

Effects of lysine and methionine in a low crude protein diet on the growth performance and gene expression of immunity genes in broilers

ABSTRACT

Globally, the poultry industry is 1 of the most advanced livestock industries. Feed contributes to the biggest proportion (65–70%) of the production cost. Most feed ingredients in Malaysia are imported, which contributes to the high food bill annually, and alternative feed formulation may help decrease the cost of poultry feed. Feed formulation are improved to efficiently meet the dietary requirements of the broilers and 1 of the ways is by reducing the level of crude protein in the diet while supplementing essential amino acids. In this study, the effects of methionine and lysine, which are the 2 most limiting amino acids in the chicken diet, were supplemented in a low crude protein diet, and its effects on the growth and expression of immunity genes such as MUC2, SLC, GAL6, and LEAP-2 were studied. A total of 300 Cobb500 broilers were tested with 10 different dietary treatments. Experimental treatment diets consist of high, standard, and low levels of methionine and lysine in the diet with reduced crude protein. The control group consists of diet with standard levels of lysine, methionine, and crude protein as recommended for Cobb500 broilers. Ribonucleic acid was extracted from the jejunum, spleen, and liver for gene expression analysis which was performed with real-time polymerase chain reaction using SYBR Green chemistry. Results of the growth performance at 6 wk showed improved feed conversion ratio when lysine was increased by 0.2% in a low crude protein diet at 1.9660.11. Gene expression of MUC2 gene in the jejunum showed a significant increase across all experimental diets with the treatment with higher lysine in low crude protein diet with the highest increase of 3.8 times as compared with the control diet. The other genes expressed in the spleen and liver were mostly downregulated. It was concluded that supplementation of high lysine with standard methionine in a low crude protein diet performed better in terms of lowest feed conversion ratio and high upregulation of MUC2 gene.

Keyword: Broiler; Lysine; Methionine; Immunity gene; Gene expression