

The effects of low-protein diets and protease supplementation on broiler chickens in a hot and humid tropical environment

ABSTRACT

Objective: This experiment was conducted to investigate the effects of dietary crude protein (CP) level and exogenous protease supplementation on growth performance, serum metabolites, carcass traits, small intestinal morphology and endogenous protease activity in broiler chickens reared under a tropical climate.

Methods: A total of 480 day-old male broiler chicks were randomly assigned to eight dietary treatments in a 4×2 factorial arrangement. The main effects were CP level (21.0%, 19.7%, 18.5%, or 17.2% from 1 to 21 days and 19.0%, 17.9%, 16.7%, or 15.6% from 22 to 35 days) and protease enzyme supplementation (0 ppm or 500 ppm). All experimental diets were fortified with synthetic feed-grade lysine, methionine, threonine and tryptophan to provide the minimum amino acid recommended levels for Cobb 500.

Results: Reducing dietary CP linearly reduced ($p<0.05$) growth performance, serum albumin, total protein, and carcass traits and increased ($p<0.05$) serum triglycerides and abdominal fat. There was no consistent effect of reducing dietary CP on morphological parameters of the intestine and on the pancreatic and intestinal endogenous protease activity ($p>0.05$). Protease supplementation improved ($p<0.05$) feed conversion ratio, body weight gain, carcass yield and intestinal absorptive surface area.

Conclusion: Protease supplementation, as measured by growth performance, intestinal morphology and carcass yield, may alleviate the detrimental effects of low protein diets in broiler chickens.

Keyword: Broiler chickens; Microbial protease; Low-protein diet; Growth performance; Intestinal morphology