

Effect of dietary β -mannanase supplementation in low-energy diets containing high-mannan ingredients on productive performance, blood measurements, and intestinal morphology in laying hens raised under heat stress conditions

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The objective of this study was to investigate the effect of dietary β -mannanase (MN) supplementation in low-energy diets containing high-mannan ingredients on productive performance, blood measurements, and intestinal morphology in laying hens raised under heat stress (HS) conditions. A total of 560 37-week-old Hy-Line Brown laying hens were randomly assigned to 1 of 5 dietary treatments with 8 replicates: a positive control (PC) with a normal energy diet (2,900 kcal/kg AME_n), a negative control (NC) with low-energy levels (2,800 kcal/kg AME_n), a high-mannan NC diet containing 5.0% palm kernel meal (High-mannan NC), and the high-mannan NC diet supplemented with 0.05% and 0.10% MN. All hens were raised under a cyclic HS condition ($31 \pm 0.7^\circ\text{C}$ for 8 h/d and $26 \pm 1.7^\circ\text{C}$ for the remaining time) during 8 weeks of the feeding trial. Productive performance (hen-day egg production, egg weight, egg mass, broken and shell-less egg production rate, feed intake, and feed conversion ratio: FCR), blood measurements (heterophil to lymphocyte ratio, aspartate aminotransferase, and alanine aminotransferase), and intestinal morphology (villus height, crypt depth, and VH:CD ratio) were analyzed. The PC treatment showed a similar FCR value to NC treatment, whereas all high-mannan NC treatments had a lower ($p < 0.05$) FCR compared with PC treatment. However, dietary supplementation of MN in high-mannan NC diets had no positive effect on all productive performance in laying hens. The NC treatment had a greater ($p < 0.05$) blood heterophil to lymphocyte ratio than PC and 0.10% MN treatments; however, no significant differences were observed among other treatments. Dietary supplementation of 0.10% MN in high-mannan NC diets resulted in a greater ($p < 0.05$) VH than NC and high-mannan NC treatments. In addition, PC treatment had a greater ($p < 0.05$) CD compared with all high-mannan treatments. In conclusion, dietary supplementation of 0.10% MN in low-energy diets containing high-mannan ingredients decreased blood heterophil to lymphocyte ratio but improved intestinal morphology in laying hens under HS conditions without positive effects on productive performance.

Key words : laying hens, health status, high-mannan diet, productive performance, β -mannanase