

Metabolism & Nutrition IV

T93 Use of Actigen® as a tool to reduce the impact of necrotic enteritis in broilers Robert Swick¹, Shawkat M'Sadeq¹, Andreas Kocher² ¹University of New England, NSW, Australia ²Alltech Australia, Dandenong South, VIC, Australia

The efficacy of Actigen® (AG) as a replacement for zinc bacitracin (ZB) and salinomycin (SM) was investigated using necrotic enteritis (NE) challenge feeding study model. 480 d old male Ross 308 chicks were assigned to 48 floor pens (75 x 60 cm) in 2 rooms. Treatments were arranged in a 2 x 4 factorial design: challenge, - or +; feed additive, control (none), ZB 100/50 ppm; AG 800/400/200 ppm and SM 60 ppm in S, G, and F respectively. Wheat, sorghum, SBM, MBM, canola diets were formulated according to Ross 308 nutrient specifications. Birds in one room were gavaged on day 9 with 1 ml saline containing sporulated oocysts of vaccine strain *E. maxima* (5000), *E. acervulina* (2500) and *E. brunetti* (2500) following gavage on days 14 and 15 with 1 ml thioglycollate broth (TB) containing 108 CFU of *C. perfringens* (strain EHE-NE18, CSIRO). Unchallenged birds were dosed with saline or TB. Results on d 35 showed lower livability (LV), weight gain (WG) and feed intake (FI) in challenged vs unchallenged birds (P<.05). ZB, Actigen and SM increased LV, WG and FI on d 35 (P<.05). Challenge X additive interactions were observed for LV, WG and FI on d 35 (P<.01). In the - vs + challenge groups, LV was 92 vs 52, 97 vs 90, 92 vs 82 and 93 vs 93% while WG was 2541 vs 2105, 2597 vs 2474, 2699 vs 2561 and 2575 vs 2704g for control, ZB, Actigen and SM respectively. Control birds had greater incidence of NE lesions when challenged (P<.01). None of the additives completely protected birds from NE or cocci lesions. Actigen was as effective as ZB and SM in preventing performance decline from coccidiosis. This study indicates that yeast based Actigen® has promise as a tool for controlling necrotic enteritis.

Key Words: necrotic enteritis, coccidiosis, yeast cell wall, bacitracin, salinomycin

T94 The effects of necrotic enteritis and aflatoxin on growth performance, lesion scores, and mortality in young broilers and products to alleviate them Sara Johnston¹, Ron Cravens¹, George Goss¹, Fang Chi¹, Steve Davis², Jane Richardson², Edward De Boer¹ ¹Amlan International, Vernon Hills IL ²Colorado Quality Research, Wellington, CO

Cobb 500 chicks (2,640, male) were used to determine the effects of disease challenge and products to decrease those effects. Three challenge levels were used; 1) no challenge; 2) necrotic enteritis (CPP) challenge; and 3) CPP+1 ppm aflatoxin B₁. Products tested to alleviate disease challenges were: 1) no product (NP); 2) a proprietary clay-based product (CL1); 3) a second proprietary clay-based product (CL2); 4) a third proprietary clay-based product (CL3); and 5) virginiamycin (VM). In the 24 d study, 22 chicks (equalized to 20 on d-7) per pen were allotted to 15 treatments (3x5 factorial arrangement) with 8 replications (experimental unit = pen). Significant difference was set at P<.05. Weights were taken on d-0, 10, and 24 for calculation of feed intake, gain, and feed:gain. Birds consumed feed and water *ad libitum*. Increased negative responses to the combination of NE and AFL were seen in this study as FI (d-0-10), gain (d-10-24, d-0-24), and F:G (d-10-24) were increasingly poorer as challenge level went from no-challenge to CPP challenge to CPP+AFL challenge (P<.05). Other growth responses were worse than non- or CPP-challenges when both CPP+AFL were applied (P<.05). Lesion score was higher in CPP challenged birds with or without AFL (P<.05). Feeding VM improved performance in non-challenged birds (P<.05). In CPP challenged birds, adding CL1 or CL2 improved FI and gain compared to NP; with CL2 being equal to those

fed VM during the challenge period (P<.05). Birds given CL1 had the highest gain and feed conversion when challenged with both CPP and AFL; feeding CL2, CL3, and VM had higher gains than adding NP (P<.05). In conclusion, increasing challenge level decreased bird performance. Birds with necrotic enteritis fed CL2 had gain that was equal to those fed VM during the challenge period. Feeding the clay-based products improved performance during a CPP+AFL challenge.

Key Words: necrotic enteritis, aflatoxin, virginiamycin, clay

T95 The effects of necrotic enteritis, aflatoxin, and virginiamycin on growth performance, lesion scores, and mortality in young broilers Sara Johnston¹, Ron Cravens¹, Fang Chi¹, George Goss¹, Steve Davis², Sam Hendrix², Edward De Boer¹ ¹Amlan International, Vernon Hills, IL ²Colorado Quality Research, Wellington, CO

A total of 2,112, male, Cobb 500 chicks were used to determine the effects of increasing aflatoxin concentration (AFL; 0, 0.75, 1.5 ppm) on broilers with or without necrotic enteritis or virginiamycin (VM). In the 23 d study, 22 chicks (equalized to 20 on d-7) per pen were allotted to 12 treatments (3x2x2 factorial arrangement) with 8 replications in a randomized complete block design; pen was the experimental unit. Significant difference was set at P<.05. Weights were taken on d-0, 16, and 23 for calculation of feed intake, gain, and feed:gain. Birds consumed feed and water *ad libitum*. Aflatoxin decreased gain and feed intake and resulted in poorer feed:gain, mortality, and lesion scores (P<.05). Inducing necrotic enteritis (CPP) using *Clostridium perfringens* contaminated litter and a 10 x dose of coccidiosis vaccine administered on d-10 increased lesion score and decreased feed intake and gain (P<.05). Adding VM to the diets improved gain, feed intake, and feed conversion, and decreased mortality (P<.05). However, there were interactions (P<.05) as challenging birds in the second period with CPP and feeding 0.75 ppm AFL had a negative synergistic effect on gain while even an additive effect was not seen when birds were fed 1.5 ppm AFL. At 1.5 ppm AFL non CPP-challenged birds fed VM had higher gain than those birds not fed VM, which was equal to gain from challenged birds with or without VM. A similar interaction (P<.05) was seen in the overall feeding period although VM helped CPP challenged birds at 0.75 ppm overall. Virginiamycin improved feed conversion with the greatest improvement at 1.5 ppm. Aflatoxin increased lesion scores in unchallenged but not challenged birds. Unexpectedly, VM increased lesion scores in challenged but not unchallenged birds (P<.05). Aflatoxin and necrotic enteritis decrease broiler performance and interact to decrease weight gain; VM helps improve gain in challenged birds at 0.75 ppm AFL but not at 1.5 ppm AFL.

Key Words: necrotic enteritis, aflatoxin, virginiamycin

T96 Performance of broilers fed a broader spectrum antibiotic (virginiamycin) or a narrower spectrum antibiotic (bacitracin methylene disalicylate) over 3 consecutive growout cycles Mark LaVorgna¹, Jon Schaeffer¹, Don Bade², John Dickson¹, Kalen Cookson¹, Stephen Davis³ ¹Pfizer Global Poultry, Durham, NC ²Microbial Research, Inc, Fort Collins, CO ³Colorado Quality Research, Inc., Wellington, CO

Virginiamycin and bacitracin are widely used in commercial broiler feed regimens to improve performance, likely due to inhibition of intestinal clostridial populations. A floorpen study of 3 consecutive growout cycles was conducted using 4 feed regimens containing bacitracin (treatment 1), virginiamycin (treatment 2), or combinations of both after cycle 1 (treatments 3 and 4). On study day 0, 46 day-of-age, male

Cobb birds were placed in 11 pens per treatment group, with 1 extra pen per treatment group providing replacement birds for any mortalities.

For cycle 1, virginiamycin-treated birds had significantly greater hot carcass weight, boneless skinless breast weight, and leg quarter weight than bacitracin-treated birds. For cycle 2 there were no significant differences. In cycle 3, treatment 4 weights were significantly greater than treatments 2 and 3, with treatment 1 intermediate. Across cycles for live weight and hot carcass weight, treatment 4 was significantly greater than 3, with 1 and 2 intermediate. Across cycles for breast weight, treatment 4 was significantly greater than 2, and treatments 4 and 1 significantly greater than treatment 3. Across cycles, there were no significant differences among treatments in leg quarter weight.

For cycle 3, post-7-day mortality attributable to bacterial infection other than with *C. perfringens*, treatments 2 (6.72%) and 4 (6.72%) were significantly higher than treatment 1 (2.3%), with treatment 3 intermediate (3.56%). Across cycles, there were no significant differences in post-7-day mortality.

During cycle 1, adjusted feed conversion ratios at day 43/44 were significantly lower for treatments 2 and 4 (virginiamycin) than for treatments 1 and 3 (bacitracin) in the starter, grower, and finisher phases. For cycle 3, there were no significant differences in feed conversion.

Virginiamycin-fed birds experienced feed conversion and processing weight advantages over bacitracin-fed birds during cycle 1, but had a 4% higher mortality rate in cycle 3. The higher mortality, resulting primarily from bacterial infection, may be hypothesized to be due to the broad-spectrum suppression by virginiamycin of beneficial microflora in the gut, allowing opportunistic bacterial growth. Microbial suppression may help channel energy to bird growth rather than to microbial proliferation, but over consecutive growout cycles may also create gut dysbiosis that makes birds vulnerable to opportunistic infection.

Key Words: virginiamycin, bacitracin, broilers, feed conversion, mortality

T97 EFFECT OF ADDING A NATURAL SOURCE OF 1,25-DIHYDROXYCHOLECALCIPHEROL ON THE CALCIUM AND PHOSPHORUS UTILIZATION OF BROILER CHICKENS Maria del Carmen Mojica-Enriquez¹, Sergio Gomez-Rosales², Maria de Lourdes Angeles² ¹Nutritec International Sàrl, Veracruz, Mexico ²NATIONAL FORESTRY, AGRICULTURE AND LIVESTOCK RESEARCH INSTITUTE, Ajuchitlan, Mexico

A balance trial experiment was carried out to evaluate the productive responses, tibia measurements, calcium (Ca) and phosphorus (P) retention in broilers fed increasing levels of 1,25-dihydroxycholecalciferol (Panbonis). Sixty Ross B308 male broilers were individually allocated and assigned to four dietary treatments from 28 to 49 d of age: 1. Positive Control (PC) diet with 100% of the nutrient recommendations, 2. Negative Control (NC) with a 0.15 % reduction in Ca and P, 3. As 2 + 50 ppm de Panbonis (Pan50) and 4. As 2 + 100 ppm of Panbonis (Pan100). Excreta were totally collected from days 39 to 42 to estimate the retention of Ca and P. On day 49, broilers were killed and the right tibia was excised, weighed and ashed. Data was subjected to ANOVA using the General Linear Model Procedures of SAS. There was a trend for the weight gain being lower in NC-fed broilers, intermediate for Pan50 and Pan100-fed broilers and higher in the PC ($P < 0.10$). Feed intake was lower ($P < 0.01$) in broilers fed Pan100 and was similar for the other treatments. The feed conversion was lower ($P < 0.05$) for Pan100 and PC broilers, intermediate for Pan50 and higher for the NC. The fresh weight, dry weight, length and ashes percentage of the tibia were similar among treatments. The ashes weight were similar for PC, Pan50 and Pan100 ($P < 0.10$) and were lowest for NC. The diameter of

the epiphysis and the diaphysis were similar ($P < 0.05$) for PC, Pan50 and Pan100 and were lower in NC. The Ca and P intake were higher ($P < 0.05$) for PC than for the other treatments. The Ca and P excretion were higher ($P < 0.05$) for PC, intermediate for NC and Pan50, and were lower for Pan100. The Ca and P retention were lower ($P < 0.05$) for PC, intermediate for NC and Pan50 and were higher for Pan100. The results indicate that broilers fed a low Ca and P diet showed lower performance, tibia measurements and Ca and P retention compared to a normal Ca and P diet, but the addition of 100 ppm of Panbonis/ton of feed caused similar feed conversion ratio and tibia measurements and higher Ca and P retentions compared to the PC. The addition of 100 ppm of Panbonis/ton of feed increased the availability of Ca and P by 0.10 and 0.11%, respectively.

Key Words: Broilers, Natural 1,25 Dihydroxycholecalciferol, Tibia ash, Ca retention, P retention

T98 Evaluation of zinc sources for broiler performance and breast meat yield Terri Parr¹, Jeff Cohen¹, Kirk Klasing², James Usry¹ ¹Micronutrients, Indianapolis, IN ²University of California-Davis, Davis, CA

A trial was conducted to evaluate the performance and breast meat yield of broilers fed various sources and combinations of zinc for a 49-day period. Two thousand eighty, one-day old Ross 708 males were housed in floor pens on recycled litter at a high density to simulate commercial-type stress and growing conditions. Performance was measured for 49 days, with carcass yield measured at day 50. Chicks were randomly assigned to one of eight treatments (10 reps/treatment; 25 chicks/pen). The treatments included 1) positive control (PC; 80 ppm feed-grade ZnSO₄), 2-5) 30, 45, 60 and 80 ppm IntelliBond® Z (IBZ, Micronutrients), 6) sulfate/organic combination (60 ppm ZnSO₄ + 20 ppm ZnOrg; Availa® Zinc, Zinpro), 7) sulfate/oxide combination (40 ppm ZnSO₄ + 40 ppm feed-grade ZnO), or 8) sulfate/oxide/organic combination (30 ppm ZnSO₄ + 30 ppm ZnO + 20 ppm ZnOrg). Single degree-of-freedom contrasts evaluated PC vs each IBZ level, sulfate/organic vs each IBZ level, and 45ppm IBZ vs each remaining combination program. At 21 days, 30 and 80 ppm IBZ improved body weight gain ($P < 0.05$) compared to PC, while 45 ppm IBZ decreased ($P < 0.05$) FCR (g feed/g gain) compared to PC or any of the combination programs. By 49 days, 80 ppm Cu from IBZ resulted in greater body weight gain ($P < 0.05$) than PC or the sulfate/organic combination, whereas there were no differences ($P > 0.05$) in FCR between any treatments. Breast meat yield was higher ($P < 0.05$) for 45 ppm IBZ compared to the sulfate/oxide/organic combination, and 80 ppm IBZ compared to either PC or sulfate/organic. Leg meat yield was higher ($P < 0.05$) when birds were fed 80 ppm IBZ as compared to the PC-fed birds. In conclusion, feeding 80 ppm Zn from IBZ for 49 days did not compromise feed conversion, resulted in heavier birds, and yielded more breast and leg quarter meat than birds fed 80 ppm Zn from any other source or combination of sources.

Key Words: zinc, broiler, yield, FCR, breast meat

T99 Comparison of copper sources for broilers fed diets with and without antibiotics Lucio Araujo¹, C. Araujo¹, J. Vittori², F.A. Longo¹, Fabio Goldflus³, Jeff Cohen³, Terri Parr³ ¹University of Sao Paulo, Sao Paulo, Brazil ²Btech Tec. Agrop. e Com. Ltda., Vallinhos, Brazil ³Micronutrients, Bauru, Brazil

When broilers are subjected to commercial stresses, the inclusion of dietary copper (Cu) and antibiotics (AGP) may improve bird performance. There is also evidence that the form of Cu is very important in determining the magnitude of improvement. A research trial was designed to differentiate between IntelliBond® C (IBC – Micronutrients) and copper sulfate (CuSO₄) with and without AGP's. Growth perfor-

mance was measured from 0-40 days of age with carcass parameters recorded on day 40. Fourteen treatments were fed crumbled or pelleted diets and replicated with 9 pens of 18 male birds per pen. The litter in the floor pen was recycled, birds were vaccinated for coccidiosis at hatch and stocked at 13 birds per m² to induce additional stress. The treatments were 1) negative control (12.5 ppm Cu from IBC), 2) treatment 1 + AGP 3-5) 62.5, 125, and 187.5 ppm Cu from IBC), 6-8) 62.5, 125 and 187.5 ppm Cu from CuSO₄, 9-11) treatments 3-5 + AGP and 12-14) treatments 6-8 + AGP. Between 0 and 21 days of age, there was a main Cu source effect (P<0.04) for FCR. The birds fed IBC had >2 points in FCR advantage over the birds fed CuSO₄. Twenty-one day old body weight gain peaked at 125 ppm Cu for the birds fed IBC and 200 ppm Cu for birds fed CuSO₄. At day 40, the birds fed 200 ppm Cu (regardless of source) had better FCR (P<0.01) than the birds fed the other levels of Cu. When Cu was included at 200 ppm and the AGP was excluded, breast and leg meat yield was improved (P<0.05) for IBC over CuSO₄. Numerical improvements in breast and leg meat were also seen for birds fed IBC over CuSO₄ when the AGP was included in the diet and Cu level was 200 ppm. In conclusion, broilers fed 200 ppm Cu under simulated commercial conditions had better feed efficiency when IBC was the Cu source in diets at 21 days of age, while at 40 days of age, the birds fed 200 ppm Cu from IBC yielded more breast and leg meat than birds fed CuSO₄.

Key Words: Copper, Copper Hydroxychloride, TBCC, CUSO4, Broiler

T100 Comparison of copper sources in broilers from 0 to 21 days of age James Usry¹, Jeff Cohen¹, James McNaughton², Terri Parr¹ ¹*Micronutrients, Indianapolis, IN* ²*AHPPharma, Inc., Salisbury, MD*

The source and level of copper used in broiler feeds for maximum performance can be financially rewarding to producers, especially when feed prices are high. A trial was designed to accurately differentiate between IntelliBond® C (IBC – Micronutrients) and basic copper carbonate (BC Carb) under field stress conditions. Birds were housed on recycled litter inoculated with *E. acervulina* and *E. coli* at day 7. Performance was measured from 0-21 days of age and intestinal lesions scored at day 21 (4 random birds / pen). Ten treatments were fed mash diets and replicated with 8 pens of 50 mixed-sex Ross 708 birds / pen. The treatments were 1) negative control (4 ppm Cu from CUSO₄), 2-5) 100, 125, 150 and 200 ppm Cu from BC Carb), 6-9) 100, 125, 150 and 200 ppm Cu from IBC and 10) 125 ppm Cu from CuSO₄. Using the technique of Littell et al., 1997, analysis was conducted to statistically determine if the slopes of the performance data and lesion scores were significantly different between Cu sources. All of the required assumptions were met so a slope ratio analysis could be performed on the data. The slopes between copper sources were significantly different (P<0.03) for day 21 body weight, 0-21 body weight gain, 0-21 FCR and 21 day lesion scores with IBC out-performing BC Carb for every measured parameter. At 125 ppm copper there was a significant difference (P<0.05) in 0-21 day FCR between IBC and CuSO₄ with BC Carb being intermediate. Using regression equations from the analysis, in order to replace 125 ppm Cu from IBC, it would take 160-180 ppm BC Carb to provide equal performance between the two sources. Based on the higher inclusion level of BC Carb needed for equal performance in this study and the lower concentration of copper in BC Carb, BC Carb would need to be priced at \$5.75/kg to equate a price of \$8.15/kg for IBC in order for diet costs not to increase at 125 ppm of dietary Cu (70% of IBC). In conclusion, IBC is a more efficacious in maximizing broiler performance than BC Carb.

Key Words: Copper, Copper Hydroxychloride, TBCC, CuCO₃, broiler

T101 An economic evaluation of dietary programs varying in protein and energy fed to female broiler grillers Sergio Vieira*, Vanessa Basurco, Daniel Miranda, Henrique Cemin, Rafael Cruz *Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil*

A study was conducted with the objective of evaluating the cost of production related to feeding Brazilian type diets to broiler grillers (1.5kg live weight). A 3 X 3 factorial composed by 3 levels of protein (ideally balanced AA diets without CP restriction – AA diet) and 3 levels of ME (ME diet). A Moderate feeding treatment was set by averaging values obtained from the industry in a program having feeds from 1 to 7 (dig. Lys = 1.28%; ME (kcal/kg) = 3,050), 8 to 18 d (dig. Lys = 1.22%; ME (kcal/kg) = 3,100), and 19 to 29 d (dig. Lys = 1.07%; ME (kcal/kg) = 3,200). Ratios of essential dig. AA to Lys from 1 to 18 d were: TSAA = 75%, THR = 65%, Val = 75%, ILE = 65%; whereas Val and Ile were at 78% and 67% from 19 to 29 d. Low and High diets had reductions and increases in ME and dig. Lys of 1.5% and 10%, respectively throughout the feeding program. Diets were all vegetable having corn, soybean meal and acidulated soybean soapstock. Cobb 500 feather sexable females in the number of 2,880 were used, they were distributed in 9 treatments of 40 birds per pen (15 per squared m) in 8 replications per treatment. No interactions were observed between Energy x AA density, with the exception of FCR (P<0.001) and feed intake (P<0.01) from 1 to 18 d. Body weight gain was increased when birds were fed High AA density (P<0.01) and High ME (P<0.02) diets. Improvements in FCR were observed (P<0.0001) as AA density increased in the 3 levels as well as with ME (P<0.0001). An increased yield of whole carcass as percentage of live Bird was observed for birds fed High AA diets (P<0.05) and a concurrent reduction in abdominal and total body fat was also observed with High AA diets (P<0.001), without changes with ME diets. When different scenarios of corn, soybean meal and soybean fat market prices were taken in consideration, the best economic returns were always when Low AA and Low ME diets were used together; one exception was when high corn prices are used with low soybean meal and low soybean fat prices. Frequent fluctuations in ingredient market prices demand appropriate estimations on the impact of changing AA and ME concentrations in broiler diets, such that production profitability is maintained.

Key Words: Female broiler, Griller, Aminoacid, Energy, Economics

T102 D1-42 yeast product inclusion and D42-118 feed form effects on large tom performance using feed produced at a commercial mill Kelley Wamsley¹, Joe Moritz² ¹*Department of Poultry Science, Mississippi State University, Mississippi State, MS* ²*Department of Animal and Nutritional Sciences, West Virginia University, Morgantown, WV*

The brooder period (D1-42) is crucial to obtaining a proper start that may carry over to overall turkey performance. The grower/finisher period (D42-118) is a time of high volume feed consumption that also may affect overall performance. Providing yeast products (YP) and high quality pellets (HQP) in the brooder and grower/finisher periods respectively may enhance overall performance. The objective of the current study was to determine the effects of providing two different YP derived from *Saccharomyces cerevisiae* in the brooder period and YP Carryover and Feed Form affects in the grower/finisher period on large Hybrid Converter tom performance. On D1, 89 1-d-old poults were randomly allocated to one of 16 pens in a house that mimicked a commercial grow-out facility. Then, diets varying in YP inclusion (YP1 or YP2) were assigned in a randomized complete block design. On D42, a 2 YP Carryover x 2 Feed Form (HQP or ground pellets (GP)) factorial design was implemented to measure main effects and interactions over the different performance periods. All diets were manufactured

at a commercial feed mill and were of similar nutritional composition. Feed form variations were made by grinding a portion of the pellets produced for each diet phase. The HQP diets averaged 78.6% intact pellets and the GP diets averaged a 1,108 micron particle size. On D42, YP1 improved ending weight (EW; $P=0.022$) and feed conversion ratio (FCR; $P=0.022$). However, no YP Carryover effect was demonstrated for any of the D42-118 performance variables ($P>0.05$). Feeding HQP produced toms that were 0.29 kg/bird heavier ($P=0.001$) with 9 points lower FCR ($P=0.015$), as compared to toms fed GP. Regression analyses predicted that if toms fed GP finished at the same D118 EW as those fed HQP, then FCR advantages of HQP would be 12 points ($R^2=0.9587$). These data show that an investment in producing HQP may be economical due to returns on turkey performance.

Key Words: yeast product, brooder period, feed form, pellet quality, turkey performance

T103 PROPIONIC ACID INCLUSION WITH PRESTARTER FOR POULTS FROM YOUNG BREEDERS Ed Moran* *Department of Poultry Science, Auburn University, Auburn, AL*

Supplemental organic acids benefit first wk production, particularly hatchlings from small eggs. Present experimentation employed commercial source toms from 35 wk old breeders while using a corn-soybean meal crumbed basal starter that included fish and corn gluten

meals. A separate 3% addition of starch to the crumbed basal was progressively replaced with 1, 2 and 3% propionic acid (PA) and offered for the first 7 D to comprise 4 treatments of similar nutritional value (28.5% CP, 2900 kcal ME/kg). After 7D, the basal feed having only starch continued until 21D. Each treatment represented 6 replicates of 10 poult in raised wire pens. All PA additions improved live performance similarly beyond the starch basal after 2D (L, $P<0.05$) which was less apparent 2-7D (L, $P<0.07$). Total 0-7D mortality progressively decreased from 5.8% for the basal to 1.7% with 3% PA (L, $P<0.05$). Half of each pen's birds provided body measurements at 7D. Blood glucose increased from 120 to 258 mg/DL as PA increased while liver glycogen followed in parallel from 37 to 47 mg/100g with 1% PA providing the most dramatic responses (Q, $P<0.001$). No treatment differences in contents pH with either crop (ca. 5.0) or ceca (ca. 6.5) were apparent. During the subsequent 14 days when all poult received the starch basal feed, birds that had not been given PA 0-7 days compensated in gain and F/G such that all treatments were similar at 21D; however, benefit of previous PA to mortality continued. Total 0-21D mortality progressively diminished from 15.5 to 1.7% as dietary PA that had been received 0-7D decreased from 0 to 3% (L, $P<0.01$). PA is a gluconeogenic organic acid that provides survival advantages to the post-hatch bird.

Key Words: propionic acid, poult, prestarter, blood glucose, liver glycogen

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T104 In-vitro antimicrobial susceptibility of Clostridium perfringens from broiler origin Jaime Ruiz¹, Hector Cervantes¹, Samuel Christenberry¹, Ken Bafundo² ¹*Phibro Animal Health, Poultry Technical Services, McKinney, TX* ²*Phibro Animal Health, Global Technical Services, Teaneck, NJ*

Clostridial enteritis is a common disease affecting the intestinal health of many US commercial broiler flocks. Several antibiotic feed additives have been used to control this costly disease condition. Field isolates of *Clostridium perfringens* were collected between 2011 and 2012 in several broiler production complexes located in the Southern United States. These isolates were tested for their ability to produce visible growth in the presence of antibiotics on a series of agar plates containing dilutions of the antimicrobial agent (agar dilution). Updated information regarding Minimum Inhibitory Concentrations (MICs) against virginiamycin and other commonly used antibiotic feed additives will be presented.

Key Words: Enteritis, Necrotic, Clostridium, MICs

T105 Factors to consider in choosing poultry house lighting Brian Fairchild*, Mike Czarick, John Worley *Department of Poultry Science, University of Georgia, Athens, GA*

Energy conservation is as important as ever. Growers pay energy bills out of their earnings. The more they pay for power the less net return on the flock. Efforts to install motors, fans and lights, the components that use the most electricity in poultry houses, are being considered by growers. However, it is not as simple as replacing an old 60 watt incandescent bulb with a newer energy efficient bulb. Factors such as light intensity at floor level, uniform light distribution, life of the bulb and ease of maintaining it should be considered. The current field study evaluated incandescent, compact fluorescent (CFL), cold cathode and LED light bulbs in poultry houses. Light intensity was measured at floor level at the beginning of the study, 6 and 12 months into the study. Bulbs were cleaned prior to taking the light intensity measurements. The average light intensity was measured in a grid at 1, 10 and 20 ft off

of the side wall and every 5 ft down the length of the house for a total of 20 ft. Dimming curves for the bulbs were obtained and bulb losses in each house were recorded at the end of each flock. Data loggers were installed to monitor the house total power and the power utilized by the lighting system.

Dimming the light intensity below 5 lux resulted in higher CFL bulb losses. When the house dimmer was marked to show the grower how to limit dimming, bulb losses were reduced from 50% to less than 4%. The dimming curve of incandescent bulbs was the most linear, followed by cold cathode, LED and CFL. All bulbs exhibited a loss of light intensity that ranged from 25% to 50% depending on the type of bulb. The average light intensity at floor level was 6.8, 10.9, 10.4 and 20.3 for LED, CCFL, LED and CFL respectively. On a second farm Light intensity measurements were affected by bulb spacing and height from the floor and reflection off of the ceiling bedding material and walls. These data suggest that not all bulbs can be used at the current spacing of incandescent bulbs. Poultry producers should evaluate the intensity of the bulb at floor level prior to investing in bulbs for all houses on the farm.

Key Words: Lighting, Energy conservation, light bulb, Light intensity

T106 Effect of repeated application of litter amendment Joseph Purswell¹, Jeremiah Davis², Aaron Kiess³, Craig Coufal⁴ ¹*USDA-ARS South Central Poultry Laboratory, Mississippi State, MS* ²*Department of Agricultural and Biological Engineering, Mississippi State University, Mississippi State, MS* ³*Department of Poultry Science, Mississippi State University, Mississippi State, MS* ⁴*Department of Poultry Science, Texas A&M University, College Station, TX*

Ammonia (NH₃) production by poultry litter is a recurring management concern for producers. Excessive NH₃ exposure has negative impacts on eye and respiratory health, as well as production efficiency. Application of litter amendments is a common management practice to reduce NH₃ concentration inside poultry houses during brooding. However, singular applications prior to chick placement typically provide