

Effect of vitamin C and natural antioxidants on the production performance and antioxidant status of laying hens through heat

Authors:

Mohammed Th. T¹,
Farhan SM¹,
Majid AA¹,
Mohammed Saeid ZJ¹ and
Abdulateef FM²

Institution:

1. Department of Animal production, College of Agriculture\ University of Anbar, Iraq.
2. Ministry of Agriculture, Directorate of Anbar Agriculture, Iraq.

Corresponding author:

Mohammed Th. T

ABSTRACT:

An experiment was carried out to investigate the effect of using ascorbic acid (vitamin C) and Dried Tomato Pomace (DTP) as natural antioxidants on the production performance and antioxidant status of laying hens through heat stress. Two hundred laying hens (Lohman brown layer) were reared at 34 weeks with a mean weight of 1750 g (\pm 150 g), distributed randomly and divided into five treatments with four replicates per treatment and 10 hens per replicate (40 hens / treatment). The treatments were T₁ basal diet (control), T₂ basal diet with 300 mg/kg of ascorbic acid (vitamin C) in addition to treatments T₃, T₄, T₅ were given 1, 2 and 3 % of DTP respectively. The temperature of the breeding chamber was 38°C for all treatments. The control treatment showed a significant deterioration in most production characteristics, such as a significant decrease in egg production and egg mass and significant deterioration in Feed Conversion Ratio (FCR) and mortality percentage. Enzymatic activity of catalase, glutathione peroxidase, and a significant increase in the level of malondialdehyde (MDA) in the liver tissue. Additionally, a significant increase in the enzyme activity of AST, ALT with a significant decrease in the activity of the ALP enzyme in blood plasma compared with birds fed on antioxidants during hot weather which indicated the susceptibility of heat stress to form oxidative stress in laying hens. Furthermore, a significant improvement in the productivity traits was detected, whereas significantly, an increase in egg production and egg mass in addition to a significant improvement in FCR and mortality percentage were demonstrated. There was also a significant improvement in the anti-oxidation status against heat stress by a significant increase in the activity of plasma glutathione peroxidase and catalase enzymes with a significant decrease in the level of MDA in the liver tissue. Moreover, a significant decrease in ALT activity, with a significant increase in ALP enzyme activity in blood plasma compared with control treatment, indicating the role of treatments in protecting against the effect of heat stress and its ability to improve the studied traits.

Keywords:

Tomato pomace, Antioxidant status, Heat stress, Laying hens.