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SYNBIOTIC SUPPLEMENTATION VERSUS AGPS IN BROILERS: THE IMPACT ON CAECAL BACTERIAL COMMUNITY STRUCTURE, GUT HEALTH AND PERFORMANCE

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Antibiotic growth promoters (AGPs) are thought to operate by modulating the gut microbiome in order to limit opportunities for colonization by pathogens, increase nutrient utilization and reduce inflammation. However, common antibiotics are found to destroy the common phyla, possibly leading to dysbiosis and other debilitating effects. Recent studies have already shown that dietary supplementation of AGPs results in a substantial reduction in the abundance of C. perfringens and other Gram-positive bacteria which make up the majority of beneficial bacteria in the gastrointestinal tract, and the proliferation of Gram-negative bacteria, including Salmonella and Campylobacter, perhaps due to the lack of competition for available nutrients. The present study aimed to evaluate the effects of a multi-genus synbiotic product (PoultryStar* sol, BIOMIN) on gut health, poultry caecal microbiome, and performance in broilers, to explore its potential as an alternative to AGPs. A field trial was conducted on the offspring of a Broiler Breeder (BB) flock that was already treated with the aforementioned synbiotic. Day-old chicks hatched from BB-synbiotic-treated eggs laid at the age of 40 weeks, were vaccinated at the hatchery and placed on a Broiler farm. Here, they were divided into two houses, one of which received the synbiotic according to a determined protocol while the other was left as a control, and reared up to 42 days of age. To mitigate the negative impact of wet litter and mortality observed during the experiment period, the Control group had to be treated with an antibiotic (Amoxicillin 800mg). Ten birds from each house were randomly sampled at 10, 28 & 38 days of age for Bacterial Enteritis (BE) scoring. Tissue from the duodenum, jejunum, and ileum-caecum, were taken, and caecal content was sampled at day 38 in order to evaluate the effect on the overall structure of bacterial communities. Body weight and mortality alongside other performance parameters were also recorded. Results showed the beneficial effect of synbiotics acting as an alternative to antibiotic growth promoters. Synbiotic administration improved gut health in terms of macroscopic dysbacteriosis score, histopathological scores, and villi length and performed better in terms of body weight gain, feed conversion ratio, and mortality. The evaluation of the caecal microbiome highlighted the effects of synbiotic supplementation on the composition of the bacterial population. The PS group showed fewer Campylobacteriales in comparison with the Control group. Therefore, this makes up one promising step toward the holistic approach to antibiotic-free production in field conditions with the application of synbiotics.

Keywords
Synbiotic, broiler, broiler breeder offspring, caecal microbiota, Campylobacteriales, gut health, performance