

275 Effect of flaxseed oil and microalgae DHA-Gold on the production performance and fatty acid profiles of egg yolk and plasma in laying hens. Mohamed Neijat*, Okeoghene Ojekudo, and James D. House, *University of Manitoba, Winnipeg, MB, Canada.*

The incorporation of n-3 (omega-3) polyunsaturated fatty acids (PUFA) in the egg dependent on both the transfer efficiency of preformed dietary n-3 fatty acids to the eggs as well as endogenous PUFA metabolism and deposition. Using an experimental design consisting of 70 Lohmann LSL-Classic hens (n = 10/treatment; 6-wk feeding trial), we examined the effect of including graded levels of either flaxseed oil (provider of precursor ALA) or DHA-Gold™ S 17B (a source of preformed docosahexaenoic acid, DHA), each at 3 inclusion levels: 0.20, 0.40 and 0.60% total n-3s. The control diet was a cereal-based diet practically devoid of both ALA and DHA. Study parameters included total and individual n-3s in egg yolk, measures of hen performance, eggshell quality, total cholesterol and fatty acid content of plasma. Data were analyzed as a complete randomized design using Proc Mixed procedure of SAS, considering each treatment group at 4 levels of total n-3 (with a separate control). No significant differences were observed between treatments with respect to hen performance, eggshell quality and cholesterol content in plasma and egg yolk. Individual and total n-3 PUFAs in the yolk and plasma increased ($P < 0.0001$) linearly as a function of total n-3 PUFA intake. At the highest inclusion levels, DHA-fed hens incorporated 3-fold more DHA in eggs compared with ALA-fed hens (179 ± 5.55 vs. 66.7 ± 2.25 mg/yolk, respectively). In both treatment groups, maximal enrichment of total n-3 PUFA was observed by wk 2, declined by wk 4, and leveled thereafter. In addition, accumulation of DHA in egg yolk showed linear ($P < 0.0001$) and quadratic ($P < 0.01$) effects for flaxseed oil ($R^2 = 0.86$) and DHA-Gold ($R^2 = 0.93$). The current data provide evidence that preformed DHA leads to greater enrichment of n-3 LCPUFA in eggs, and serve to highlight potential regulatory aspects explaining the limitations in the deposition of endogenously produced n-3 LCPUFA.

Key Words: egg yolk, fatty acid profile, flaxseed oil, DHA-Gold

276 Effect of altering dietary electrolyte balance using sodium bicarbonate and potassium carbonate on broiler breeder performance and egg shell parameters. John Halley*, Sandro Cerrate, Alejandro Corzo, and Bryan Fancher, *Aviagen Inc., Huntsville, AL.*

A study was performed altering the dietary electrolyte balance (DEB) to investigate the effects on broiler breeder performance and egg quality parameters. Ross 708 pullets and Ross YPM males were reared according to the 2014 Ross body weight standard. At 22 wk of age birds were randomly assigned to pens in a curtain-sided building with 3 treatments replicated 12 times each (70 hens with 7 males per pen). Treatment (Trt.) 1 was formulated to the Ross 2013 Nutrition Specifications. Trt. 2 was formulated to the same specifications except for the addition of sodium bicarbonate, while Trt. 3 utilized sodium bicarbonate as well as potassium carbonate. The DEB of the 3 diets was calculated to be 170, 200, 230 mEq/kg, respectively. Chemical analysis of the feeds showed actual values to be 160, 180, and 205. All birds were fed to meet their estimated dietary energy needs, from 25 weeks until peak feed hens were fed an increasing energy allocation such that peak feed energy was attained at 27 weeks, 3 d (60% production). Trts. 2 and 3 had significantly better egg production for wk 50; otherwise there were no differences. Cumulative chicks were lower for Trt. 2 for the last 5 wk of production. Egg weights were lower for Trt. 3 compared with Trt. 1 for wk 43, and Trt. 2 for wk 45. Percent cracked eggs from Trt. 3 were significantly reduced when compared with the other treatments. Specific gravity was sig. better for Trts. 2 and 3 when measured at wk 36 and 49. Feathering was sig. worse for Trt. 3 from 46 wk until the end

of production. Mortality was unaffected by treatment. Significant differences were seen from progeny hatched at 45 and 55 wk of age for body weight, FCR, and breast meat yield. Addition of sodium bicarbonate and potassium carbonate to increase DEB significantly improved broiler breeder performance parameters and measurements of egg quality as well as progeny hatched from these hens.

277 Influence of particle size of the main cereal of the diet on egg production of brown laying hens. Jorge Herrera¹, Beatrix Saldaña², Pilar Guzmán², Mohammad V. Kimiaetalab², and Gonzalo G. Mateos*, ¹*Camar Agroalimentaria, S.L, Toledo, Spain,* ²*Departamento de Producción Agraria, Universidad Politécnica de Madrid, Madrid, Spain.*

The influence of the geometric mean diameter (GMD) of the main cereal of the diet on productivity was studied in hens from 33 to 64 wk of age. The experiment was completely randomized with 6 dietary treatments arranged as a 3×2 factorial with 3 main cereals (barley, corn, and wheat) and 2 grinding sizes of the cereal (6 and 10 mm screen). Diets were isonutritive. Each treatment was replicated 11 times. Egg production, ADFI, egg weight, egg mass, and feed conversion ratio (FCR) were calculated by period of 28 d each, as well as for the entire experiment (33 to 64 wk of age). Also, egg quality traits (number of dirty, broken, and shell-less eggs, proportion of albumen, yolk, and shell, and thickness, strength, and color of the shell) were measured. No interactions between main cereal and GMD of the diet were observed for any of the traits studied. Diet did not affect feed intake, egg production, FCR, or BW gain. Eggs were larger ($P < 0.01$) in hens fed the barley diet than in hens fed the corn or the wheat diet, probably because of greater level of supplemental fat of the barley diet. Dietary treatment did not affect any egg quality trait ($P > 0.05$). The GMD of the diet did not affect any variable studied. In summary, barley or wheat can substitute the corn in diets for laying hens supplemented with enzymes without any adverse effect on productivity. Consequently, the election of the main cereal of the diet will depend primarily on their relative cost. Within the range studied, screen size did not have any effect on hen productivity.

Key Words: barley, corn, laying hen, particle size, wheat

278 Occurrence of mycotoxins in the 2015 US corn crop. G. Raj Murugesan^{*1}, Chasity M. Pender¹, Ruben Beltran Jr.², and Ursula Hofstetter³, ¹*Biomim America Inc., San Antonio, TX,* ²*Biomim USA Inc., San Antonio, TX,* ³*Biomim Holding GmbH, Getzersdorf, Austria.*

Mycotoxins are secondary toxic metabolites produced by fungi, exposure to which can impair health and adversely affect poultry performance. The objective of the current study was to determine the occurrence of mycotoxins in the 2015 corn crop in the United States of America and to assess the potential risk to poultry species. From September 2015 to January 2016, 381 corn samples were collected from 20 states as part of the annual Biomim Mycotoxin Survey. Samples were analyzed either by high performance liquid chromatography (HPLC) or liquid chromatography tandem mass spectrometry (LC-MS/MS) techniques which are highly sensitive in detecting very low mycotoxin concentrations. The major mycotoxin groups analyzed were aflatoxins (Afla), zearalenone (ZEN), trichothecenes including deoxynivalenol (DON) and T-2 toxin (T-2), fumonisins (FUM), and ochratoxin A (OTA). Mycotoxins were detected in 94% of the corn samples tested and 50% of the positive samples contained more than one mycotoxin. Co-occurrence of mycotoxins may lead to synergism and enhanced toxicity in animals which consume contaminated feed. The percent of positive samples, mean of positives (ppb), maximum of positives (ppb), and risk threshold (ppb)