

Gut microbiota and transportation stress response affected by tryptophan supplementation in broiler chickens

ABSTRACT

Stimulation of serotonergic activity by tryptophan (TRP) supplementation is known to influence behavioural and physiological processes. One hundred and twenty male broiler chicks were assigned in groups of 5–24 battery cage and fed experimental diets with 0.22, 0.42 and 0.62% of digestible TRP during 21–42 d. On 42 d, birds were challenged with 2 h of transportation stress and samples were collected before or after the transportation. The results revealed that TRP increased feed intake, but had no significant effect on growth performance. Regardless of transportation, heat shock protein 70 (HSP70) and corticosterone (CORT) decreased and serotonin (5-HT) elevated by increasing TRP level in diet. Breast muscle pH and colour were not affected by elevation in dietary TRP, but drip loss decreased and shear force increased. Quantification of gut microflora showed that supplementation of TRP increased Enterococci, and Bifidobacteria populations, while *E. coli*, Clostridia, Campylobacter and Enterobacteria populations decreased. The effect of diet on Lactobacilli population was not significant. In conclusion, feeding broilers with higher levels of TRP improves their welfare condition both before and after transportation stress, as measured by lower serum CORT and HSP70 and higher 5-HT. Increasing dietary TRP level may shift the balance of pathogenic/non-pathogenic bacteria in gut to a favourable state.

Keyword: Tryptophan, meat quality, corticosterone, microflora, transportation