

Physiological response of glutamine and glutamic acid supplemented broiler chickens to heat stress

ABSTRACT

This study was conducted to investigate the effects of dietary glutamine (Gln) + glutamic acid (Glu) supplementation on growth performance and physiological stress response broilers exposed to cyclic heat stress. Day-old commercial broiler chickens were kept in environmentally controlled chambers and fed (i) basal diet (control), (ii) basal diet + 0.5% Gln+Glu from 1 to 21 days of age. From day 22–42, chicks in one chamber were subjected to 5 h daily heat stress at $34 \pm 1^\circ\text{C}$ and the other chicks remain in thermoneutral condition. Weight gain and FCR significantly improved during the starter (day 1–21) and overall (day 1–42) periods with Gln+Glu supplementation when compared to control. Supplementing birds with Gln+Glu has also significantly reduced mortality rate in birds under heat stress. Physiologically, provision of Gln+Glu for the birds under heat stress resulted in higher heat shock protein 70 (Hsp70) and ovotransferrin (OVT) production. In conclusion, it appears that the beneficial effect of Gln+Glu supplementation in performance and survivability of broiler under heat stress may be partially due to enhancement of Hsp70 and OVT synthesis.

Keyword: Broiler, nutrition; Heat stress; Glutamine; Glutamic acid; Acute phase protein; Hsp70