maintained until week 85. Besides influencing the layer performance, adding Shellbiotic affected the outer quality traits of the eggs. The percentage of 2nd grade eggs was higher for the control group (+0.87%). This difference can mainly be explained by a higher percentage broken and dirty eggs (respectively 0.23% en 0.25%). Egg weight and mortality were not affected. The improved egg production together with the effects on the outer quality of the eggs resulted in 3 additional first grade eggs. Shellbiotic also succeeded in limiting the decrease in albumen quality (expressed in Haugh units) with 4% and thus maintaining higher albumen qualities at the end of the production cycle.

This trial indicates that both laying persistency and egg quality in commercial layers can be improved by supplementing the feed with a specific mixture of activated MCFA’s.

**Key Words:** Shellbiotic, Laying Persistency, MCFA, Egg quality, Albumen

### T125 Effects of Two Xylanase Enzyme sources on Laying Hen Performance fed low density diets from 22-52 wks of age

Sheila Purdum1, Dana Didde2, Brett Kreifels, Pamela Eusebio, Kathy Hanford University of Nebraska, Lincoln, NE

Two hundred and forty Hy-Line W-36 laying hens were fed experimental diets during 2 dietary production periods (22-42 wks) and (42-52 wks) of age. Six experimental diets included a positive control (Diet 1) to meet breed nutrient recommendations (2900 kcal/kg) and a negative control (2820 kcal/kg) (Diet 2), a negative control supplemented with Enzyme A added at 0.30 lb/ton (Diet 3); negative control supplemented with Enzyme B added at 0.5 lb/ton (Diet 4); 1.0 lb/ton (Diet 5) or 1.5 lb/ton (Diet 6). Enzymes A and B were primarily xylanase source enzymes (plus some activity of amylosa and proteasa) from 2 different companies. At 42 weeks of age, diets were reformulated to dramatically lower nutrient density, dropping from 17% to 15% protein; 80% to .67% TSAA; 0.94 to 0.74% lysine; and 0.40 to .34% NPP; dietary energy stayed at 2900 kcal/kg (Diet 1) or 2820 kcal/kg (Diet 2-6). Each diet was fed to 9 replicate cages with 4 hens/cage. Data were analyzed by repeated measures analysis for a randomized complete block design. Diet had little to no effect on feed intake (FI), wt, gain or feed efficiency during period 1; FI was lower for Diet 2 only during period 2 (diet x time effect at p< .05). Enzyme supplementation partially recovered feed intake during period 2 compared to the negative control diet 2. Egg production (EP) showed a trend (p<.09) during period 1 and then became significant during period 2 (p<.008) such that hens fed Diet 2 showed a sharp decline in EP during period 2 after diet nutrient density was reduced. This decline was overcome with supplementation of either Enzyme A or B during period 2. There was no dose response difference for EP between Diets 4, 5 or 6. Egg wt (EW) did not differ by diet during period 1, but did show a significant interaction effect (diet x time) such that during period 2, hens fed the negative control diet (Diet 2) actually had a slightly greater egg weight, perhaps due to less total EP. There were no benefits of Enzyme supplementation on...
Effects of essential oil, probiotic and ionophore on intestinal traits

Albaraa Sarsour1, Edgar O. Oviedo-Rondon, Kayla Classeen, Manuel J. Da Costa

The mechanisms of action of feed additives (FA) such as essential oils (EO) and probiotics (P) should be better understood, especially when combined with ionophores (I) in broiler diets. One experiment was conducted to evaluate the possible interactive effects of EO, P and I on broiler intestinal traits. Corn-soybean meal diets with DDGS were formulated for starter (0-14d), grower (14-35d) and finisher (35-42d) phases. The specific EO blend containing benzoic acid (Crina Poultry Plus) was added at 300 ppm. The P containing Lactobacillus acidophilus and Lactobacillus casei (Primalac) was added at 300 g/ton. The I, monensin, (Coban-90) was added at 90 g/ton. A total of 720 Ross 708 d-old male chicks were identified and placed in 72 floor pens with reused litter. BW, intestinal length, pancreas weight, and cecal pH were recorded at 42d of age. Mucus digesta content was quantified using a colorimetric procedure. Data from 9 treatments, with 8 replicate pens (10 chicks each), were analyzed as a RCBD with a 2x2x2 factorial arrangement of treatments with EO, P and I as main factors for 8 treatment combinations, plus a positive control with growth promotant antibiotic (BMD) and I (GPA-I), that was used for orthogonal contrasts. Only one three-way interaction effect (P<0.05) was observed on ileal mucus (μg/g) production. The EO reduced mucus production in diets with or without I, compared to treatments without FA or diets with P. Broiler cecal pH was affected (P<0.05) by the interaction IxEO. Broilers fed EO without I, had higher pH than those fed diets containing both FA. Pancreas (g/100g) was reduced (P<0.09) by using P. Broiler intestinal relative length (cm/kg) was reduced (P<0.05) by using EO, P or I compared to GPA-I. It was concluded that FA significantly affected broiler gut development and physiology in different ways. Mucus production was enhanced by P and reduced by EO, and modifications on microbial profiles may cause changes in cecal pH in broilers fed EO.

Key Words: essential oil, probiotic, ionophore, broiler, gut traits

Effects of Adding Different Dietary Levels of Black Cumin (Nigella sativa L.) Seed on Productive Performance of Laying Hens Dr. Sherif Hassan1, Dr. Abdulaziz AL Qail2,*, Dr. Abdulaziz AL Qail2

The present study was conducted to evaluate the effect of adding different dietary levels of black cumin (Nigella sativa L.) seed (0.0, 1.0, 2.0, 4.0 %) on productive performance of laying hens over a 8-wk trial period. Two hundred 52 wk old Hysex laying hens with similar body weight and laying rate were randomly distributed among 4 treatments with 5 replicates with 10 hens each. Body weight, body weight gain, mortality rate, feed intake, feed conversion ratio, egg production, egg weight, egg mass, egg specific gravity, haugh units, and yolk color were measured. Results showed that body weight gain for hens fed a layer diet containing 2.0% black cumin seed was significantly lower than those fed 1.0% black cumin seed. Feed intake was significantly lower for hen fed a layer diet containing 4.0% black cumin seed than those fed both 0.0 and 2.0% black cumin seed. Feed conversion ratio was significantly lower for hen fed a layer diet containing 4.0% black cumin seed than those fed both
T130 An Electron Microscopic Study of the Effect of Adding Dietary Baker Yeast (Saccharomyces cerevisiae) on the Ability of E. coli to Attach and Efface the Intestinal Cells of Broiler Chicks Challenged with E. coli

Dr. Sherif Hassan*, Dr. Abdulaziz Al-Aql, Dr. Mohammed Shathele King Faisal University; Al-Ahsa, Saudi Arabia

To evaluate the effects of adding dietary baker yeast (Saccharomyces cerevisiae) on the ability of E. coli to attach and efface the intestinal cells of broiler chicks challenged with E. coli, 240 broiler chicks of 1 d old were used from 1 to 35 d of age. Chicks were randomly distributed among four treatments with three replicates of 20 chicks each. Chicks were fed either 0.00% yeast and unchallenged with E. coli (negative control), 0.00% yeast and challenged with E. coli (positive control), 0.75% yeast and challenged with E. coli, or 1.00% yeast and challenged with E. coli. Chicks were challenged with 1.9 x 10^6 colony forming units of E. coli in 1.5 mL at 7 d of age by oral gavage. Three chicks from each replicate were sacrificed at 7, 14, 21, and 28 d post-challenge and specimens of the gastrointestinal tract were collected for E. coli enumeration and adhesion assay by scanning and transmission electron microscopy. Results showed that the eum of all challenged chicks were the only segment of the gastrointestinal tract that showed observable lesions. Challenged chicks fed 1.00% yeast showed drastic diminishing in bacterial enumeration compared to the other treatments. At 21 d post-challenge, about 87% of positive control chicks showed both cecal attachment and effacement, while 37% and 16% of challenged chicks fed 0.75% and 1.00% yeast showed cecal attachment, respectively. Results obtained from the present study suggest that adding 1.00% yeast to broiler diet resulted in a significant reduction in bacterial attachment and may enhance the productive performance of chicks via the inhibitory effect of yeast against E. coli pathogenic bacterium.

Key Words: Broiler, Electron microscopy, Escherichia coli, Saccharomyces cerevisiae, Yeast

T131 Nucleotide supplementation in the diet of broiler breeders and their effect on hatchability and subsequent progeny performance

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This study was aimed to evaluate the effects of nucleotide supplementation on broiler breeders diets regarding egg hatchability and on progeny performance. The nucleotides were derived from a yeast source (Hilyses/ICC). Two trials were conducted, the first trial with 80 broiler breeder females (Cobb), from 25 to 45 weeks of age, were distributed in a completely randomized design (CRD), with 2 treatments, with (5 kg per MT) or without nucleotide rich product called Hilyses. Each treatment consisted of 10 replications, with 4 breeders in each (4 birds/m²). Breeders were inseminated when they were 35 and 45 weeks old. Eggs were collected and incubated from the 3rd day until the 10th day post insemination. Egg production (EP%), egg fertility (EF%) and hatchability of incubated eggs (HIE%) and fertile eggs (HFE%) were evaluated. In a second trial, 2 groups of 150 male chicks; one group originated from breeders fed nucleotide supplemented diets, and other group originated from the breeders not given dietary nucleotides, were distributed in CRD, 10 replications with 15 straight run chicks in each. All broiler groups received the same growout diets over a 42 day grow out period (1 to 21, 22 to 35 and 36 to 42d). Study criteria included BWG, F1 and, F/G at 21 and 42 days. The data were analyzed using the GLM (SAS) and means were compared by Tukey (P<0.05). Nucleotide supplementation in the diet of broiler breeders improved (P<0.05) EP (1.6%), EF (1.7%), HIE (4.1%) and HFE (2.3%). Offspring from 35 week old breeders fed diets supplemented with 5% nucleotides had improved (P<0.05) BWG (3.45kg vs 3.30kg) and F/G (1.61 vs 1.66) versus chicks from breeders not supplemented dietary nucleotides. Progeny from 45 week old breeders fed dietary nucleotides also had better (P<0.05) BWG (3.46kg vs 3.24kg) and F/C (1.60 vs 1.70) versus broilers hatched from breeders whose diet was not supplemented with nucleotides. In summary, this study demonstrated that supplementation of nucleotides to broiler breeders increases the number of live chicks by 6% and appears to have a positive carryover effect on their progeny performance for both body weight gain and feed conversion.

Key Words: Black Cumin Seed, Egg Production, Egg Weight, Laying Hens, Productive Performance

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