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ABSTRACTS
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SYMPOSIA AND ORAL SESSIONS

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kcal/kg). N digestibility and DE was higher ($P < 0.05$) in birds fed WS, but no significant difference was seen in DM and En (DE: 3,447 vs. 3,343 kcal/kg) between the two. The En and DE values were lower ($P < 0.05$) with increasing adaptation lengths (lower on day 12 vs. days 4 and 8; DE: 3,158 vs. 3,234 and 3,233 kcal/kg). Energy digestibility and the DE of the test ingredient were higher for corn ($P < 0.05$) compared to wheat middlings (DE: 3,288 vs. 1,614 kcal/kg; En 72.7 vs. 35.3%). Based on these results, the En and DE of corn and wheat middlings was not influenced by the adaptation length. However, corn had a higher DE compared to wheat middlings.

Key Words: Broiler, Corn, Energy, Wheat, Digestibility

M73 Effects of multiple direct fed microbial feed additives on broiler performance Corey Johnson*^{GS1}, Kyle Smith¹, Nathan Augspurger², Jason Lee¹ ¹*Poultry Science, Texas A&M University;* ²*JBS United*

Two experiments were conducted to evaluate growth performance in broilers fed diets supplemented with two *Bacillus* spp. based direct fed microbial feed additives (DFM). In both experiments, birds were fed non-medicated diets in three phases (d 1-12, d 13-26 and d 29-35). All diets were corn-soybean meal based and contained corn dried Distillers' Grains with Solubles and meat and bone meal. Body weight (BW), feed consumption (FC), body weight gain (BWG) and mortality corrected feed conversion (FCR) were evaluated at d 12, d 26 and d 35 for both experiments. Replicates were arranged in a completely randomized block design with 50 male Cobb broilers per replicate. Experiment 1 consisted of four treatments and 13 replicates, including a non-medicated control and DFM A supplemented at 3.67×10^8 , 7.35×10^8 , or 1.10×10^9 cfu/kg, respectively. Feed conversion ratio was reduced ($p < 0.05$) in broilers fed diets containing DFM A at all inclusion levels compared to the control from d 1-12, d 27-35 and d 1-35. Elevated inclusion of DFM A did not further improve any evaluated parameter as compared to the lowest inclusion level. These results demonstrate a performance benefit with the inclusion of DFM A. Experiment 2 consisted of three treatments and 12 replicates, including a non-medicated control, DFM A at 3.67×10^8 cfu/kg and DFM B at 7.35×10^7 cfu/kg. During this experiment, an elevated level of mortality was observed during the grower phase between d 15 and 19. Mortality was reduced ($p < 0.05$) in birds fed DFM A compared to the control from d 15-26 (2.48 vs 9.99%) and d 1-35 (6.67 vs 15.61%). Feed conversion ratio was improved ($p < 0.05$) in broilers fed diets containing each DFM premix from d 1-12 (1.24 vs 1.27) and DFM B from d 13-26 (1.55 vs 1.58) compared to the control. These data demonstrate the growth performance benefits observed when using either of the *Bacillus* spp. based DFM investigated in these experiments.

Key Words: DFM, Broiler, Performance, Mortality

M74 Dynamics of expression of tight junction protein encoding genes in the jejunum of broiler chickens induced to necrotic enteritis and supplemented with sodium butyrate and essential oils Cristiano Bortoluzzi*^{GS1}, Bruno Vieira¹, Juan Mallo², Monica Puyalto², Maria Villamide³, Charles Hofacre⁴, Todd Applegate¹ ¹*University of Georgia;* ²*Norel;* ³*Universidad Politecnica de Madrid;* ⁴*SPR Group*

The objective of this study was to determine the effects of sodium butyrate protected with sodium salts of palm fatty acids (0.1% of N^oRGY; SB), and sodium butyrate plus essential oils (carvacrol and ginger, 0.5% of each in the commercial product) protected with sodium salts of palm fatty acids (0.1% of NATESSE; SBEO) on jejunum morphology, and expression of TJ proteins encoding genes in the jejunum *Clostridium perfringens* challenged broiler chickens. One-day-old broiler chickens were assigned to 4 treatments with 8 replicates of 58 birds each. The treatments were: 1 - Negative control - NC (basal diet and no challenge), 2 - Positive control - PC (basal diet and challenge) 3 - PC+SB, and 4 - PC+SBEO. On d 1, all birds were vaccinated against coccidiosis by coarse spray (Coccivac[®]-B52). On d 13, the birds from treatments 2 to 4 were inoculated with ~5,000 oocysts of *Eimeria maxima* by oral gavage. On d 18 and

19, the same birds were administered a fresh broth culture of *C. perfringens* via drinking water. Jejunal samples were collected at 12, 18, 21, and 28 d of age to analyze morphology, microscopic lesion score, and expression of claudin 1, 2, and 4, zonula occludens 1, and occludin encoding genes. There was no effect of diet nor challenge on the microscopic lesion score ($P > 0.05$). Jejunal morphology was affected by diet on d 12, wherein SB supplementation increased villus height ($P = 0.001$) compared to the other groups. Additionally, on d 12, SBEO upregulated the expression of occludin ($P = 0.02$), when compared to the other groups. At d 18, five d after the *E. maxima* challenge, SB supplementation upregulated claudin 4 expression ($P = 0.02$); SB tended to upregulate claudin 1 ($P = 0.08$), and partially attenuated the effect of the challenge on the expression of zonula occludens 1 ($P = 0.07$). No effects were observed at d 21 on the expression of these genes. On d 28, SB supplementation partially restored the expression of claudin 1 ($P = 0.02$), compared to PC or PC+SBEO. Sodium butyrate supplementation had beneficial effects on the expression of TJ genes. Future research is needed, however, to determine whether these changes would affect the leaking of plasma proteins into the intestinal lumen, and decrease the translocation of undesirable molecules and/or bacteria.

Key Words: Butyrate, broilers

M75 The effect of refined functional carbohydrates (RFC) and coarse corn in broiler diets on the prevalence of Salmonella in broiler ceca. Grayson Walker*^{GS1}, Coltin Caraway¹, Sangita Jalukar², John Brake¹ ¹*North Carolina State University;* ²*Arm and Hammer Animal Nutrition*

Enzymatic hydrolysis of yeast produces RFC that have activities against gram negative bacteria. Specifically, Aviator SCP (Arm and Hammer Animal Nutrition, Princeton, NJ) possesses sugars that interfere with *Salmonella* attachment to the intestinal lumen. The utilization of dietary coarse corn (CC) in addition to RFC was investigated in response to a need for holistic broiler microbial control programs that address nutrition and management aspects of broiler production. A total of 576 male broiler chicks were assigned to new litter pens following coccidiosis vaccination. Broilers were fed a 0 (RFC-0) or 100 (RFC-100) g/MT RFC diet. Broilers were further fed either a fine corn (FC) diet or a diet with increasing levels of CC (0% to 10 d, 15% from 11 to 21 d, 30% from 22 to 35 d, and 45% from 36 d) to 48 d of age to complete a 2 x 2 factorial design. Treatments were randomly assigned to 6 replicate pens of 24 broilers per interaction. At 48 d of age, 5 broilers were randomly selected from each pen and assayed for presence of *Salmonella* in the ceca using enzyme linked fluorescence assay methods. *Salmonella* were isolated from 10.00% of ceca from RFC-0/FC broilers and 16.67% of ceca from RFC-0/CC broilers, which was significantly greater than the RFC-100/FC broilers ($P < 0.05$) where there was no *Salmonella* isolated. The RFC-100/CC broilers were statistically intermediate with 6.67% of ceca positive. These data demonstrated that RFC had a beneficial effect on the presence of *Salmonella* in the ceca of broilers.

Key Words: Salmonella, RFC, coarse, corn, broiler

M76 Performance, nutrient utilization and relative immune organ weights in broiler chickens fed corn-soybean meal diets without or with yeast nucleotides upon challenge with Eimeria Haley Leung*^{GS1}, Rob Patterson², John Barta¹, Elijah Kiarie¹ ¹*University of Guelph;* ²*Canadian Biosystems*

Studies on the effects of yeast supplements report conflicting findings on performance, nutrient utilization and immune response in the presence or absence of an enteric pathogen challenge. To evaluate the effects of yeast nucleotides (YN) on performance, nutrient utilization and immune organ weights, 336 d old male broiler chicks (Ross 708) were used. The birds were housed in floor pens with fresh wood shavings and allotted to a corn-soybean meal based diet without or with YN (500 g/t; n=14). On d 10, broilers in seven pens/ diet were orally given 1-mL of *Eimeria* culture (*E. acervulina* and *E. maxima* sporulated oocysts) and the rest were given 1-mL of distilled water. On d 15 and d 35, two birds/pen were euthanized