106 Relative availability of organic calcium for layer hens. Diego Martínez1,3, Fernando Prado*2, and Carlos Vilchez2, 1LIAN Development and Service, Lima, Peru, 2Universidade Estadual Paulista, Jaboticabal, SP, Brazil, 3Universidad Nacional Agraria La Molina, Lima, Peru.

To estimate the relative availability of calcium citrate 120 Hy-Line Brown layer hens of 40 wk of age placed in cages were fed one of the following diets: D1, low calcium (0.5% Ca), D2 and D4 both with medium calcium (2.16% Ca), and D3 and D5 both with the recommended calcium level (3.82% Ca). Diets D2 and D3 were supplemented with calcium carbonate whereas D4 and D5 with calcium citrate. D1 contained no calcium carbonate nor citrate. All diets were formulated to contain 2800 kcal/kg EM and 14.6% crude protein. Experimental diets were assigned to cages under a Completely Randomized Design with 5 treatments and 4 replications each. Production rate, feed intake, feed conversion ratio, egg mass and specific gravity, shell weight and density, Haugh units and tibia ash content were evaluated within a period of 4 wk. Data were processed and regression curves obtained having the amount of calcium intake as the independent variable. All the variables were tested to determine linear trends with SAS software. Curves were adjusted to a common intercept and the relative availability was estimated as the relation of the slopes of the linear regression curves obtained for both additives. Values ranging from 103 to 119% for performance and from 83 to 98% for egg quality were found. The results show an interesting opportunity for the use of calcium citrate as a feed additive to improve performance in specific situations.

Key Words: calcium citrate, relative availability, regression, organic calcium, egg quality

107 Effect of organic calcium on egg production and quality. Diego Martinez1 and Fernando Prado*2, 1LIAN Development and Service, Lima, Peru, 2Universidade Estadual Paulista, Jaboticabal, SP, Brazil.

Three experiments were conducted with 96 Hy-Line Brown layer hens each over 35 wk of age to evaluate the effect of calcium citrate (CIT) on performance and egg quality. All the diets were formulated according to the genetic line nutrition requirements with the exception of calcium due to the treatments. In Experiment 1, the effect of 3 products, claiming to have different solubility (H, high; M, moderate; L, low), was tested against calcium carbonate (CAR) on performance on a Completely Randomized Design with 4 treatments and 4 replications each (T1, CAR; T2, CIT-H; T3, CIT-M, T4, CIT-L). Experiment 2 was designed to estimate, by regression, the effect of CIT-H on performance and egg quality on a same-calcium-intake basis: T5, standard diet supplemented with CAR; T6 to T8, diets with different calcium and CIT-H contents but with no CAR. Experiment 3 was designed to determine the correlation coefficient of egg yolk pigmentation to dietary CIT-H intake under a Completely Randomized Design with 4 treatment diets supplemented with CIT-H and/or CAR: T9, 100% CAR; T10, 1/3 CAR replaced by CIT-H, T11, 2/3 CAR replaced by CIT-H; T12, 100% CIT-H. Data were processed with SAS and GraphPad software. In Experiment 1 a negative effect ($P < 0.05$) was shown on egg production rate among CIT treatments due to differences in feed intake associated to CIT-H. In Experiment 2 better performance ($P < 0.05$; egg production rate, egg mass, feed conversion ratio) was found for CIT-H supplemented hens on a same-calcium-intake basis; however, a negative effect ($P < 0.05$) was also found on egg quality. In Experiment 3 a significant ($P < 0.05$) negative correlation was found between CIT-H intake and egg yolk pigmentation. In conclusion, CIT presents a positive effect on laying performance but also a negative effect on egg quality and pigmentation associated to CIT-H.

Key Words: calcium citrate, egg quality, organic calcium, regression, egg pigmentation

108 Yolk and albumen chemical composition and weight of components of eggs laid by broiler breeders supplemented with conjugated linoleic acid. Poliana C. Martins1, Januaria S. Santos1, Billy N. Marques1, Lais de M. Montel1, Geovane M. Chagas1, Natiele F. Oliveira1, Amanda R. Ribeiro1, and Jose H. Stringhini*1,2, 1Universidade Federal de Goias, Goiânia, Goiás, Brazil, 2CNPq, Goiânia, Goiás, Brazil.

We aimed to evaluate the egg, albumen, yolk and shell weights and the chemical composition of eggs laid by broiler breeders supplemented with CLA. Two 58 wk old broiler breeder commercial flocks, Cobb 500, were fed a commercial diet; however, one of them was supplemented with 0.025% of CLA. After 26 d of supplementation, 30 eggs per flock were selected for evaluation of the weight of its components and determination of the chemical composition of yolk and albumen. The eggs, shells, yolks and albumens were weighted before yolks and albumens were grouped into 6 pools of 5 units each, to determine the percentage of dry matter, and percentages of mineral matter, ether extract and crude protein, in the dry matter and in the natural matter. It was adopted a completely randomized design, consisting of 2 treatments with 30 replicates for weight evaluations, and 6 replicates for chemical evaluations. Data were submitted to ANOVA and F test to compare the means, through the R software. The egg, albumen and shell weights were not affected by the inclusion of CLA in the diet. However, breeder supplemented with CLA showed higher yolk weight ($P < 0.009$) compared with control treatment. Breeders fed CLA produced eggs which albumens showed lower percentage of dry matter ($P < 0.051$), lower percentage of protein in natural matter ($P < 0.001$), higher percentage of mineral matter both in natural matter ($P < 0.001$) and in the dry matter ($P < 0.001$). Regarding the yolk, there was no effect of the treatments ($P > 0.05$) on the evaluated variables. In conclusion, CLA can lead to the production of eggs with greater weight of yolk, without, however, changing its basic chemical composition. Although the albumen weight was not affected, there was a greater mineral deposition when the breeder were supplemented with CLA. More studies should be conducted to confirm possible changes in the yolk fatty acids profile, usually reported when CLA is added to the diet of layers or breeders.

Acknowledgments: CNPq, Asa Alimentos, BASF

Key Words: CNPq, Asa Alimentos, BASF

109 Association of symbiotic and nutritive gel with broiler performance. Fernanda V. Castejon1, Eduardo M. de Oliveira1, Juliana M. S. Martins1, Italo C. S. Araujo1, Filipe M. Ribeiro1, and Jose H. Stringhini*1,2, 1Universidade Federal de Goias, Goiânia, Goiás, Brazil, 2CNPq researcher, Goiânia, Goiás, Brazil, 3Biomin Latin America, Piracicaba, SP, Brazil.
In this study, a symbiotic (PoultryStar, sol) supplementation on broiler performance associated with a nutritive gel in the hatchery were evaluated. 400 male neonate Cobb 500 chicks were fed in the hatchery and then transported to experimental facilities and allotted in battery cages, in 5 treatments and 8 replicates of 10 birds each. Treatments were: T1 – negative control; T2 – Gel in hatchery; T3 – Gel plus symbiotic in hatchery; T4 – Gel plus nutritive in the hatchery and symbiotic in water in the battery; T5 – symbiotic in water in the battery. Symbiotic was offered during 3 d, before, on the first day and a day after diet change and once a week, so T4 received the symbiotic in the hatchery and d 2,3,7,10,11,12,14,22,23,24,28 (12 time points) and T5 at d 2,3,4,7,10,11,12,14,22,23,24,28 (12 time-points). All groups remained in a 24 h period of fasting of feed and water as a stressing factor, after hatchery expedition. live weight, average weight gain, feed intake and feed conversion in the total period (1 to 42 d of age) were evaluated. Statistical analysis was performed using ANOVA and Tukey test applied for means comparison using Software R. significant differences were obtained for final weight at 42 d of age. Broilers from negative control presented lower live weight compared with the group supplemented with the nutritive gel product in the hatchery. The early supplementation of nutritive gel and symbiotic can stimulate the beneficial microbiota and contribute to start the microbiota establishment and gastrointestinal development, which reflected in an improved performance. Thus, the symbiotic tested increased broiler performance.

Acknowledgments: Asa Alimentos, Biomín, CNPq

Key Words: transportation box, transition period, vitelline sac, villi development


The aim of this study was to evaluate, by meta-analysis, the effect of canthaxanthin in diets of broiler breeders and layers on production and quality of eggs. For this purpose were examined data of researches conducted between the years 2008 to 2015 of the Poultry Laboratory of the Federal University of Santa Maria (UFSM). The experiments involved 1292 hens, totaling 844 broiler breeders (Cobb 500) and 448 laying hens (Isa Brown and Novogen). Broiler breeders were placed in an open-sided house, divided into pens consist of 6 nests. Each pen was equipped with an automatic drinker, one tube feeders to females, and a trough-type feeder to the roosters. Laying hens were placed in experimental facilities equipped with metal cages with Nipple drinker and feeder. All data were derived from hens feed with corn and soybean meal, and adding 6mg/kg canthaxanthin (CAROPHYLL Red 10%, DSM Nutritional Products). Variables analyzed were: egg production (EP), egg yolk, albumen and shell weight, egg specific gravity (SG) and yolk color. Data were evaluated weekly to 3 eggs by replicate coming from broiler breeders and laying hens. Variables analyzed to egg incubation in the experiments that involved broiler breeders were hatchability of fertile eggs (HF), hatchability of total eggs (HT) and fertility of eggs (F). Data were subjected to proc mixed and means compared a level of 5% significance. Statistical procedures were performed using the SAS software. Broiler breeders and laying hens fed with diets supplemented with canthaxanthin showed highest EP (P = 0.0003). Egg weight (P = 0.6923), yolk (P = 0.7878), albumen (P = 0.3317) and shell weight (P = 0.3317) did not differ between treatments. The SG was highest in eggs of hens fed without the supplementation of canthaxanthin in the diet (P = 0.0099). Egg yolk color was highest in eggs from hens fed with canthaxanthin in the diet (P < 0.0001). The HF, HT and F were highest in eggs from hens fed with 6mg/kg of canthaxanthin in the diet (P < 0.0001). The addition of canthaxanthin in broiler breeders and layers showed a positive effect on production and egg quality.

Key Words: feed additive, egg production, yolk color, hatchability, fertility

112 Internal egg quality from laying hens fed corn-based diet with the addition of canthaxanthin. Danielle P. Rosa*, Alexandre P. Rosa1, Angélica Londo-ero1, Catiane Orso1, Mariane O. Fernandes1, and José F. Miranda1, 1Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil, 2DSM Nutritional Products, São Paulo, SP, Brazil.

The aim of this study was to evaluate the effects of canthaxanthin on corn-based diets and its effects on hens’ internal egg quality. It was used 320 ISA Brown hens from 20 to 48 wk of age, distributed in a completely randomized design with 2 treatments, 10 replicates of 16 birds each one. Treatments were: NC negative control diet and CTX
diet with the addition of 6mg/kg canthaxanthin (Carophyll Red 10%, DSM Nutritional Products). The parameters analyzed were: Haugh unit (HU), yolk index (YI), egg weight (EW), yolk and albumen percentage (%Y and %A), mg of total carotenoids/kg of yolk (C), yolk color (YC), vitelline membrane resistance (VMR) and lipid oxidation (TBARS). To determine internal quality 3 eggs were selected per repetition according to an interval for variance of 2.5%. To determine yolk carotenoids concentration a kit containing a portable photometer iCheck was used. Data were submitted to ANOVA (P < 0.10). Statistical procedures were performed using SAS software. Canthaxanthin supplementation presented higher C in yolk (23.43) (P < 0.001), HU (90.79) (P = 0.10) and YC (12.6) (P < 0.001), compared with NC (14.72, 89.79 and 5.7). No differences were observed between treatments for EW, %Y, %A, YI, VMR and TBARS (P > 0.10). Canthaxanthin supplementation in corn-based diets is beneficial to the improvement of some internal quality parameters of eggs, such as concentration of carotenoids in yolk, Haugh unit and Yolk index.

Key Words: corn, carotenoid, vitelline membrane, lipid oxidation

113 Effects of corn-based diets supplemented with canthaxanthin on performance and egg quality of laying hen. Daniele P. Rosa*,1, Alexandre P. Rosa1, Angélica Londero1, Mariane O. Fernandes1, Catiane Orso1, Adrian S. Ertmann1, Alexandre B. Mariani1, and José F. Miranda2,1Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil, 2DSM Nutritional Products, São Paulo, SP, Brazil.

The aim of this study was to evaluate the effects of corn-based diets, with or without the addition of canthaxanthin, on the productive and qualitative parameters of laying hen eggs. It was used 320 Isa Brown hens (20 to 48 wk of age) in a completely randomized design with 2 treatments, 10 replicates of 16 birds each one. Treatments were: a Negative Control (NC) and other it the addition of 6mg/kg canthaxanthin (CTX, Carophyll Red 10%, DSM Nutritional Products). Performance was evaluated considering the productive parameters: laying rate (LR), body weight (BW), daily feed intake (DFI), feed conversion per dozen eggs (FCR/DZ), feed conversion per egg mass (FCR/EM), egg weight (EW) and egg mass (EM). Egg qualitative parameters were: yolk color (YC), specific gravity (SG) and albumen pH (pH). YolkFan DSM was used to measure egg yolk color in a 1 to 15 scale, 1 – light yellow and 15 – dark orange. Data were submitted to ANOVA (P < 0.10). Statistical procedures were performed using SAS software. Birds fed CTX diet showed better results for LR (88.2%) (P = 0.0205) and higher BW (1703g) (P = 0.0634) than NC diet (84.82% and 1669g). Canthaxanthin supplementation also increased YC (12.6) (P < 0.0001), presented better EM (22.23 kg) (P = 0.0679) and FCR/DZ (1.39) (P = 0.1004) compared with NC. DFI, FCR/EM, EW, SG and pH did not showed differences between treatments (P > 0.10). Canthaxanthin supplementation improved laying rate, yolk pigmentation, egg mass and feed conversion rate per dozen eggs.

Key Words: feed additive, carotenoid, laying rate, egg yolk

114 Performance of broilers fed with canthaxanthin and 25-hydroxycholecalciferol. Douglas V. Bonamigo*,1, Alexandre P. Rosa1, Catiane Orso1, Mariane O. Fernandes1, Pedro S. Feltrin1, Ana C. Cougo1, Rafael Hermes2, and José F. Miranda2,1Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil, 2DSM Nutritional Products, São Paulo, São Paulo, Brazil.

The purpose of this study was to evaluate the effect of MaxiChick and its active ingredients, canthaxanthin combined with 25-hydroxycholecalciferol (25-OH-D3) in broilers feed. Two experiments were made to evaluate the effects on male and female chicks: 1500 and 1680 male and female one-day old Cobb-500 broilers were used, distributed in a completely randomized design, with 2 treatments of 15 replicates of 50 birds each for male chicks and 56 birds each for female chicks. Male broilers were raised during 42 d and female broilers during 43 d. Treatments were: T1: Control Diet and T2: Control Diet + 0.1% MaxiChick until 21 d of age. Parameters measured on a weekly basis were: weight gain (WG), feed conversion (FC) and feed conversion rate (FCR). At 42 d of age, 6 male broilers were selected, with an average weight by replicate, for further slaughter and measurement of cuts and carcass yield. Female broilers were evaluated at 28 d of age for carcass yield, and at 43 d of age for cuts and carcass yield. Six broilers were selected by replicate, with the same average weight. Data were subjected to ANOVA. Male broilers fed with MaxiChick showed a significantly higher (P < 0.05) BW at 14 and 21 d of age (551g vs 544g) (1072g vs 1055g) in respect of those fed with control diet. As far as female broilers, significant results (P < 0.05) were found for breast yield at 43 d of age in those birds supplemented with MaxiChick (41.16% vs 40.44%). It is therefore concluded that the addition of the commercial product MaxiChick, based on Canthaxanthin and 25-hydroxycholecalciferol (25-OH-D3), has different effects on male and female birds, probably due to growth speed. In male chicks, benefits were found during the initial phase with better weight gain values until diet supplementation; whereas in females, for the same period, there was a significant contribution for breast yield at 43 d of age.

Key Words: vitamin D, feed conversion rate, weight gain, nutrition, carcass yield.

115 Effect of supplementation of Vitamin E on productive parameters of laying hens. Mariane O. Fernandes*, Alexandre P. Rosa, Angélica Londero, Daniele P. Rosa, Catiane Orso, Alexandre B. Mariani, Adrian S. Ertmann, Janaina S. Moura, and Lourdes B. Brittes, Universidade Federal de Santa Maria, Santa Maria, Rio Grande do Sul, Brazil.

The objective of this study was to evaluate the effect of supplementation of Vitamin E on productive parameters of laying hens. The experiment was carried out at Poultry Science Laboratory of the Federal University of Santa Maria, with 128 laying hens of Novogen Brown lineage (40 to 55 wk of age). A completely randomized design was used with 2 treatments, 8 replicates of 8 laying hens each. The treatments were: DC, negative control diet; and DViTE, diet with addition of 200 mg/kg of Vitamin E (acetate dl-α-tocopherol). The parameters evaluated were laying rate (LR), body weight (BW), daily feed intake (DFI), feed conversion per dozen eggs (FCR/DZ), feed conversion per egg mass (FCR/EM), egg weight (EW) and egg mass (EM). The laying rate and egg weight were calculated weekly for each replicate. All variables were performed at the end of each period (28 d). All data were subject to ANOVA (ANOVA) using the SAS statistical program. Laying hens fed with DViTE showed better results for LR (P = 0.0309), EM (P = 0.0378), FCR/DZ (P = 0.0289) and FCR/EM (P = 0.0878). The variables DFI, BW and EW showed no differences among the treatments (P > 0.10). Supplementation of Vitamin E provides a positive effect on egg production, egg mass, conversion per dozen and egg mass, demonstrating to be an excellent additive used in diets of laying hens.

Key Words: feed additive, production performance, feed conversion, laying hen.

The intensification of poultry production has led to the use of antibiotics to maintain production levels. However, antibiotics have been banned by many countries. Phytogenic additives may be an alternative to replace these products due to their anti-inflammatory and antioxidative activities, and to their modulating effects on the intestinal microbiota. The aim of this trial was to evaluate how the supplementation of functional oils in breeder diets affected hatchability and embryo mortality. A total of 16,400 females and 1,722 males Ross AP 95 were evenly divided and placed in 2 similar breeder houses. The treatments consisted of commercial feed + antibiotic growth promoter (bacitracin methylene disalicylate; BMD) or commercial feed + functional oils (essential, Oligo Basics Agroind Ltda; active ingredients: cashew nut shell liquid and castor oil). Diets were supplemented from the 26th to the 46th week of the breeders' life. Every 4 wk (26th, 30th, 34th, 38th, 42th, and 46th), 5,040 eggs/treatment were collected/treatment and hatched in single-stage incubators. The eggs were divided into 30 floors (168 eggs/floor) in one incubation trolley per treatment and assessed for hatchability, chick weight, and embryo diagnosis (mortality from 0 to 3, 4 to 10, 11 to 17, and 18 to 21 d, and alive pipped eggs). Data were analyzed by logistic regression, using the SAS GENMODE procedure with 2 treatments and 30 replicates (floor of the incubation trolley) of 168 birds each. As expected, all variables behaved quadratically ($P < 0.05$) as they followed the production curve of the breeders. However, at 26, 30 and 46 wk, hatchability was increased ($P < 0.05$) when functional oils were supplemented. Also, at 26, 30, 38, and 46 wk, chick weight was lower ($P < 0.05$) for the functional oil treatment. Finally, functional oil supplementation resulted in lower mortality ($P < 0.05$) from wk 0 to 3 d at wk 46 and alive pipped eggs at wk 26. In conclusion, the use of functional oils as additives in broiler breeder diets may be an effective strategy in maintaining productive and reproductive levels.

Key Words: phytogenic additive, growth enhancer, microbiota, hatching, breeder diet


Phytogenic additives can play important roles in avian reproduction by maintaining antioxidant defenses in spermatozoa and embryonic tissues. The aim of this trial was to evaluate the effects of functional oils in breeder diets on fertility and on lipid peroxidation of the yolk. A total of 16,400 females and 1,722 males Ross AP 95 were evenly divided and placed in 2 similar breeder houses. The treatments consisted of commercial feed + antibiotic growth promoter (bacitracin methylene disalicylate; BMD) or commercial feed + functional oils (Essential, Oligo Basics Ltd.; active ingredients: cashew nut shell liquid and castor oil). Diets were supplemented from the 26th to the 46th week of the breeder’s life. Every 4 wk, 5,040 eggs/treatment were collected and incubated for fertility assessment. Every 8 wk a sample of 45 eggs/treatment was collected to determine lipid oxidation. The amounts of 2-thiobarbituric acid reactive substances (TBARS) were expressed as mg malondialdehyde (MDA) per kg yolk. Data were analyzed by logit regression, using the procedure GENMODE. Functional oils improved fertility ($P < 0.05$) at wk 38 (98.41%) and 46 (96.90%) compared with AGP (96.32 and 94.52%, respectively). At the end of the trial, functional oils increased the fertility in about 1%. Also, whereas the concentration of MDA in eggs from birds supplemented with functional oils decreased linearly during the experiment, a quadratic effect ($P < 0.05$) was observed for birds supplemented with AGP, where MDA concentration decreased from wk 25 to 33, and increased from wk 41 to 46. Oxidative stress has been attributed to affect the fertility and physiology of spermatozoa. In avian species, the female stores the sperm in tubules, which contain antioxidant enzymes to minimize damage due to lipid peroxidation and maintain sperm membrane integrity. A large proportion of the sperm membrane is composed of polyunsaturated fatty acids that are highly susceptible to oxidative damage. In conclusion, the supplementation of functional oils decreased the lipid oxidation of the yolk and improved fertility parameters.

Key Words: sperm storage tubule, oxidative stress, egg, PUFA


The objective of this study was to evaluate whether a commercial mixture of cashew nut shell liquid and castor oil (essential, Oligo Basics Agroind Ltda., Cascavel, Brazil) would produce results similar to those of monensin in chickens inoculated with coccidiosis. A total of 864 one-day-old male chicks (Cobb) were randomly assigned to 6 treatments (8 pens/treatment and 18 birds/pen) in a $3 \times 2$ factorial design with 3 additives: control (no additive), 100 ppm of monensin, and 0.15% of Essential; and 2 challenge levels at 14 d of age: no challenge and inoculation by gavage of 1 mL of a solution containing sporulated oocysts of *Eimeria tenella* ($10 \times 10^3$), *Eimeria acervulina* ($200 \times 10^3$), and *Eimeria* máxima ($80 \times 10^3$). Data were analyzed using PROC GLM (SAS 9.2) by ANOVA. The statistical model included the effects of additives and challenge and their interactions in the analysis of all variables. Treatments did affect live weight (LW), average daily feed intake (ADFI), average daily gain (ADG) and feed conversion rate (FCR) during the pre-challenge period. Coccidiosis inoculation negatively affected ($P < 0.05$) performance parameters in all treatments. Challenged birds supplemented with monensin showed higher LW, ADG, ADFI and better FCR ($P < 0.05$) than the other 2 treatments, 1 wk post inoculation. However, 2 wk post inoculation, birds supplemented with Essential showed higher ADG and better FCR than control or monensin supplemented birds ($P < 0.05$), which resulted in similar LW for monensin and Essential birds, and lower LW for control birds ($P < 0.05$) at 35 d of age. Overall, whereas the performance of unchallenged birds was not influenced by treatment, the performance of chickens challenged with coccidiosis and supplemented with monensin or Essential was better than that of control birds at 42 d of age. Thus, Essential improved the performance of broilers infected with coccidia from the second week on after infection, keeping the performance at 42 d of age similar to that of monensin.

Key Words: coccidiosis, monensin, castor oil, cashew nut shell liquid, health challenge

Digestibility of nutrients of growing broilers fed diets containing yerba mate (*ilex paraguariensis*) extract. Danielle Leonardi Migotto*, Aline Mondini Calil Racanici, José Fernando

119 Effects of a commercial blend of cashew nut shell liquid and castor oil or monensin on the growth performance of broilers challenged with *Eimeria* spp.
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Yerba mate (Ilex paraguaiensis) is a plant commonly used in several South American countries to prepare a beverage through an aqueous infusion of dried leaves and stems. This beverage is known for its bitter taste and diuretic, besides choleretic, hypocholesterolemic, anti-inflammatory, and stimulant properties in humans (Schinella et al., 2000, Filip et al., 2001). The main objective of this study was to assess the effects of the addition of lyophilized extracts of yerba mate in broilers diets on nutrient digestibility. The metabolism trial was conducted using 90 one-day-old female Cobb 500 broiler chicks distributed in 15 cages (6 birds per cage) in a randomized design with 3 treatments and 5 repetitions. The broiler chicks were fed ad libitum diets formulated to achieve nutritional requirements according to Rostagno et al. (2011) until 17 d of age with the addition 0; 250 and 750 mg of lyophilized extract of yerba mate /kg. The method of total excreta collection was applied during 5 consecutive days (from 12 to 17 d of age) after 4 d of adaptation period. The addition of yerba mate extracts did not improve (P > 0.05) the results of AME and AMEn, digestibility of dry matter (DDM), crude protein (DCP), ether extract (DEE) and crude energy (DCE). In conclusion, the addition of yerba mate extract to broilers diets did not resulted in increasing nutrient metabolization.

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Key Words: plant extract, natural additive, stimulant property, metabolization coefficient.

Evaluation of an emulsifier in broiler diet. B. G. S. Leite*,1, M. A. Bonato2, R. L. C. Barbalho2, F. A. Roque1, L. V. Sanfelice1, and L. F. Araújo1, 1University of São Paulo, Pirassununga, SP, Brazil, 2ICC Industrial Trade Import Export Ltd., São Paulo, SP, Brazil, 3Faculty of Anhanguera Leme, Leme, SP, Brazil.

The objective of this current study was to evaluate the performance of broilers 1–42 d fed with or without inclusion of emulsifier. It was used 1200 male broilers Cobb 500 in a completely randomized design in a 2 x 2 x 2 factorial (2 sources of oil – acidulated soybean oil soapstock and soybean oil; 2 energy levels – reduction of 80 and 100 kcal; inclusion of emulsifier or not) + a basal diet with acidulated soybean oil soapstock and a basal diet with soybean oil. A total of 10 treatments with 10 replicates of 12 birds each were studied. Basal diets were formulated to contain corn and soybean meal. For performance was evaluated: body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR). The data analyzed were using the Tukey test at 5% significance. There was no significant difference for FI from 1 to 42 d. However, the acidulated soybean oil soapstock with reduction of 80 kcal for energy and emulsifier inclusion had a better BWG (P ≤ 0.001) and the acidulated soybean oil soapstock with reduction of 100 kcal for energy and emulsifier inclusion had inferior FCR (P ≤ 0.001). Analyzing the contrast between the treatments, it was observed that there was no significant effect between the responses for the control group and the birds of the treatment with acidulated soybean oil soapstock with reduction of 80 kcal for energy and emulsifier inclusion. Overall, the supplementation of acidulated soybean oil soapstock with reduction of 80 kcal for energy and emulsifier inclusion did not affect the performance. However, birds fed acidulated soybean oil soapstock with reduction of 100 kcal for energy and emulsifier inclusion had a negative effect on performance.

Key Words: acidulated soybean oil soapstock, energy reduction, performance, soybean oil