

methylene disalicylate (BMD). The study consisted of 4 dietary treatments – Negative Control (NC), NC + probiotic (Sporulin containing spores of *B. subtilis*), NC + protease (Cibenza DP100), and NC + BMD, each with 12 replicate pens of 24 birds. Nutritionally complete typical US corn soybean meal based diets were formulated for starter (0–14 d), grower (14–27 d), and finisher (27–41 d) phases. All birds were challenged with a coccidiosis vaccine at 10X recommended dose via oral gavage on d 15. Body weight, feed intake, FCR, and mortality were determined on d 14, 21, 27, and 41. On d 28, 3 birds per pen were euthanized to score *E. acervulina*, *E. maxima*, and necrotic enteritis (NE) lesions. Data were subject to one way ANOVA; means were separated by Fisher's protected LSD test. Bacitracin improved ($P < 0.05$) FCR on d 14 (1.144 vs 1.220), d 21 (1.294 vs 1.352), and d 27 (1.375 vs 1.426); probiotic and protease improved ($P < 0.05$) FCR on d 14 (1.150 and 1.153 vs 1.220) and d 21 (1.316 and 1.315 vs 1.352), and their effects were not different from BMD ($P > 0.05$). No significant difference in FCR was observed among dietary treatments on d 41 ($P > 0.05$). Bacitracin increased ($P < 0.05$) BW by 6.0% and feed intake by 4.8% on d 21; probiotic and protease numerically increased ($P > 0.05$) 21-d BW by 3.0 and 2.8% and feed intake by 2.2 and 2.8% to a level that was equivalent to BMD ($P > 0.05$). No treatment difference in BW or feed intake was observed on d 14, 27 and 41 ($P > 0.05$). Low mortality throughout the trial, minimal coccidiosis and mild NE lesions were observed, and they were not affected by dietary treatments ($P > 0.05$). In summary, for broilers subject to *Eimeria* challenge on d 15, while BMD was effective in improving performance up to d 27, probiotic and protease were effective up to d 21 indicating that they have different mechanism of action from BMD, and they could serve as effective nutritional tools to maintain growth performance during certain phases in AGP free broiler production.

Key Words: probiotic, protease, antibiotic, broiler, *Eimeria*

462P Comparative effect of extracts and leaf meal of bitter leaf (*Vernonia amygdalina*) with antibiotics on performance and blood profile of broilers. Olufemi Adebisi¹, Ngozi Anurudu¹, Lukmon Ajani¹, Tolulope Ososanya¹, and Remilekun Oshinowo², ¹University of Ibadan, Ibadan Nigeria, Ibadan, Oyo, Nigeria, ²Federal College of Education, Osielle, Abeokuta, Ogun, Nigeria.

Negative effects of antibiotics such as emergence of antibiotic resistant pathogen, drugs toxicity and drugs residues in meat has led to the ban on usage of antibiotics in food and poultry products, this has accelerated investigation on newer, safer and natural alternatives sources of antibiotic. Hence, the effects of extracts and leaf meal of *Vernonia amygdalina* on performance, hematological, and serum biochemical parameters of broiler chickens were evaluated in a feeding experiment lasting 56 d. Two hundred-day old Arbor Acre chicks were randomly divided into 5 treatments with 4 replicates containing 10 birds per replicate. The treatments were: T1 (Positive control: antibiotics only), T2 (ethanolic extract of *V. amygdalina*), T3 (aqueous extract of *V. amygdalina*), T4 (leaf meal of *V. amygdalina*), T5 (Negative control: neither extract nor leaf meal). All data were subject to ANOVA, and significant means were separated by Duncan Multiple Range Test of SAS, 2010. The results revealed that no significant ($P < 0.05$) difference occurred in the weight changes of broilers fed the different treatment diets. Birds fed diet T1 had mean value of 2,286g compared 2,199g and 2,305g that were observed in birds fed T2 and T5, respectively. The same trends were also observed in the feed conversion ratio with values ranging from 1.80 (T1), 1.97 (T2) to 1.86 (T5). The white blood cell varied significantly ($P < 0.05$) from birds fed T1 ($19.28 \times 10^3 \mu\text{L}$) compared with their counterparts fed T5 ($16.32 \times 10^3 \mu\text{L}$), however, no significant ($P > 0.05$) variation

was observed in birds fed T2, T3 and T4 with values of $18.66 \times 10^3 \mu\text{L}$, $18.31 \times 10^3 \mu\text{L}$ and $17.73 \times 10^3 \mu\text{L}$, respectively. Similar trends were also observed in the platelets count with significant ($P < 0.05$) variations of 20.50% (T1) compared with 13.58% in T5. All other hematological parameters measured were not significantly different from each other. The serum cholesterol concentration in the serum reduced in the treated group compared with the control. Nevertheless, birds fed T2 (4.88 g/dL) and T3 (4.72 g/dL) showed significantly ($P < 0.05$) lower serum protein compared with 6.22 g/dL, 5.32 g/dL and 5.30 g/dL for birds in T1, T4 and T5, respectively. It may therefore be concluded that *Vernonia amygdalina* may either be extracted with ethanol or aqueous and added to the drinking water of broiler birds to replace the use of antibiotics without any deleterious effect on the performance, hematological and serum profile.

Key Words: *Vernonia amygdalina*, antibiotics, performance, blood profile, serum

463P Undefined microbiome cultures of non-Galliformes origin increase weight gain in *Gallus gallus*. Si Hong Park¹, Fernanda Castro², Irene Jarquin², Dayanara Reyes², and Irene Hanning^{*2}, ¹University of Arkansas, Fayetteville, AR, ²Lincoln International Academy, Managua, Managua, Nicaragua.

When delivered orally, some cultures of live bacteria act in the intestines to improve chicken health by stimulating the immune system, preventing colonization by zoonotic pathogens and in some cases improving weight gain. Nearly all commercially available bacterial cultures, termed probiotics, originate from poultry to be used in poultry. The purpose of this work was to determine if non-galliformes intestinal bacteria would have any similar effects as commercial probiotics on weight gain. Fresh fecal samples were collected from Chinese geese (*Anser cygnoides*) and Great Kiskadees (*Pitangus sulphuratus*). The goose was chosen as an obese chicken model because geese have a relatively thick layer of fat on the abdomen for buoyancy and the Kiskadee as a lean chicken model as they have very little fat. A total of 30 d-old broilers were randomly assigned to 3 groups of 10 and given 0.25 mL of the fecal sample suspended in water at a 1:10 ratio or water for the control group. All chickens were weighed weekly for 4 weeks and the entire experiment was replicated. In both trials, at 10 d of age there were no differences among the 3 groups in weight ($P < 0.01$). However, from 17 d of age and later, there were statistically significant increases in weight for the group that received the goose bacteria ($P < 0.01$). The most dramatic differences were at 17 d of age where this group averaged 130 g more in weight than the other 2 groups. The group receiving the bacteria from the Great Kiskadee differed numerically but not statistically in weight compared with the control ($P < 0.05$). It is well known, that some species of bacteria can act on the FiaF (fasting-induced adipose factor) pathway to increase fat storage. From our experiment, we could not determine if the bacteria from the goose are increasing weight gain through the FiaF pathway. However, current work involves sequencing and identification of the microbiome in the goose and from chickens receiving the goose bacteria. Identification and relative quantification of the microbiome will provide additional information regarding the mechanisms of weight gain observed in these experiments.

Key Words: microbiome, weight, undefined cultures, probiotics

464P Yeast cell wall as an alternative to AGP in broilers' diets. Roberto Fornazier^{*2}, Daniela Rodrigues¹, Valdir Junior³, Luis Albino³, Fernando Tavernari⁴, Diego Silva³, Horacio Rostagno³, Rosana Maia³, Renan Lino³, and Bruna Kreuz³, ¹Aleris, Jundiá, SP,

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Prebiotics are potential replacers for AGP by their influence on intestinal microbiota, immunity system, mycotoxins control, and others positive effects. The purpose of this study was to evaluate an ethanol fermentation *Saccharomyces cerevisiae* yeast cell wall (YCW), as a replacer of the antimicrobial, avilamycin, on broilers' performance (1–41d), phosphorus (P) and nitrogen (N) content in litter after 41d as well carcass yield. A total of 800 one-day-old Cobb chicks were blocked in a randomized design (5 treatments and 8 replications of 20 birds each). Treatments were: 1- negative control (NC), without YCW or AGP, 2- positive control (PC), NC + 0.1kg/t of AGP (avilamycin), 3- NC + 0.5kg/t of YCW, 4- NC + 1.0kg/t of YCW and 5- NC + 1.5kg/t of YCW. The YCW, branded MAXIMOS, was provide by Aleris Animal Nutrition. To simulate a challenge, there was no disinfection of facilities before housing and reused litter was utilized. Chicks were forced to a fasting of feed and water on the first day, after this, drinking water was contaminated twice a week with litter from a layer facility, until 21d. Data were submitted to ANOVA and SNK test using PROC GLM of SAS. There were no differences ($P > 0.05$) of diets on feed intake, feed conversion, and viability. PC tended to have higher BWG ($P = 0.0534$) than NC (2337 and 2527g respectively). WG of YCW diets (0.5; 1 and 1.5kg/t: WG of 2467; 2460 and 2463g, respectively) was not different from NC and PC, but values were approximate to PC. Production efficiency index (PEI) involves WG, viability, slaughter age and feed conversion values and is used to make an overall evaluation of the production. PEI results behaved in the same way of WG but statically different ($P < 0.05$) between NC (319) and PC (387). PEI average for YCW diets was 367, being 15% higher than NC and 5.1% lower than PC. Litter was evaluated and there were reductions in N and P in PC and levels of YCW. N content numerically reduced from 1.10 to 0.86%, comparing PC and 1.5kg/t of YCW. P content was higher ($P < 0.05$) in NC. Comparing PC and 1.5kg/t of YCW P numerically reduced 45%, from 11.6 to 6.4%. The carcass and yield parts were not affected by the diets ($P > 0.05$). The inclusion of ethanol fermentation yeast cell wall in broilers' diets showed equivalent results compared with AGP, without any loss in animals' performance and providing a reduction of phosphorus content in the litter when compared with NC.

Key Words: poultry, prebiotic, PEI, *Saccharomyces cerevisiae*, weight gain

465P Effect of supplementation probiotic (Micromix 3B Dry) and organic acid (Selmalex) on growth performances, carcass characteristics and meat quality of broiler chickens as rearing in tropical climates. Anon Airlang*, Faculty of Agriculture, Rajamagala University of Technology Srivijaya, Thungsong, Nakhon Si Thammarat, Thailand.

This study was conducted to determine the effect of supplementation probiotic (Micromix 3B Dry) and organic acid (Selmalex) on growth performances, carcass characteristics and meat quality of broiler chickens as rearing in tropical climates for a period of 56 d. A total of 1,400 one-day old mixed sex, Ross 308 were randomly assigned to completely randomized design (CRD) received 4 dietary groups with 5 replicates; groups 1-control: basal diet; group 2: basal diet plus organic acid (Selmalex; fumaric acid, formic acid, lactic acid, propionic acid and citric acid) 2 kg/ton feed; group 3: basal diet plus probiotic (Micromix 3B Dry; *Bacillus* sp. 5×10^{11} cfu/kg) 2 kg/ton feed and group 4: basal diet plus probiotic (Micromix 3B Dry) and organic acid (Selmalex) 2 kg/ton feed. Broilers have area in the temperature between 29 and 31°C and 78%

humidity. Result showed that supplementation of probiotic and organic acid had improved ($P < 0.05$) feed conversion ratio of broiler in starter period (1–21 d of age) when compared with the other groups. However, all of the dietary treatments had no effect on growth performances of broilers during grower (22–42 d of age) and finisher period (43–56 d of age). It was also found that supplementation of probiotic or organic acid and combination of probiotic and organic acid had no effect on carcass characteristics and meat quality of broilers. However, the result showed that supplementation of probiotic and organic acid tended to improve carcass characteristics in term of increasing breast percentage and reduced abdominal fat pad percentage. Basal on the data of this experiment it was concluded that combination of supplementation of probiotic and organic acid in the level of 2 kg/ton feed had significantly improved ($P < 0.05$) growth performances in term of feed conversion ratio of broilers as rearing in tropical climates during the starter period.

Key Words: probiotic, organic acid, growth performances, carcass characteristic, broiler

466P Evaluation of potential cytotoxic effect of silver carbene complexes in broiler chickens. Akhil Alsadwi*¹, Shah Parth³, Carolyn Cannon³, Raghad Abdaljaleel¹, Yansoon Al-Jumaa¹, Denise Caldwell², J. Byrd², and Christopher Bailey¹, ¹Texas A&M University System, College Station, TX, ²USDA, College Station, TX, ³Texas A&M Health Science Center, College Station, TX.

Silver carbene complexes (SCCs), a group of novel silver-based compounds capable of gradually releasing silver ions, possess 2 major features: significant wide antimicrobial activity and low toxicity on host cells. In terms of the latter, an in vivo study was designed to investigate the potential cytotoxic effect of SCC1 and SCC22 on one hundred five 21-d old broilers. We used a completely randomized design with a 2×3 factorial arrangement of treatments (2 products of SCCs and 3 widely spaced doses) with separate positive control pens. Determination of the median lethal dose (LD₅₀), bird performance, blood biochemistry, relative organ weight, and bone mineralization were evaluated. After a 1-week acclimation period (7-d-old), ascending doses of SCC1 and SCC22 (10, 100, 1000 mg/kg of body weight (BW)) were applied by a single oral gavage. Birds were observed from d 7 to 21 for mortalities and any toxic effects. The SCC1 did not cause any mortality among the birds at any given dose after 2 weeks from exposure. Furthermore, no abnormalities were noted on necropsy, no significant adverse effect ($P \geq 0.05$) on bird performance, relative organ weight and bone mineralization. At d 14, there was a significant product main effect ($P = 0.003$) in total plasma protein, where SCC1 had lower concentration than SCC22. At doses of 1000 mg/kg BW, plasma GGT level was significantly reduced ($P < 0.001$) in both SCC1 and SCC22 at d 21. The LD₅₀ of SCC22 was calculated using logistic regression analysis as 1274 mg/kg BW. SCC22 at a dose of 1000 mg/kg BW caused 5 mortalities (33%), at different times with 1 mortality (6%) at doses of 10 and 100 mg/kg BW. Compared with the control, only the highest level of SCC22 (1000 mg/kg BW) resulted in reduced chick body weight ($P = 0.009$), weight gain ($P = 0.003$) and increased feed to gain ratio ($P = 0.006$) after 1 week of exposure. However, there were no main effects, or a significant product by dose interaction ($P \geq 0.05$) in any of the production parameters at day-21. In the present study we report that both SCC1 and SCC22, are novel silver-based compounds that gradually release silver ions, appear to be well tolerated by broilers as judged by indicators of LD₅₀, performance, and blood biochemistry, supporting the safety and efficacy of SCC products for use in broiler feed as an alternative to traditional antibiotics.

Key Words: silver ion, SCC1, SCC22, LD₅₀, cytotoxic