

Response to dietary supplementation of L-glutamine and L-glutamate in broiler chickens reared at different stocking densities under the hot, humid tropical conditions

Abstract

A study was conducted to determine whether supplementing AminoGut (a commercial dietary supplement containing a mixture of L-glutamine and L-glutamic acid) to broiler chickens stocked at 2 different densities affected performance, physiological stress responses, foot pad dermatitis incidence, and intestinal morphology and microflora. A randomized design in a factorial arrangement with 4 diets [basal diet, basal diet + 0.5% AminoGut from d 1 to 21, basal diet + 0.5% AminoGut from d 1 to 42, and basal diet + virginiamycin (0.02%) for d 1 to 42] and 2 stocking densities [0.100 m²/bird (23 birds/pen; LD) or 0.067 m²/bird (35 birds/pen; HD)]. Results showed that villi length and crypt depth were not changed by different dietary treatments. However, birds in the HD group had smaller villi ($P = 0.03$) compared with those of the LD group. Regardless of diet, HD consistently increased the serum concentrations of ceruloplasmin, α -1 acid glycoprotein, ovotransferin, and corticosterone ($P = 0.0007$), and elevated heterophil to lymphocyte ratio (0.0005). Neither AminoGut supplementation nor stocking density affected cecal microflora counts. In conclusion, under the conditions of this study, dietary supplementation of AminoGut, irrespective of stocking density, had no beneficial effect on growth performance, intestinal morphology, and physiological adaptive responses of broiler chickens raised under hot and humid tropical conditions. However, AminoGut supplementation from d 1 to 42 was beneficial in reducing mortality rate. Also, the increased serum concentrations of a wide range of acute phase proteins together with elevated corticosterone and heterophil to lymphocyte ratio suggested that high stocking density induced an acute phase response either indirectly as a result of increased incidence of inflammatory diseases such as foot pad dermatitis or possibly as a direct physiological response to the stress of high stocking density.

Keyword: L-glutamine; L-glutamic acid; Stocking density; Acute phase protein; Well-being