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EVALUATING THE EFFECT OF CASTANEA SATIVA ON FUNCTIONAL EGG TRAITS UNDER PROTEIN-RESTRICTED DIETS OF LAYING HENS

Petru Alexandru Vlaicu, Arabela Elena Untea, Tatiana Dumitra PANAITE, Mihaela SARACILA, Gabriela Maria CORNESCU

National Research and Development Institute for Animal Biology and Nutrition, Feed and Food Quality Department 077015 Balotesti, Ilfov, Romania

Abstract: This study investigates the effects of Castanea sativa (chestnut) supplementation on egg quality in laying hens fed low-protein diets. Three dietary treatments were evaluated: control (CON), low-protein diet (LPD), and low-protein diet supplemented with Castanea sativa (LPC). Egg physical traits, internal and external quality parameters, chemical composition, antioxidant profile, and shelf-life under two storage temperatures (5°C and 22°C) were assessed.

Introduction

Castanea sativa, (chestnut), is valued for its high concentration of bioactive compounds, particularly tannins and polyphenols, which have demonstrated antioxidant, antimicrobial, and anti-inflammatory properties.

Protein is one of the most expensive components of poultry diets, and reducing its inclusion without compromising animal health and product quality remains a key challenge.

Egg quality and shelf life are critical parameters in poultry industry, influencing consumer acceptance and market value.

This study aimed to evaluate the effect of *Castanea sativa* supplementation on egg quality traits in laying hens subjected to reduced-protein diets.

• Results and discussions

> no significant effect on fresh egg, albumen or shell weight, however, yolk weight was significantly higher in CON (17.12 g), vs. LPD (16.02 g) and LPC (15.65 g).



Material and method

✓ Birds: 168 Lohmann Brown hens, aged 51 weeks, three experimental (56 hens / group); ✓ **Diets:** control group (CON) received a diet with 17.50% CP; low protein diet group (LPD) received a diet with 15.50% CP; low protein diet group (LPC) received a diet with 15.50% CP, and 0.50% *Castanea sativa* supplement+limiting amino acids; ✓ **Sampling:** 162 eggs (54/group /18 per analyses) collected, for initial quality evaluation, including analyses of TPC and DPPH assay; storage time (42) days) at ambient temperature (22°C) and refrigeration (4°C) to assess storage effects on shelf life.

✓ **Statistics:** one-way analysis of variance (ANOVA) using Stat View software (version 6.0).

from low-protein diets from chestnut-diet group

✓ LPC eggs exhibited slightly better weight retention (62.05 g at 5° C and 57.98 g at 22° C); ✓ at 22°C, LPC eggs maintained higher Haugh Units (53.35) than CON (48.28) and LPD (49.92); ✓ at 22°C, pH in CON albumen was 11.01, vs. 8.88 (LPD) and 7.89 (LPC),

✓ at 5°C and 22°C, yolk pH, color and index of LPC eggs was higher (p<0.05) than CON and slightly higher than LPD;

✓ shell thickness and breaking force showed slight improvements in LPC eggs for both 5°C and 22°C.

Conclusions

Eggs from hens receiving LPC diets demonstrated better preservation of albumen and yolk characteristics, enhanced Haugh Units, and improved shell strength, particularly under



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