

Effect of Coated Sodium Butyrate (CM3000®) On Zootechnical Performance, Immune Status and Necrotic Enteritis After Experimental Infection of Broiler Chickens

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Abstract : The present study was conducted to determine the effect of commercially coated slow-release sodium butyrate (CM3000®) as a feed additive on zootechnical performance, immune status and Clostridium perfringens severity after experimental infection. Three hundred 1-d-old broiler chicks (Cobb 500) were randomly distributed into 3 treatment groups (4 replicates each) using 25 chicks per replicate on floor pens. Control (C) birds were offered non-supplemented basal diets. Treatments 1 and 2 (T1 and T2) were fed diets containing CM3000® at 300 and 500 g/ton feed, respectively, during the entire experimental period (35 days). Feed and water were offered ad-libitum. Feed consumption and body weight were recorded weekly to calculate body weight gain and feed conversion. Blood samples were collected to evaluate the immune status of the birds against Newcastle disease vaccines using HI test. At the end of the experimental period, 20 birds were chosen randomly from each group (5 birds from each pen) to compare carcass yield. At day 16 of age 20 birds from each group (5 birds/replicate) were bacteriologically examined and proved to be free from Clostridium perfringens. The isolated birds were challenged orally with 1 ml buffer containing 106 CFU/ml Clostridium perfringens local isolate and prepared from necrotic enteritis (NE) diseased farms. Birds were observed on a regular basis daily for any signs of NE. Birds that died in the challenged group were necropsied to determine the cause of death. On day 28 of age, the surviving chickens were killed by cervical dislocation and necropsied immediately. Intestinal tracts were removed and intestinal lesions were scored. Tissue samples of the duodenum, jejunum, ileum and cecum for histopathological examination were collected. All collected data were statistically analyzed using IBM SPSS® version 19 software for personal computers. Means were compared by one-way ANOVA ($P<0.05$) followed by the Duncan Post Hoc test. The results revealed that body weight gain was significantly ($P<0.05$) improved in chicks fed on both doses of CM3000® compared to the control one. Final body weight gain in T1 and T2 were 2064.94 and 2141.37 g/bird, respectively, while in the control group, the weight gain showed 1952.78 g/bird. In addition, supplementation of diets with CM3000® increased significantly feed intake ($P<0.05$). Total feed intake in T1 and T2 were 3186.32 and 3273.29 g/bird, respectively; however, feed intake in the control group recorded 3081.95 g/bird. The best feed conversion was recorded in T2 group (1.53). Feed conversion in the control and T1 groups were 1.58 and 1.54, respectively. Dressing percentage, liver weights and the other carcasses yields were not different between treatments. The butyrate significantly enhanced immune responses measured against Newcastle disease vaccines. Sodium butyrate significantly reduced NE lesions and healthy improved the intestinal tissues in the samples collected from T1 and T2-challenged chickens versus those collected from the control group. In conclusion, exogenous administration of slow-release butyrate (CM3000®) is capable of improving performance, enhancing immunity and NE disease resistance in broiler chickens.

Keywords : sodium butyrate, broiler chicken, zootechnical performance, immunity, necrotic enteritis

Conference Title : ICASVM 2024 : International Conference on Animal Science and Veterinary Medicine

Conference Location : Pattaya, Thailand

Conference Dates : February 05-06, 2024