

Influence of postbiotic RG14 and inulin combination on cecal microbiota, organic acid concentration, and cytokine expression in broiler chickens

ABSTRACT

This study examined the effects of different combinations of inulin and postbiotics RG14 on growth performance, cecal microbiota, volatile fatty acids (VFA), and ileal cytokine expression in broiler chickens. Two-hundred-and sixteen, one-day-old chicks were allocated into 6 treatment groups, namely, a basal diet (negative control, NC), basal diet + neomycin and oxytetracycline (positive control, PC), T1 = basal diet + 0.15% postbiotic RG14 + 1.0% inulin, T2 = basal diet + 0.3% postbiotic RG14 + 1.0% inulin, T3 = basal diet + 0.45% postbiotic RG14 + 1.0% inulin, and T4 = basal diet + 0.6% postbiotic RG14 + 1.0% inulin, and fed for 6 weeks. The results showed that birds fed T1 and T3 diets had higher ($P < 0.05$) final body weight and total weight gain than NC and PC birds. A lower ($P < 0.05$) feed conversion ratio was observed in birds fed T1 and T2 compared with those fed the NC diet. Birds fed PC, T1, T2, and T3 had higher ($P < 0.05$) cecum total bacteria and *Bifidobacteria* compared to the NC birds. Diet had no effect on cecum *Lactobacilli*, *Enterococcus* and *Salmonella*. The NC birds had higher ($P < 0.05$) *Enterobacteria* and *E. coli* than other treatments. Concentration of acetic acid was higher in birds fed PC, T1, and T4 compared to the NC birds. However, the concentration of butyric acid, propionic acid, and total VFA did not differ ($P > 0.05$) among diets. The NC birds had higher ($P < 0.05$) expression of interferon (IFN) and Lipopolysaccharide-induced tumor necrosis factor-alpha factor (LITAF) gene compared with those fed other diets. The mRNA expression of interleukin-6 (IL-6) was up-regulated in birds fed T3 and T4 compared to the NC birds. However, the expression of interleukin-8 (IL-8) gene was not influenced by diet. Postbiotic and inulin combinations are potential replacements for antibiotic growth promoters in the poultry industry.

Keyword: Postbiotic RG14; Inulin; Bacteria; Cytokine expression; Broiler chickens