312 Yeast cell wall in broilers' diets improves performance and reduces phosphorus in litter. Roberto Fornazier[5], Daniela Rodrigues*[1], Valdir Junior[2], Luis Albino[4], Fernando Tavernari[3], Horacio Rostagno[2], Diego Silva[2], Mariane Marques[2], Tarcisio Tizziani[2], and Maurilio Junior[2], *[1]Aleris, Jundiai, SP, Brazil, [2]Viçosa Federal University, Viçosa, Minas Gerais, Brazil, [3]Embrapa Swine and Poultry, Concórdia, Santa Catarina, Brazil, [4]Viçosa Federal University, Viçosa, Minas Gerais, Brazil, [5]University Estado de Santa Catarina, Chapecó, Santa Catarina, Brazil.*

The purpose of this study was to evaluate the effects of ethanol fermentation yeast cell wall (*Saccharomyces cerevisiae*), in an AGP-free broilers diet, on the performance of broilers (1 to 41d), on phosphorus and nitrogen concentration of litter after 41d and on carcass and noble parts yield. Six hundred forty 1-d-old Cobb broilers chicks were distributed in a complete randomized block design, with 4 treatments and 8 replications of 20 birds each. The treatments were a control diet, without yeast cell wall (YCW), and crescent inclusions: 0.5; 1.0 or 1.5kg/t of the YCW named MAXIMOS provide by Aleris Animal Nutrition. To simulate a challenging scenario, there was no disinfection of the facilities before housing and the utilized litter was reused. During the first 24 h, the chicks were forced to a restriction of feed and water, after this period the drinking water was contaminated twice a week with litter from a layer facility, until 21d. Data were submitted to ANOVA and orthogonal polynomials to determine linear and quadratic effects of YCW supplementation, using the PROC GLM procedure of SAS. There were no differences ($P > 0.05$) of diets on feed intake, feed conversion, and viability. There were notable advantages in weight gain (WG), feed conversion (FC) and production efficiency index (PEI) of using YCW in broilers' diets. From 1 to 21d the diets provided quadratics effects ($P < 0.05$) to WG and FC, giving an ideal inclusion level of 1kg/t. For total phase, there were found linear effects ($P < 0.05$) for WG, FC, and PEI. WG increased from 2337g to 2463g (5.4%); FC reduced from 1.72 to 1.59 (7.3%) and PEI improved from 319 to 368 (15.2%) for Control and 1.5kg/t MAXIMOS, respectively. In the end of the trial, litter was evaluated and there were reductions in the content of nitrogen and phosphorus with increasing levels of YCW. The nitrogen content reduced ($P = 0.066$, no statistical difference) from 1.40 to 0.86% and phosphorus reduced 51% ($P < 0.001$), from 13.1 to 6.4%. The carcass and yield parts were not affected by the treatments ($P > 0.05$). The inclusion of ethanol fermentation yeast cell wall in broilers' diets without antimicrobials growth promoters improves performance and provides environmental benefits reducing phosphorus content in the litter.

Key Words: AGP free, feed conversion, nitrogen, poultry, *Saccharomyces cerevisiae*

313 Effects of synbiotic supplementation on intestinal development and integrity of broilers. Chasity Pender*[1], G. Raj Murugesan[2], and Dawn Koltes[3], *[1]Biomin America Inc., Manassas, VA, [2]Biomin America Inc., San Antonio, TX, [3]University of Arkansas, Fayetteville, AR.*

As researchers and industry leaders search for an alternative to the use of sub-therapeutic antibiotics to help alleviate concerns of antibiotic resistance and satisfy consumer and regulatory demands, probiotics have received increased attention for their ability to improve enteric health in poultry. The objective of this experiment was to evaluate the effects of synbiotic (probiotic + prebiotic) supplementation on broiler intestinal development and integrity. A total of 300, day-old, Cobb 500 broiler chicks were randomly assigned to one of 2 treatment groups, a non-treated control and a treated group supplemented with a synbiotic (PoultryStar me^{US}; 500 g/ton), each consisting of 3 replicate pens (50 birds/pen). On d 7, 14, 21, and 35, 8 birds per treatment were euthanized and duodenum, jejunum, and ileum samples were taken for histological analysis (villus height, crypt depth, and villus height:crypt depth (VH:CD)), and ileal samples were collected for integrity measurements (transepithelial electrical resistance (TER) before and after lipopolysaccharide (FITC-LPS) challenge). Villus height was increased ($P < 0.05$) in all 3 small intestinal segments in the first week of life for synbiotic group. On d 14, duodenal villi height was augmented ($P < 0.05$) in the synbiotic fed birds. Increase in villus length continued in the ileum until d 35 for synbiotic group ($P < 0.05$). The TER for synbiotic fed birds increased ($P < 0.05$) until d 35 while the TER for birds fed non-treated feed increased only until d 21, indicating enhanced integrity with synbiotic supplementation. Challenging with FITC-LPS increased ($P < 0.05$) the TER in both groups on d 7, 14, 21, and 35. Exposure to FITC-LPS increased ($P < 0.05$) TER in the synbiotic group in comparison to the control group on d 35. The change in TER was higher ($P < 0.05$) in synbiotic group on d 21 and 35 suggesting synbiotic supplementation increased the resilience of intestinal tract in the face of a potential challenge. Overall, these results suggest that the synbiotic used in this study could be an effective means of improving intestinal development and integrity and allow the intestinal tract to adapt to pathogenic stressors, thus helping to prevent bacterial translocation and enteric diseases.

Key Words: probiotic, LPS, gut barrier function, TER, villus height

314 Effect of various sodium and chloride levels on the performance of broilers fed diets with Lasalocid. Manuel Da Costa*[1], Kalen Cookson[1], Sam Hendrix[2], Steve Davis[2], Jon Schaeffer[1], and John Dickson[1], *[1]Zoetis, U.S. Poultry, Durham, NC, [2]Colorado Quality Research, Wellington, CO.*

The interactive effects of anticoccidial ionophores and dietary electrolyte levels on broiler performance are widely recognized. It is believed that this interaction is exacerbated with divalent ionophores. The objective of this study was to evaluate the performance of broilers fed 2 levels of Avatec (Lasalocid) in combination with 12 sodium (Na) and chlorine (Cl) ratios. A total of 3,840 d-old Cobb 500 males were placed in 192 pens divided in 8 blocks. Dietary treatments consisted of a factorial arrangement of 2 levels of Avatec (90 and 125ppm), 4 levels of Na (0.16, 0.18, 0.19 and 0.22%), and 3 levels of Cl (−20, equal and 20% of Na). The treatment levels were kept constant across the 3 dietary phases (starter: 0 to 18 d; grower: 18 to 28 d; finisher: 28 to 42 d) with the exception of the 0.18% Na, where there was a 0.02% increase for each phase. Birds and feed were weighed at the end of each dietary phase for performance evaluation. Mortality was recorded daily for adjusted feed conversion ratio (FCR) calculation. Data were analyzed as a CRBD with pen as the experimental unit and repeated measures. No differences ($P > 0.050$) were observed on BW and FCR at 18 d. At 28 and 42 d, birds fed high levels of Avatec were significantly lighter ($P < 0.001$) with higher ($P < 0.005$) FCR than birds fed low levels. There was a Na by Cl interaction ($P < 0.001$) on FCR at 28 and 42 d of age. At both high and low levels of Na, FCR was minimized when combined with high and low levels of Cl, respectively. When birds were fed high levels of Cl, increasing Na levels resulted in lower FCR. In conclusion, the Avatec level most commonly used commercially (90 ppm) resulted in better performance

than the high level (125 ppm). This was especially evident at later stages of the growing cycle. Nevertheless, it should be considered that birds did not face any specific coccidiosis challenge herein; therefore, it might be advisable to base Avatec dose level considering coccidial challenge. In addition, the interaction of Na and Cl reveals that the ratios between these electrolytes may be as important as their absolute levels.

Key Words: Avatec, sodium, chloride, electrolyte, broiler

315 Validation of an alternative growth promoter, Presan-FY, under research and commercial broiler production conditions in North America. Kellie Hogan*[1] and Gregory Page[2], *[1]Trouw Nutrition, Dacula, GA, [2]Trouw Nutrition Agresearch, Guelph, ON, Canada.*

The present studies validated the use of Presan-FY (Selko Feed Additives), a commercially available blend of short chain fatty acids (SCFA), medium chain fatty acids (MCFA), slow release MCFA and a phytogenic compound, as an alternative growth promoter under US production conditions and commercial conditions in Canada. The goal of these studies was to assess if Presan-FY could support broiler performance relative to BMD at prevention levels (55 ppm). The controlled study was performed at Southern Poultry Research, Inc. in Athens, GA. A total of 3600 Ross 708 male coccidiosis-vaccinated chicks were assigned to treatments pens on re-used litter. Broilers were grown to a final weight of approx. 2.5 kg (49 d) or 3.6 kg (63 d), with one of 4 treatments: negative control (no AGP or Presan-FY); Presan-FY standard dose (1.5 – 1.0 – 0.5 kg/t starter – grower – finisher); Presan-FY elevated dose (2.0 – 1.5 – 1.0 kg/t starter – grower – finisher); or BMD. The results were analyzed using SAS 9.4 software to assess multiple comparisons (ANOVA). The observed body weight gains of the Presan-FY groups were comparable with the AGP group, and significantly higher than the negative control ($P < 0.05$), with no dose-response effect to elevated levels of Presan-FY. The feed conversion ratio (FCR) of Presan-FY groups were similar to the BMD group, and significantly lower than the negative control group ($P < 0.001$). In the commercial study, 40 commercial straight-run Ross 708 broiler flocks were placed between April–June 2016, and fed a commercial feed program (Nicarb + Biocox in starter, Biocox in grower and finisher, with plain withdrawal), supplemented with Presan-FY (1.2 – 0.8 – 0.4 kg/t starter - grower – finisher) or BMD (55 ppm/kg, all phases). Twenty-two flocks (614,550 broilers) were fed the Presan-FY program, while 18 flocks (514,692 broilers) were fed the BMD program, with a target weight of 2.15kg. The results were analyzed using Minitab 16 software (ANOVA). No significant differences in weight, FCR, mortality or condemnations were observed ($P > 0.10$). The results from these studies suggest that Presan-FY maintains performance in an AGP free production system in broilers over a range of market weights, under various production conditions.

Key Words: feed additives, broiler, organic acids, phytogenic compound

316 Male broilers fed corn-soy or wheat-milo-soy diets supplemented with the direct-fed microbial BiOWiSH MultiBio 3P over a 6-week period. Michael Sims*[1], JoElla Barnes[2], Richard Carpenter[2], Michael Showell[2], and Josh Ison[2], *[1]VA Diversified Research, Harrisonburg, VA, [2]Biowish Technologies, Cincinnati, OH.*

A 42-d complete randomized block design broiler floor pen study was conducted to compare live weights (LW), non-adjusted (FC) and mortality adjusted (MAFC) feed conversion ratios, %mortality (MRT), and apparent digestibility values (ADV) of broilers fed diets supplemented with the direct fed microbial (DFM) BiOWiSHTM MultiBio 3P (BWSH) at 200 g/mT in starter feeds and 500g/mT on grower and finisher feeds. The BWSH contains *Pediococcus acidilactici* ($>1.0 \times 10^8$ cfu/g), *Pediococcus pentosaceus* ($>1.0 \times 10^8$ cfu/g), *Lactobacillus plantarum* ($>1.0 \times 10^8$ cfu/g) and *Bacillus subtilis* ($>1.0 \times 10^7$ cfu/g). Study design consisted of corn-soy (USA) and wheat-milo-soy (AUS) diets with BWSH and without (CON) BWSH for a total of 4 treatment groups among 48 pens of 27 broilers/pen. Data were analyzed by Randomized Complete Block ANOVA and means separated by LSD Test (Statistix 10, Analytical Software, Tallahassee, FL). The 14d LW of USA+BWSH was significantly heavier ($P \leq 0.05$) than USA+CON while at 14d and 28d both were significantly heavier ($P \leq 0.05$) than both AUS groups. The 42d LW of the AUS+CON was significantly lower ($P \leq 0.05$) than the 2 USA groups with AUS+BWSH intermediate ($P \geq 0.05$). The 14d and 42d FC and MAFC of the AUS+BWSH group were significantly lower ($P \leq 0.05$) than those of the AUS+CON group. The 42d FC and the MAFC of the AUS+CON was significantly poorer ($P \leq 0.05$) than all other groups and AUS+BWSH was significantly less efficient ($P \leq 0.05$) than both USA groups. There were no differences ($P \geq 0.05$) in MRT between each of the 4 groups at each day observed. The ADV of carbohydrates, digestible energy, dry matter, metabolizable energy and total digestible nutrients were only found to be significantly lower ($P \leq 0.05$) in the USA+BWSH and AUS+CON finisher feeds than in USA+CON. There were no feed ADV Protein differences ($P \geq 0.05$) observed during this study. Data from this study conclusively showed that the inclusion of BWSH at 200 g/mT in starter feeds increased to 500 g/mT in the grower and finisher feeds results in broilers with improved performance as compared with non-supplemented broilers.

Key Words: BiOWiSH, broiler chicken, apparent digestibility value, direct fed microbial, performance

317 *Bacillus subtilis* 29784 improves performance of broilers fed different diets. Vincent Jacquier*[1], Lamya Rhayat[1], Pierre André Geraert[1], Karoline Brinch[2], and Estelle Devillard[1], *[1]Adisseo, Commentry, France, [2]Novozymes, Bagsvaerd, Denmark.*

Probiotics have been shown to increase animal performance, but can be sensitive to the substrates available for their development in the gut. Consequently, probiotic effects can be different depending on the source of cereals included in the diet. The objective of the present study was to investigate the effect of *Bacillus subtilis* 29784 on the performance of broilers fed either a corn and DDGS-based diet, or a corn/wheat and DDGS-based diet. This *B. subtilis* 29784 was compared with another *B. subtilis*, named X. A total of 3,120 one-day-old male broiler chicken, Cobb 500, were randomly allocated according to a factorial design to 6 treatments (13 replicates of 40 birds) and reared until 42 d in floor pens. The experimental treatments were: T1, Control 1, a corn-based diet; T2, T1 + *Bacillus* strain 29784 at 1.10^8 cfu/kg of feed; T3, T1 + *Bacillus* strain X (1.10^8 cfu/kg of feed); T4, Control 2, a corn/wheat-based diet; T5, T4 + *Bacillus* strain 29784 at 1.10^8 cfu/kg of feed; T6, T4 + *Bacillus* strain X (1.10^8 cfu/kg of feed). Feed intake (FI) and body weight gain (BWG) were measured at 42 d and feed conversion ratio (FCR) were calculated. With a corn- and wheat-based diet, FCR was significantly improved for T5 (1.712; $P = 0.004$) and for T6 (1.731; $P = 0.05$) compared with T4 (1.766). FI was significantly reduced for T5 versus T4 (4742 g vs. 4831 g; $P = 0.027$). On a corn-based diet, FCR of the group with *B. subtilis* strain 29784 (T2) was better compared with T1 (1.699 versus 1.738, respectively; $P = 0.05$). However, there was no difference in FCR with *B.* strain X (T3) when compared with T1. These results highlight the consistency of the efficacy of *Bacillus* strain 29784 on broiler performance, regardless of the main source of

cereal. It also confirms that strain specificity is very important when choosing probiotics.

Key Words: probiotic, *Bacillus subtilis*, broiler, consistency, cereals

318 Feeding the direct-fed microbial, *Bacillus subtilis* DSM 32315, alters the cecal microbiome of broilers chickens. Rose Whelan*[1], Kiran Doranalli[1], German Jurgens[2], Teemu Rinttilä[2], and Juha Apajalahti[2], [1]*Evonik Nutrition & Care GmbH, Hanau, Germany,* [2]*Alimetrics Ltd, Espoo, Finland.*

Direct-fed microbials (DFM) may positively alter the intestinal microbiome and prevent detrimental effects of dysbiosis on broiler performance. A DFM, *Bacillus subtilis* DSM 32315, was previously shown to improve the weight and FCR of broilers in a Necrotic Enteritis (NE) challenge and inhibit the growth of pathogenic *Clostridium perfringens*. The present study further investigated how the DFM affected the intestinal microbiome. Cecum digesta samples (20/treatment) were obtained from 18 d broilers in a NE challenge. Samples were analyzed with %G+C microbial profiling which fractionates bacterial chromosomes based on the % of guanine and cytosine in DNA. The method revealed significant differences in the profiles between a negative control, antibiotic positive control and the DFM treatment in low (27.0–34.5%), mid (40.5–54.0%) and high (59.0–68.0%) %G+C fractions. 16S rRNA gene amplification and next generation sequencing was conducted (5 samples/treatment) on these fractions to elucidate specific bacterial family and species changes. Treatments were compared using a one-way ANOVA and LSD means (SAS v9.4, SAS Institute). The DFM had higher abundance of *Lactobacillaceae* family members than either control in both the low ($P = 0.03$) and mid ($P = 0.01$) %G+C fractions. The DFM fed birds specifically had greater abundance of *Lactobacillus salivarius* ($P = 0.01$) and *Lactobacillus johnsonii* ($P = 0.01$) in the mid fraction. Cecal abundance of *Lachnospiraceae* in the mid fraction was reduced in the DFM treatment compared with the negative control ($P = 0.04$) and of the species decreased some operational taxonomic units showed homology to known mucin degrading bacteria. In the high %G+C fractions the positive control had a higher abundance of *Coriobacteriaceae* than either the DFM or negative control ($P > 0.01$), and there was a tendency for an increased abundance of the *Lactobacillaceae* family ($P = 0.08$), specifically *L. salivarius* species ($P = 0.09$). The results of this study show that dietary inclusion of *B. subtilis* DSM 32315 in a NE challenge modified microbial populations in the cecum of broilers. These microbiome changes are hypothesized to positively impact the health and growth performance of broilers.

Key Words: DFM, necrotic enteritis, dysbiosis, microbiome, broiler

319 *Bacillus subtilis* 29784, a reliable efficacy in highly performing broilers. Vincent Jacquier*, Lamya Rhayat, Pierre André Geraert, and Estelle Devillard, *Adisseo, Commentry, France.*

Most alternatives to antibiotics show their efficacy in under-performing animals. The present study demonstrates the potential of a reliable *Bacillus*-based probiotic to improve growth and feed conversion in highly performing birds. Also, the strength of a probiotic lies in its ability to show consistent improvement of performance, independently of the production batch. The objective of the present study was to evaluate the effect of the production batch on the efficiency of *Bacillus subtilis* 29784 on the performance of highly performing broilers fed a corn-based diet. Four different production batches (A, B, C, D) of *B. subtilis* 29784 (Bs 29784) were tested and added at 1.10^8 cfu/kg of feed for each treated group. A total of 1,200 one-day-old male broiler chicken (Ross PM3) were randomly allocated according to 5 treatments (16 replicates of 15 birds) and reared until 42 d in floor pens. The experimental treatments were: T1, Control; and T2 to T5 being the treated groups receiving *B. subtilis* 29784 in the form of A, B, C or D, respectively. Feed intake (FI) and body weight gain (BWG) were measured at 42 d and feed conversion ratio (FCR) was calculated. At 42 d, FCR of all the *Bacillus*-treated groups was significantly improved compared with T1 ($P \leq 0.001$), with improvements of 3.3%, 3.8%, 4.4%, and 4.2% respectively for T2, T3, T4 and T5. BWG measured in all groups was greater than 3,100 g. Considering FCR as well as BWG, there was no difference between treatment groups. These results confirm that *B. subtilis* 29784 improves performance of highly performing broilers, by 3.9% for FCR and by 2.8% for BWG. In addition, the consistency of the efficacy of the *B. subtilis* 29784 is demonstrated throughout 4 different production batches.

Key Words: probiotic, *Bacillus subtilis*, broiler, batch production

320 Effect of a novel *Bacillus subtilis* (CHCC16872) based DFM on the performance of chickens with physiological intestinal inflammation. Alfred Blanch*[1], Dorthe Sandvang[1], Line Skjoet-Rasmussen[1], Mickael Rouault[1], Carlos Millán[2], and Marta Gracia[2], [1]*Chr. Hansen A/S, Hørsholm, Denmark,* [2]*Imasde Agroalimentaria, S.L, Pozuelo de Alarcón, Spain.*

The objective of this study was to assess the effect of different dosages of a novel DFM strain of *Bacillus subtilis,* strain CHCC16872, (QH72) in a feed (mash form and rich in non-starch polysaccharides), on broiler performance under presumably physiological intestinal inflammation conditions. Eighteen hundred male Ross 308 broilers from one day old to 42 d of age were used and allocated at random to 6 dietary treatments: basal diet without any DFM (T1), basal diet + QH72 at 5×10^7 cfu/kg feed (T2), basal diet + QH72 at 2×10^8 cfu/kg feed (T3), basal diet + QH72 at 6×10^8 cfu/kg feed (T4), basal diet + QH72 at 2×10^9 cfu/kg feed (T5), basal diet + QH72 at 5×10^9 cfu/kg feed (T6). Each treatment was replicated in 12 floor pens of 25 birds each. Feeding periods were: starter (1 to 14 d of age), grower (15 to 28 d) and finisher (29 to 42 d). All diets were calculated to meet or exceed the nutrient requirements recommended by NRC (1994). Feed and water were available ad libitum. Weight gain, feed intake and feed conversion ratio of each pen were assessed for each feeding period (0, 14, 28 and 42 d) and for the whole experiment. Mortality and weight of dead birds were recorded as it occurred. Furthermore, European Production Efficiency Factor (EPEF) was calculated at 42 d. During the starter period, no significant differences between treatments were observed. In the grower period, a linear and quadratic QH72 dose-response effect was observed in growth and FCR ($P < 0.001$). From 28 to 42 d of age, a linear and quadratic dose-response effect was observed in growth and feed intake ($P < 0.01$). Regarding the global period (0–42 d of age), T6 birds significantly grew faster than T1, T2 and T3 animals ($P < 0.01$), exhibiting the other doses intermediates values (71.8, 70.8, 71.8, 72.4, 73.9 ad 74.4 g/d for T1 to T6, respectively). EPEF was significantly affected by dietary treatment ($P < 0.01$). The dose-response effect in the global period was both linear and quadratic for all the performance parameters evaluated ($P < 0.05$). In conclusion, QH72 supplementation in broiler diets improves performance of chickens with intestinal inflammation during the whole fattening period.

Key Words: DFM, *Bacillus*, chicken, inflammation

321 Effects of ButiPEARL and PrimaLac used alone or in combination on 57-d broiler performance and processing. Dana

Dittoe*, Christopher McDaniel, Kelley Wamsley, Wei Zhai, and Aaron Kiess, *Mississippi State University, Mississippi State, MS.*

Separately, Lactic acid producing bacteria (LAB) and organic acids have been found to improve broiler performance when provided in diets. The combination may have the same potential; however, the combination has not been explored in literature. Thus, the objective of this study was to determine if the inclusion of an encapsulated butyric acid, LAB, or the combination of both products influence broiler performance when added to the diet throughout a 57 d growout. The 5 dietary treatments included a basal diet (C), the basal diet including ButiPEARL (B), the basal diet including PrimaLac (P), the basal diet including both ButiPEARL and PrimaLac (B+P), and the basal diet including an antibiotic, bacitracin methylene disalicylate (A). All additives were included based on manufacturer recommendations. On d 0, 1440 d old male Ross × Ross 708 chicks were obtained and placed into 80 floor pens (16 replicates, 18 birds per pen). Birds were provided feed and water ad libitum. Performance data were collected at 0, 14, 28, 45, and 56 d. On d 14, birds were challenged with a 10X dose of a live coccidiosis vaccine. Processing data were collected on d 57. Data were analyzed using a randomized complete block design and means were separated using Fishers protected LSD when $P \leq 0.05$. No live performance differences were observed on d 14 or on d 56 of the experiment ($P > 0.05$). However, differences at 0–45 d demonstrated that birds fed P and A diets had increased BW gain (BWG) compared with B+P and C ($P = 0.009$). Additionally, birds fed A and P tended to have lower d 0–45 FCR ($P = 0.07$) compared with birds fed C. Also, d 28–45 mortality was significantly reduced when fed diets containing A, B, P, or B+P, as compared with birds fed C ($P = 0.03$). Significance was not found for most of the measured processing characteristics ($P > 0.05$); however, wing yield was greater for birds fed P compared with birds fed B and C treatments but were similar to that of birds fed B+P and A ($P = 0.03$). Although there were no differences observed from d 0–56, the current study demonstrates the potential efficacy of using P to replace A in commercial diets, as birds fed P and A performed similarly from 0 to 45 d. As well, B+P did not prove to be effective in improving broiler performance as it did not demonstrate a positive effect on FCR or BWG.

Key Words: lactic acid producing bacteria, organic acid, broiler, performance

322 Effects of in-water synbiotic supplementation in laying hens challenged with *Salmonella*. Ashley Markazi*[1], Amanda Luoma[1], Revathi Shanmugasundaram[1], G. Raj Murugesan[2], Michaela Mohnl[3], and Ramesh Selvaraj[1], *[1]The Ohio State University, Wooster, OH, [2]Biomin, San Antonio, TX, [3]Biomin, Getzersdorf, Austria.*

Salmonella contamination from poultry meat and eggs can lead to salmonellosis infection in humans, with symptoms including diarrhea, fever, and vomiting. In chickens, *Salmonella* infection stimulates an immune response including increased IgA and IgG antibodies. This study analyzed the inhibitory effect of a commercial synbiotic (PoultryStar sol; BIOMIN) on immune response and bacterial colonization in laying hens with and without a *Salmonella* challenge. The synbiotic product consisted of probiotics *Lactobacillus reuteri, Enterococcus faecium, Bifidobacterium animalis,* and *Pediococcus acidilactici,* and the prebiotic fructo-oligosaccharide. The synbiotic was supplemented in the water from day of hatch to 28 weeks of age. Birds were either vaccinated or left unvaccinated at 14 and 16 weeks of age, and half the hens within the vaccinated treatment and all of the unvaccinated hens were challenged with *Salmonella* at 24 weeks of age, resulting in a 3 × 2 factorial arrangement of treatments. Each treatment was replicated in 24 feeders of 8 hens per replication. Results were analyzed using 2-way ANOVA followed by Tukey's honest significant test when main effects were $P < 0.05$. Synbiotic supplementation decreased ($P < 0.05$) plasma IgG levels compared with the control at 3, 10, and 24 d post-challenge in vaccinated birds by 25%, 12%, and 39%, respectively. Synbiotic supplementation increased ($P < 0.05$) bile IgA levels compared with the control at 22 d post-challenge in vaccinated birds by 25% and 58%, respectively. Decreased plasma IgG levels may be due to the absence of systemic *Salmonella* infection in the birds. The enhanced local immune response in chickens supplemented with synbiotics (observed as secretory IgA in bile) suggest a positive resistance against *Salmonella* colonization and infection.

Key Words: intestinal health, probiotic, prebiotic, antibody, vaccine