

Effect of Natural Antioxidant on Oxidative Stability of Eggs and Productive and Reproductive Performance of Laying Hens

Radwan Nadia, L., R.A. Hassan, E.M. Qota and H.M. Fayek

Department of Poultry Nutrition, Animal Production Research Institute, Agriculture Research Centre, Giza, Egypt

Abstract :

The main target of this study was to determine the effect of dietary natural antioxidants: Thyme, rosemary, oregano and curcuma longa on production and reproduction performance of laying local hens and study the oxidative stability of yolk shell egg storage at room temperature ($16\pm 2^{\circ}\text{C}$). A total number of 360 hens and 36 cocks from El-Salaam strain of 28 weeks old were divided into 12 groups with 3 replicate each (10 hens +1 cock). Birds were fed on the experimental diets, using two levels (0.5 and 1.0%) from four types of herbs (oregano, thyme, rosemary, curcuma longa) as natural antioxidants, in comparison to two levels of vitamin E (100 and 200) mg/Kg diet, in addition to two diets, one using vitamins and minerals premix with vitamin E (control) and the other without vitamin E (Negative-control). The main results obtained from this study can be summarized as follows: Addition of herbs as natural antioxidants during the laying period can improve the production performance especially at 1.0% thyme, rosemary, oregano or 0.5% curcuma longa increased egg production, egg mass and improved feed conversion. Addition of 1.0% curcuma longa increased numerically values of shell weight and egg shape index. This treatment increased percentage of yolk weight and improved yolk colour by 10.87% and 15.62%, respectively compared to control group. Addition 1.0% oregano gave the highest values of all nutrient digestibility coefficients; except ether extract digestibility that was the lowest value compared to control diet, however it was statistically insignificant. Statistically, the highest values ($P<0.05$) of antibody titer against sheep red blood cells were recorded for hens fed 1.0% thyme or rosemary. Thyme or rosemary at 1.0% significantly decreased plasma total lipid, in comparison to the control by 17.15 and 27.15%, respectively while total cholesterol and LDL- cholesterol decreased insignificantly. Addition of thyme, rosemary or curcuma longa at 1.0% significantly decreased yolk total lipid, in comparison to the control group by 12.14, 13.19 and 13.95%, respectively. Addition of 1% oregano or rosemary or 0.5 and 1.0% curcuma longa during laying period significantly decreased malonaldehyde formation in egg yolk and had positive effect on oxidative stability of shell eggs storage at room temperature ($16\pm 2^{\circ}\text{C}$). Addition of 1.0% oregano, rosemary or 0.5% curcuma longa significantly increased the percentages of fertility. While 1.0% thyme or 0.5-1.0% curcuma longa significantly increased the percentages of hatchability of fresh eggs. It could be concluded from this study that herbs could be used as natural antioxidants during laying period. Oregano, rosemary or thyme at 1.0% or curcuma longa at 0.5% can improve productive performance, fertility and hatchability and had positive effect on oxidative stability of shell eggs during storage.

Key Word :

Natural antioxidants, herbs, oxidative stability, productive performance, fertility and hatchability