Nutrition IV

T95 Essential oil compounds in combination with benzoic acid as a new feed additive concept: effects on performance of broiler chickens Cees Kwakernaak1, Laura S. Star1, Gilbert M. Weber2, 1Schothorst Feed Research B.V., Lelystad, AM, Netherlands, 2DSM Nutritional Products Ltd., Kaase­rungst, AG, Switzerland

Since the EU-ban on antimicrobial growth promoters, the poultry industry needs alternative products capable of positively modulating the gut microflora. A new feed additive formulation has been developed, which is based on the combination of a mixture of essential oil compounds (main actives: thymol, eugenol, piperrine) and benzoic acid to improve digestion and to reduce the negative impact of harmful bacterial activity. This new product, CRINA® Poultry Plus (CPP), was tested in a performance study with broilers. CPP was added at 0, 150, 300 and 450 mg/kg to starter (0-22 d), grower (22-35 d) and finisher (35-42 d) broiler diets. Diets were wheat (40-45%) and barley (5%) based and fed to either Ross 308 males or females (62 birds/pen). AME for broilers (kcal/kg) / digestible lysine (g/kg) content was 2900/10.6, 3025/10.2, and 3050/10.0 for starter, grower and finisher respectively. Mineral as well as vitamin contents met the NRC requirements. Starter and grower diets contained a chemical coccidiostat and no NSP enzymes were used. All diets were pelleted and were tested with 6 pens (replicates) per gender. Feed and water were given ad libitum. Performance data was statistically analysed using ANOVA (Genstat) with diet and gender as treatment factors. No interaction effects between gender and diet or effect of dietary treatment on mortality were found. Feed conversion ratio (FCR) of the broilers on CPP was numerically improved in starter (+1%), grower (+1.5%) and finisher phase (+1-5%). This resulted in a significantly (P<0.03) improved FCR from 0 to 42 d, when at least 300 mg/kg CPP was supplemented. Over 42 days FCR varied from 1.760 for the unsupplemented groups and 1.741, 1.732 and 1.735 for the dietary groups when 150, 300 and 450 mg/kg CPP was added respectively. Under these conditions, the addition of 300 mg/kg CPP to a wheat/barley based broiler diet did significantly improve FCR of highly productive broilers from 0-42 days of age.

Key Words: Broilers, Feed additives, Essential oil compounds, Benzoic acid, Performance

T96 Dose response effects of a formulation of essential oil compounds with an organic acid in broilers Hervé Juin1, Gilbert M. Weber2, 1INRA Magneraud, Sargères, Sargères, France, 2DSM Nutritional Products Ltd., Kaisersruht, AG, Switzerland

A 6-week floor pen experiment was conducted in order to evaluate the efficacy of CRINA® Poultry Plus (CPP), a combination of essential oil compounds (thymol, eugenol, piperrine) with benzoic acid, when added to a wheat-based diet in broilers (Ross PM3). Control diets were formulated with 3000 kcal metabolisable energy and 20% crude protein or 3100 kcal metabolisable energy and 20% crude protein for starter (1-22 days) and grower periods (23-43 days) respectively. CPP was added at inclusion levels of 0 (control), 200, 300 and 400 g/T of feed. Each of the 4 dietary treatments was assigned to 6 pens of 40 male and 6 pens of 51 female birds. Body weight at 22 and 43 days of age and feed conversion ratio (FCR) per pen and per period were monitored as performance parameters. At 23 days, cecal contents from 4 birds per pen were collected and analyzed for specific intestinal bacteria (Lactobacilli, Clostridium, Coliforms and Streptococci). At 44 days, carcass yield was measured on 5 birds per pen. No differences between groups were observed for FCR, cecal microorganisms or carcass yield, but growth was improved. In females, dietary supplementation with CPP at 300 g/T significantly improved weight at 22 days of age from 760 g (negative control) to 790 g (+3.9%). In males, dietary supplementation with CPP at 300 g/T significantly improved weight at 22 days of age from 795 g (negative control) to 866 g (+8.9%) and weight at 43 days of age from 2757 g (negative control) to 2860 g (+3.7%), respectively. Since CPP300 resulted in the highest body weight of all treatments (significant on day 22), 300 ppm of CPP was considered as the optimum dose. CPP demonstrates the ability to improve broiler performance and potentially function as an alternative to antibiotic growth promoters.

Key Words: Broilers, Essential oils, Benzoic acid, Performance

T97 Effect of a dietary feed additive with anti-inflammatory properties on growth performance and immune response of chickens Theo Niewold1, Kurt Van de Mierop1, Anne Goderis2, 1Catholic University of Leuven, Department Animal-Food-Quality, Heverlee, Vlaams-Brabant, Belgium, 2NU­TREX IV, Lille, Antwerp, Belgium

This experiment was carried out to study the effect of dietary supplementation of a feed additive containing natural anti-inflammatory substances (Y-Mune) on the performance and on the inflammatory response of chicks immunized with human serum albumin (HSA). 200 male chicks were randomly allocated to 8 floor pens. 2 treatments were studied, with 4 repeats per treatment. One group received a commercial diet, while the other received the same diet supplemented with 300 ppm Y-Mune. At d14, starter diet was changed for a commercial finisher diet. The chicks that received the Y-Mune-supplemented starter diet were now provided with the 300 ppm Y-Mune-supplemented finisher diet. Body weight (BW) and feed intake were recorded per pen at 2, 4 and 6 weeks (wk) of age. At 3 weeks of age, 3 chicks per pen were taken at random and a blood sample was collected from a wing vein. These chicks were then injected subcutaneously with 100 µg HSA (100 µg HSA/100 µl PBS and Freund’s complete adjuvant (FCA): 50:50 v/v). 2 other chicks per pen of each group were injected subcutaneously with 100 µl phosphate-buffered saline (PBS) as control vehicle. During the next 3 weeks, blood samples were taken regularly. 14 d after the first immunization, the HSA-challenged chickens received a 2nd immunization with HSA. The control chicks received a similar volume of PBS. The acute phase protein (APP) response was measured by quantification of Ceruloplasmin (Cp) concentrations. ELISA was used for quantification of anti-HSA IgG. Data on performance and plasma parameter values were analyzed with a two-factor ANOVA with age and diet as variables. At d42, the Y-Mune-supplemented chicks had the highest BW and the lowest total feed conversion compared to the control chicks (3105 g vs 2940 g and 1.674 vs 1.756) (not statistically significant (p<0.01) compared with other programs. The number of Enterobacteriaceae was increased significantly(p<0.05). The total number of anaerobic bacteria was significantly decreased (p<0.05) by BSC and by AGP. It was concluded from this study that BSC improved FCR in the presence of VM or BMD® and BSC may potentially contribute to reducing the feed expense portion of broiler production cost.

Key Words: Broilers, Essential oils, Benzoic acid, Performance

T98 Effect of Bacillus subtilis C-3102 (CALSPORIN®) with growth promoting antibiotics on live performance of broiler chickens. Tomohiro Hamaoka1, Brian Y. Lee1, Danny M. Hooge2, Michael D. Sims3, Naoki Onomo4, 1Calpis USA, Inc., Mt. Prospect, IL, 2Hooge Consulting Service, Inc., Mountain, UT, 3Virginia Diversified Research, Inc., Harrisonburg, VA

Bacillus subtilis C-3102 (BSC) is utilized in a direct-fed microbial product CALSPORIN®. The BSC has been used to improve production performance in broilers since 1986. To investigate the effect of using BSC with growth promoting antibiotics (AGP), a 42-d trial was conducted. A 2X3 factorial arrangement with 6 dietary treatments was used (BSC levels, 0 or 3X105^5 ^CFU/g, and 3 AGP treatments). Virginiamycin (VM) and Bacitracin Methylene Disalicylate (BMD®) were used as AGP. The 3 AGP treatments were: 1) no antibiotics (NA); 2) VM 20 g/ton (VM20); 3) BMD® 50g/ton from 0 to 7 d, BMD® 25g/ton from 8 to 35 d, then VM 20 g/ton from 36 to 42 days (BD/VM). There were 20 replicate pens with 30 Cobb 500 chicks each per treatment. The BW and feed conversion ratios (FCR) were measured at day 21, 35 and 42. Fecal samples were collected from all pens at the end of the trial for microbial profiling. All data were analyzed by SAS/STAT using GLM procedure and Tukey’s HSD test to separate means. Significant improvement
The EU limits the contents of arsenic to 12 mg/kg, lead at 30 mg/kg, mercury

Ruben Perez

ABSTRACT OF PAPERS

T99 Hypcholesterolemic effect of herbal supplement on serum and egg yolk cholesterol in layers Shivi Mains1, Ajay Kandura2, Kotaarin Ravi-kant2, Vithal Mundai1, Shrish Kkone1 1College of Veterinary & Animal Sciences, Udgir, Maharashtra, India, 2Ayurvet Limited, Baddir, Himachal, Pradesh, India

The relationship between cholesterol & atherosclerosis has long been of concern. Plasma total cholesterol & low density lipoprotein (LDL) are closely related to atherosclerosis & excessive concentration of these two may lead to coronary artery disease or death. Ordinary chicken eggs provide protein, vitamins & lipids that contain high levels of cholesterol. Thus, eggs are considered to be a high-cholesterol food. In addition to genetic selection of chicks, research with lowering egg-yolk cholesterol has centered mostly on dietary manipulation, dietary supplementation & pharmacological intervention. An experiment was conducted to evaluate efficacy of Herbal hypcholesterolemic supplement (supplied by Ayurvet Ltd. Baddi, India) for its effect on cholesterol level in serum & egg yolk. Major constituent herbs of this hypcholesterol

Key Words: Bacillus subtilis C-3102, Calsporin, Broiler, direct-fed microbial, AGP

T100 Effects of Aflatoxins and Fumonisins on performance of Broilers and the efficacy of a Feed Additive containing Fumonisin degrading Enzyme Karin Naehrer1, Carmen Mallmann2 1BIOMIN Holding, Herzogenburg, Lower Austria, Austria, 2Federal University of Santa Maria, Santa Maria, RS, Brazil

Mycotoxins are a potential threat in poultry production leading to decreased performance and impaired health. An experiment was conducted at the SAMITEC Institute (Brazil) with mycotoxicological analysis carried out at the LAMIC lab of Universidade Federal De Santa Maria (Brazil) with the aim to evaluate the efficacy of an experimental feed additive containing a fumonisin degrading enzyme (FUMzyme®) in diminishing the toxic effects of aflatoxins (Afla) and/or fumonisins (FUM) added to broiler rations. 600 one-day old COBB male broilers were divided into 8 treatment groups with 6 or 12 replicates and 10 birds each replicate for 21 days. Group 1: Control group (no mycotoxins, no feed additive), Group 2: 0.5% feed additive containing Mycorase® FUM, Group 3: 2.8 ppm Afla, Group 4: 2.8 ppm Afla, 0.5% feed additive containing FUMzyme®; Group 5: 100 ppm FUM; Group 6: 100 ppm FUM, 0.5% feed additive containing FUMzyme®; Group 7: 2.8 ppm Afla and

Key Words: Mycotoxins, Aflatoxins, Fumonisins, Sphinganine:sphingosine ratio

T101 Study of the Presence of Heavy metals in Anti-Mycotoxin Additives Based in Aluminosilicates. Juan Carlos Medina B.*, Robertina Zuniga, Ruben Perez Franco NUTEK S.A: de C.V., Tehuacan, Puebla, Mexico

The EU limits the contents of arsenic to 12 mg/kg, lead at 30 mg/kg, mercury at 0.1 mg/kg and cadmium at 5 mg/kg in aluminosilicate and raw materials of mineral origin which are used in making balanced feeds. Due to the above, a search of heavy metals was performed on two commercial products based in aluminosilicates (commercialized as aflatoxins adsorbents). The products are available in Latin American markets. One of the products is of national origin (Mexico) and the other is from the United States. Previous studies have proven that deposits of aluminosilicates contaminated with arsenic have been found especially in Northern Mexico. The assays were performed by atomic absorption. Using the techniques of hydride generation to determine arsenic and mercury contents, lead was quantified by means of the flame technique and cadmium was determined with the graphite furnace procedure. The samples for analysis were sent to this laboratory. Arsenic and lead were analyzed in the 40 samples of the commercial product proceeding from the United States. All 4 heavy metals considered were tested on the 120 samples received by the laboratory of the national product. With the values obtained for each element and every one of the products, the average was calculated and the percentage of samples above the maximum level permitted was reported. For the national product, the average of the analyses of arsenic, it was of 3.3 ppm and for the imported product was 3.2 ppm, that is to say all the results were minor to the limit allowed of 12 ppm. In case of the contamination with lead: the national product was 14 ppm as an average, all the samples inside the international norm. The imported product was 29.4 ppm in average. 40 % of the samples were as brought out of the specification of 30 ppm. The national product 1 bring free of contamination with mercury and cadmium. The imported product was not analyzed for these elements. It was confirmed in this study that the imported product is contaminated with lead, 40% of the analyzed samples has a reported value above the tolerance level. The national product was reported free of contamination with arsenic, lead, mercury and cadmium.

Key Words: Mycotoxins, Leads, Feed, Arsenic, Binder

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T102 Functional Oils are an Alternative to Pharmaceutical Growth Promoters in Turkeys. Peter Ferket1, Ramon Malheiro1, Vera Moraes1, Ayub Ajoka1, Ilana Barash1, Joan Torrent1 North Carolina State University, Raleigh, NC1, Sao Paulo State University, Sao Paulo, Brazil, 1Oligo Basics USA, Excelsior, MN

Essential1 (Oligo Basics USA, Wilmington, DE), a blend of functional oils from cashew and castor beans, was evaluated as an alternative to monensin and virginiamycin on the growth performance of turkey toms. One day-old poults were placed in floor pens with used litter to provide a natural microbial challenge. Feed and water were provided for ad libitum consumption. Birds were randomly assigned to 3 dietary treatments from 1-84d: non-medicated control (C), 0.15% Essential1 (E), and 0.15% Essential1 (E), and 66 ppm Monensin (M). Each one of the 15 pens/treatment was then distributed among 3 other dietary treatments from 85-140d: C, E, and 20 ppm Virginiamycin (V), which resulted in 9 treatments (5 pen/treatment, ~13 toms/pen). Body weights (BW), feed intake (FI) and FCR (adjusted for mortality) were determined at 28d intervals. None of the treatments affected the mortality rate during experiment. At 84d, toms fed M and E and M on BW continued from 85-140d, with a significant additive benefit when followed by E (+1% over C) and V (+5% over C) supplementation from 85-140d. However, a significant period X treatment effect was observed on 1-140d FCR. Among toms fed E from 1-84d, E and V supplementation from 85-140d reduced 1-140d FCR by ~6% relative to C; but among toms fed M and C from 1-84d, E and V supplementation from 85-140d increased 1-140d FCR by ~6% relative to C. Although dietary supplementation of M was better than E supplementation on 1-84d growth performance, E and V showed similar growth promoting effects from 85-140d. The results showed that Essential1 was an effective alternative to pharmaceutical antimicrobials for starting and finishing turkeys.

Key Words: Functional Oils, Monensin, Virginiamycin, Growth Performance, Turkeys

T103 Effects of feeding a mixture of organic acids, a phytochemical and a permeabilising substance on the growth inhibition of bacteria and performance of broilers Angela Riemensperger1, Renata Urbaityte1, Sigrid Pastein1, Fernando Guilherme Perazzo Costa2 Binomin HOLDT GmbH, Herzogenburg, Lower Austria, Austria, 2Federal University of Paraiba, Paraiba, Brazil

Purpose of the experiments was to investigate if a mixture of organic acids (OA), a phytochemical (Ph) and a permeabilising substance (P) inhibits the growth of pathogenic bacteria and thus has positive influence on broiler performance as birds do not have to compete with the bacteria for nutrients anymore or loose energy for immune responses caused by the presence of pathogenic bacteria. For the in vitro trial Salmonella enteritidis (SE), Salmonella typhimurium (ST), E. coli O55:K59:BS:H1 (ECO55) and E. coli O128:H2 (ECO128) were cultivated and used for a microplate assay. Growth inhibition of SE, ST, ECO55 and ECO128 by OA was 33.5, 59.3, 55.2 and 33.3%, respectively, while the addition of the Ph inhibited the growth of SE, ST and the two E. coli strains by 99.0, 99.8 and 100.0%. After adjusting the medium growth inhibition of SE, ST, ECO55 and ECO128 by OA and the Ph was 69.9, 39.9, 29.5 and 2.3%, respectively, while the addition of P inhibited growth by 86.2, 100.0 and 100.0%, respectively. The effects of feeding a commercial diet (CD) or a common BW (NC) were 1.882, 1.860, and 1.836 (p<0.001) and 1.882, 1.868, and 1.878 (p=0.933), respectively. The 0-47 d mortality-adjusted FCR were respectively 1.938a, 1.878ab, and 1.796b (p<0.05). The 0-42 d mortality-adjusted FCR were respectively 1.938, 1.878, and 1.796 (p=0.933) and to a common BW (NC) were 1.882, 1.860, and 1.836 (p=0.606). The 0-47 d mortality % were respectively 8.50, 7.00, and 7.5 (p<0.001). In a 42-d trial, the addition of OA, Ph and P inhibited growth of pathogenic bacteria and thus has positive influence on broiler performance as birds do not have to compete with the bacteria for nutrients anymore or loose energy for immune responses caused by the presence of pathogenic bacteria. In conclusion, the addition of OA, Ph and P inhibited the growth of bacteria in vitro and improved growth performance of broilers over a 42 day period.

Key Words: organic acids, phytochemical, permeabilising substance, bacteria inhibition, broiler performance

T104 Broiler chickens performance enhanced through addition of CALSPORIN® or CALSPORIN® plus QMOS to basal or AGP-supplemented diets. Troy Lohrmann1, Karen Christensen1, Michael Sims2 Quality Technology International, Inc, Elgin, IL, 2OK Farms, Inc., Mountain View Research, Fort Smith, AR, 1Virginia Diversified Research Corp., Harrisonburg, VA

A 42-d summer time, pen trial with high stocking density used 720 Hubbard M99 x Cobb 500 chicks fed 3 treatments: 1) negative control (NC); 2) CALSPORIN® (CSP; 3x1010 cfu/g feed); and 3) CSP plus 1x Q-MOS™. Q-MOS™ is a proprietary Saccharomyces cerevisiae cell wall derived product. 8 pens of 30 chicks/treatment were placed (initial stocking density of 0.062 m2 (0.67 ft2) per bird was decreased by 10% at 21 d. Birds were placed on new litter, at 7 d and 21 d, and composted litter was added to each pen. Corn-soy-DDGS-meal and bone meal diets were used. Salinomycin was added at 50 g/tom to starter and 60 g/tom to grower feeds (0-35 d). The 42-d BW were respectively 1.861, 1.929, and 1.962 kg (p=0.021; 1-way ANOVA, LSD). The 0-42 d mortality-adjusted FCR were respectively 1.938, 1.878, and 1.796 (p<0.035). The 0-42 d mortality % were respectively 8.33, 5.00, and 6.25 (p=0.216). A 47-d pen trial with 600 Hubbard x Cobb 500 chicks (10 pens of 20 chicks each/treatment) used 3 dietary treatments: 1) negative control (NC; corn-soy-DDGS-animal protein blend diets); 2) BMD® 25 g/tom 0-29 d and Stafac® 10 g/tom 29-47 d; and 3) BMD®/Stafac® plus CSP (3x1010 cfu/g feed) and 1x Q-MOS™. 29-47 d, outdoor temperatures ranged 37.2-46.1°C. The 47-d BW were respectively 2.932, 2.957, and 3.064 kg (p=0.085; 1-way ANOVA, LSD). The 0-47 d mortality-adjusted FCR were respectively 1.882, 1.868, and 1.878 (p=0.933) and to a common BW (NC) were 1.882, 1.860, and 1.836 (p=0.606). The 0-47 d mortality % were respectively 8.00, 7.00, and 7.5 (p<0.005). In a 42-d trial, the addition of OA, Ph and P inhibited growth of pathogenic bacteria and thus has positive influence on broiler performance as birds do not have to compete with the bacteria for nutrients anymore or loose energy for immune responses caused by the presence of pathogenic bacteria. In conclusion, the addition of OA, Ph and P inhibited the growth of bacteria in vitro and improved growth performance of broilers over a 42 day period.

Key Words: organic acids, phytochemical, permeabilising substance, bacteria inhibition, broiler performance

T105 Effect of adding dietary humate on productive performance of broiler chickens Sherif Hassan1, S. M. Hassan and A.A. Al-Aqil College of Agriculture and Food Science, King Faisal University, AL-Hassa, Saudi Arabia

One hundred thirty five one-d-old broiler chicks were randomly distributed among 3 treatments with 3 replicates of 15 chicks per replicate. Chicks were assigned to one of the following treatments: 1) chicks fed broiler starter control diet, 2) chicks fed control diet containing 5 g humate/kg feed, and 3) chicks fed control diet containing 10 g humate/kg feed. Weekly body weight, body weight gain, feed intake, feed conversion, and mortality rate were recorded from 0 to 28 d of age. Body weight and body weight gain of chicks fed diet containing 10 g humate/kg feed was significantly lower than other treatment groups at 14 d of age, but body weight gain of chicks fed diet containing 5 g humate/kg feed was significantly lower than those fed diet containing 10 g humate/kg feed at 28 d of age. Body weight of chicks fed diet containing 5 g humate/kg feed was significantly lower than other treatment groups at 14 d of age, but body weight gain of chicks fed diet containing 10 g humate/kg feed was significantly lower than control chicks at 28d of age. Feed intake of chicks fed diet containing 10 g humate/kg feed was significantly lower than other treatment groups at 14 d of age, but chicks fed diet containing 5 g humate/kg feed was significantly lower than the other treatment groups at 14 d of age, but chicks fed diet containing 5 g humate/kg feed was significantly lower than those fed diet containing 10 g humate/kg feed at 28 d of age. Feed conversion of chicks fed diet containing 5 g humate/kg feed was significantly lower than other treatment groups at 28 d of age. There were no significant effects of both levels of humate used in this study on mortality rate. Results suggest that adding humate in the broiler diets has effect on the productive performance of broiler chicks.

Key Words: antibiotic, Bacillus subtilis C3102, broiler, CALSPORIN, QMOS

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