

T133 Protease, essential oil, and organic acid improve growth performance and gut health of broilers subject to Eimeria challenge

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Government regulation, along with consumer pressure, is driving US poultry production toward Antibiotic Growth Promoter (AGP) free production in a rapid pace. Nutrition program including feed additives will need to be an integral part of any AGP free production. A floor pen study was conducted with 1320 day-old male broilers to evaluate the efficacy of protease, essential oil, and organic acid in alleviating the negative impact of mild Eimeria challenge on growth performance and gut health in comparison to Bacitracin Methylene Disalicylate (BMD®). The study consisted of 5 dietary treatments – Negative Control (NC), NC+organic acid (ACIDOMATRIX™ GH), NC+essential oil (NEXT ENHANCE® 150), NC+protease (CIBENZA® DP100), and NC+BMD, each with 12 replicate pens of 22 birds. Nutritionally complete typical US corn soybean meal based broiler diets were formulated for starter (0-14 d), grower (14-29 d), and finisher (29-42 d) phases. All diets were pelleted, and starter diet was crumbled after pelleting. All birds were orally gavaged with a coccidiosis vaccine at 5X the recommended dose on d 15. Body weight, feed intake, FCR, and mortality were determined at d 14, 21, 29, and 42. On d 30, three birds per pen were euthanized to measure concentrations of serum endotoxin, IL 1 β , IL 6, IL 10, α 1 acid glycoprotein, and yellowness. Data were subject to one-way ANOVA; means were separated by Fisher's protected LSD test. A P-Value \leq 0.05 was considered statistically different. Increase in BW was observed for organic acid (21 d), protease and essential oil (29 d), and BMD (21 and 29 d). Essential oil and BMD reduced 0-29 d mortality. Protease and essential oil decreased serum endotoxin and IL 10 concentrations, and increased serum yellowness. Similarly, BMD also reduced serum endotoxin and IL 10 levels; however, it had no effect on serum yellowness. Organic acid only reduced serum IL 10 concentration. In summary, in broilers under mild Eimeria challenge, protease, essential oil, and organic acid improved growth performance and gut health, especially protease and essential oil effects were comparable to BMD. Therefore, these feed additives could be effective nutritional tools to manage gut health challenge and improve growth performance of broilers in AGP free production.

Key Words: protease, essential oil, organic acid, broiler, antibiotic