

# PRODUCTION PERFORMANCES AND NUTRITIONAL EGG QUALITY WHEN FEEDING FLAXSEED MEAL AND DIFFERENT SOURCES OF ANTIOXIDANTS IN LAYING HENS' DIET

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## Abstract

Nowadays, the evaluation of the fat content of dietary components in the poultry sector carries considerable significance in assessing their utilization and deposition within the animal body and the resulting products. The effect of dietary flaxseed meal and different antioxidant sources on layers' performances and egg quality was investigated in a 6-wks feeding trial on 120 Tetra SL layers (38 weeks) assigned to 4 groups (C, E1, E2, E3). The control (C) diet was characterized by 2800 kcal metabolisable energy (ME) and 17.8% crude protein (CP), 1.13 g  $\alpha$ -linolenic acid/100g FAME. Compare to C diet, all three experimental groups were supplemented with flaxseed meal 5%, and different antioxidant sources: 27 mg vitamin E/kg diet (E1), 100 mg vitamin E/kg diet (E2), and 2% red grape pomace meal (E3). The flaxseed meal supplementation increased up to 10 times the  $\alpha$ -linolenic acid dietary concentration. At the end of the experiment, 18 eggs/group were collected to determine the eggs' nutritional and quality parameters. The ingesta of polyunsaturated fatty acids omega 3 (PUFA) concentration increased highly significantly ( $p=0.0001$ ) by 7.5 times at all experimental groups (0.60; 0.60; 0.61 g FA/ingesta) compared to C group (0.08 g FA/ingesta). The fat concentration of yolk significantly decreased ( $p \leq 0.05$ ) in E2 and E3 groups compared to C. The same trend was noticed for the cholesterol level which significantly decreased ( $p = 0.039$ ) on all experimental groups (0.25; 0.25; 0.23g/100g egg) compared to C group (0.29g/100g egg). A highly significantly level ( $p = 0.0001$ ) of  $\Omega 3$  fatty acids was recorded on E1 (62.59 mg/ whole egg), E2 (64.45 mg/ whole egg), and E3 (59.97 mg/ whole egg) groups compared to C group (17.61 mg/ whole egg) which determined a low  $\Omega 6/\Omega 3$  ratio. The index of thrombogenicity (TI), important indicators thrombogenic potential of fatty acids, registered lower values ( $p \leq 0.05$ ) on E1, E2 and E3 (0.54, 0.57, 0.55) compared to C group (0.70).

In conclusion, the dietary flaxseed meal inclusion and the antioxidants supplements registered a high transfer rate of omega-3 fatty acids to egg yolk therefore enhancing the egg nutritional quality with real benefits for human health.

**Key words:** eggs quality, flaxseed meal, fatty acids, layers' performances