

## **Dietary bromelain improves nutrient digestibility, digesta viscosity and intestinal villus height as well as reduces intestinal *E. coli* population of broiler chickens**

### **ABSTRACT**

The effect of dietary bromelain at doses of 0, 0.05, 0.1, 0.2 and 0.5% on growth performance, nutrient digestibility and faecal nitrogen content of broilers was investigated. Its effect on digesta viscosity, intestinal bacterial populations, intestinal morphology and blood biochemistry were also investigated. A total of 180 one-day old Cobb 500 chicks were randomly allocated to five treatment groups fed with commercial basal diet. At day 21 and 42, birds were slaughtered and ileal digesta was collected for nutrient digestibility, digesta viscosity as well as *Lactobacillus* and *E. coli* population analyses. Intestinal segments were collected to determine villus height and crypt depth under a light microscope. Excreta was collected to determine nitrogen content using the Kjeldahl method. Blood samples were collected at slaughter to determine biochemical parameters. Starter birds fed 0.05 and 0.1% bromelain had higher ( $P<0.05$ ) fat and protein digestibility than the control, respectively. Finisher birds fed 0.05, 0.2 and 0.5% bromelain had higher ( $P<0.05$ ) fat digestibility than the control. As a result of the improved protein digestibility, bromelain showed a trend to decrease faecal nitrogen content ( $P=0.096$ ). However, it seemed that the improved digested protein was not utilized for lean gain as bromelain did not improve the body weight gain and feed conversion ratio ( $P<0.05$ , respectively). Bromelain improved intestinal villus height and reduced digesta viscosity in the starter birds ( $P<0.05$ ). Bromelain might have reduced the negative effects of dietary anti-nutritional factors that led to improvement of intestinal villus height and digesta viscosity. Bromelain reduced intestinal *E. coli* populations and increased *Lactobacillus* populations ( $P<0.05$ ). Bromelain had no effect on serum alanine aminotransferase (ALT) level ( $P>0.05$ ) and it reduced serum alkaline phosphate (ALP) and aspartate aminotransferase (AST) levels ( $P<0.05$ , respectively), indicating no adverse effect on liver and kidney functions of broilers. In conclusion, dietary bromelain improved protein and fat digestibility resulting in reduced faecal nitrogen content, with no changes on body weight gain in broilers. Bromelain also increased intestinal villus height, reduced digesta viscosity and reduced intestinal *E. coli* populations.

**Keyword:** Broiler chicken; Bromelain; Nutrient digestibility; Digesta viscosity