

Effects of dietary prebiotics, probiotic and synbiotics on performance, caecal bacterial populations and caecal fermentation concentrations of broiler chickens

ABSTRACT

Background: In view of a worldwide attempt to restrict or ban the use of antibiotics as growth promoters in animal production, probiotics, prebiotics and combinations of both, as synbiotics, have been suggested as potential alternatives. In this study, the effects of a prebiotic (isomalto-oligosaccharides, IMO), a multi-strain probiotic (consisting of 11 *Lactobacillus* strains), and a combination of these dietary additives as a synbiotic on the performance, caecal bacterial populations and concentrations of caecal volatile fatty acids and non-volatile fatty acids of broiler chickens were evaluated. **Results:** Supplementation of 1g kg⁻¹ probiotic (PRO); 5 g kg⁻¹ prebiotic IMO (PRE05); 10 g kg⁻¹ prebiotic IMO (PRE10); synbiotic consisting of 1g kg⁻¹ probiotic + 5 g kg⁻¹ prebiotic IMO (SYN05); or synbiotic consisting of 1g kg⁻¹ probiotic + 10 g kg⁻¹ prebiotic IMO (SYN10) significantly ($P < 0.05$) improved weight gain of broiler chickens at 22–42 and 1–42 days of age, and feed conversion rate from 1 to 21, 22–42 and 1–42 days of age. The supplementation of probiotic (PRO), prebiotics (PRE05 and PRE10) or synbiotics (SYN05 and SYN10) also significantly ($P < 0.05$) increased the caecal populations of lactobacilli and bifidobacteria, and decreased the caecal *Escherichia coli* at 21 days of age, and increased the caecal VFA at 21 and 42 days of age. In all parameters studied, synbiotics did not show a two-fold synergistic effect, when compared to those of probiotic or prebiotic alone. **Conclusion:** The results of the study indicated that prebiotic IMO (5 g kg⁻¹ or 10 g kg⁻¹), probiotic and their combinations as synbiotics were effective in improving the performance of broiler chickens and in increasing the caecal beneficial bacteria and fatty acids.

Keyword: Probiotic; Prebiotic; Synbiotic; Broiler performance; Caecal microflora