

VARIOUS DIETARY LEVELS OF INORGANIC VITAMIN D ON INTERNAL AND EXTERNAL PHYSICAL QUALITY PARAMETERS OF LAYING HEN EGGS

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Abstract

The study investigated the effect of different dietary levels of inorganic vitamin D₃ on the laying hens performances, internal and external physical parameters of eggs, instrumental color measurements and self-life. The experiment was conducted on 114 Lohmann Brown laying hens, (38 laying hens/group; 34 weeks age) with an average initial body of 1850 g for 8 weeks trial period. Three different levels of vitamin D₃ inorganic form were taken into consideration: Diet 1 (Control, 2500 UI/kg premix), Diet 2 (3000 UI/kg premix) and Diet 3 (3200 UI/kg premix). All internal and external egg quality parameters were measured at the begging, after 4 and 8 experimental weeks, including instrumental color measurements. We also determined the self-life of eggs stored for 28 days at room temperature. The internal and external physical parameters measured during the experiment were: egg white and yolk pH, egg weight height, yolk color, Haugh unit, breaking shell strength, eggshell thickness, yolk height, yolk diameter, and yolk index. We observed significant differences for feed intake and feed conversion ratio in the first four experimental weeks. Diet 1 had the highest feed intake compared with diet 2 and diet 3. During the entire experimental period, diet 2 had constantly the lowest feed conversion ratio, compared to diet 1 and diet 3. At the end of the trial (8 weeks) diet 3 group presented eggs with significantly higher weight compared with diet 1 and diet 2. For egg quality parameters, a significant ($P < 0.05$) eggshell thickness was noticed at diet 2 (0.42 mm) compared to diet 1 group (0.39mm) during the first 4 weeks of feeding, while during the 8 weeks of feeding no difference could be notice between groups (0.39 mm). The breaking shell strength was higher in diet 3 (5.21 kgf) and diet 2 (5.08 kgf) compared to diet 1 group (4.83kgf), without statistically significance during the first 4 weeks, with similar trend after 8 weeks of feeding. Albumen pH increased significantly after first 4 weeks of feeding, with significant modification on Haugh units ($p < 0.0001$) between the groups.

Keywords: egg, inorganic, physical parameters, vitamin D₃, laying hens