



Effect of dietary basil essential oil supplementation on performance and egg quality of laying hens

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- Abstract:** This study investigated the effect of dietary basil essential oil (BEO; *Ocimum basilicum* L.) on laying performance and egg quality. Thirty ISA Brown laying hens, 25 weeks of age, were fed for 8 weeks. a fixed amount of feed (120 g/hen/day). Basil essential oil (BEO) was added to the feed at inclusion levels of 0, 1000, and 2000 mg/kg for treatments BEO0 (control), BEO1000, and BEO2000, respectively. assigned to three treatments: Basil essential oil did not affect feed intake, egg production, abnormal egg production, egg weight, egg mass, or feed efficiency (P>0.05). However, increasing BEO reduced shell weight and shell thickness while improving albumen index and Haugh units (P<0.05). Most other egg-quality traits were not affected.
- ### Introduction
- **Natural feed supplements** have been investigated as alternatives to antibiotic growth promoters.
 - The use of **essential oils** in the diet of farm animals may support digestion, antioxidant status and gut health.
 - **Basil (*Ocimum basilicum* L.)** is rich in bioactive compounds and has recognized functional properties.
 - **Aim:** to evaluate the effect of dietary basil essential oil on productive performance and egg-quality traits of laying hens.

Materials and methods

- **Thirty ISA Brown laying hens, 25 weeks old.**
- **Treatments:** BEO0 = control; BEO1000 = 1,000 mg BEO/kg diet; BEO2000 = 2,000 mg BEO/kg diet (5 replicate cages/treatment, 2 hens/cage).
- **Duration:** 8 weeks (56 days); feed allowance 120 g/hen/day; water ad libitum.
- **Performance measurements:** body weight (at day 1 and day 56), feed intake, egg production, egg weight, egg mass, feed efficiency, cracked/thin-shelled/shell-less eggs (daily).
- **Egg quality measurements:** External (egg weight, length and diameter, eggshell weight and thickness); Internal (yolk colour, yolk and albumen height and diameter, yolk weight, yolk and albumen pH) at days 14, 28, 42, and 56.
- **Statistical analysis:** The effect of treatment was included in the statistical model. Cage was the observational unit; significance declared at P < 0.05.

Results and discussions

- Feed intake was similar among treatments: 119.44, 119.68, and 119.53 g/hen/day for BEO0, BEO1000, and BEO2000.
- Egg production was not affected: 0.94, 0.96, and 0.96 eggs/hen/day.
- Egg weight, egg mass, and feed efficiency were not significantly influenced (P>0.05).
- Shell weight and shell thickness decreased as BEO increased.
- Albumen index and Haugh units increased, indicating improved internal egg quality.
- No increase in cracked eggs was observed

Table 1. Performance of laying hens

	Treatment ^{1,2}			SEM
	BEO0	BEO1000	BEO2000	
Initial body weight (BW) (g)	1,761.0	1,891.2	1,880.0	40.065
Feed intake (g/hen/day)	119.44	119.68	119.53	0.109
Egg production – (eggs/hen/day)	0.94	0.96	0.96	0.008
Cracked, thin-shelled and shell-less eggs (eggs/hen/day)	0.01	0.01	0.01	0.004
Egg weight (g)	59.97	59.99	58.99	0.697
Egg mass (g/hen/day)	56.60	57.67	56.48	0.854
Feed efficiency (g feed/g egg mass)	2.12	2.08	2.12	0.032

¹BEO0 = control treatment, BEO1000 = treatment with 1,000 mg basil essential oil (BEO)/kg, BEO2000 = treatment with 2,000 mg BEO/kg.

²Number of cages (replicates)/treatment = 5. Number of hens/cage (replicate) = 2.

Evidence from the scientific literature indicates that basil supplementation appears to exert variable effects on productive performance and egg quality, depending on the form of basil used and the inclusion level.

Table 2. Egg quality of laying hens

	Treatment ^{1,2,3}			SEM
	BEO0	BEO1000	BEO2000	
External egg quality				
Egg weight (g)	59.97	59.99	58.99	0.519
Egg shell area (cm ²)	72.64	72.68	71.84	0.417
Egg shape index	79.28	79.05	80.43	0.356
Egg shell weight (g)	6.23	6.02	5.85	0.068
Egg shell thickness (mm)	0.39	0.36	0.35	0.006
Internal egg quality				
Yolk colour (15-point colour scale by using a Roche fan)	11.90	12.05	11.85	0.075
Yolk index	49.44	49.02	50.64	0.325
Yolk weight (g)	14.25	13.62	14.35	0.195
Yolk pH	5.80	5.83	5.93	0.028
Albumen index	16.14	17.69	19.84	0.439
Haugh units	104.29	107.22	110.46	0.795
Albumen weight (g)	36.94	37.57	35.95	0.466
Albumen pH	7.75	7.90	7.90	0.037

¹ BEO0 = control treatment, BEO1000 = treatment with 1,000 mg basil essential oil (BEO)/kg, BEO2000 = treatment with 2,000 mg BEO/kg.

² Number of cages (replicates)/treatment = 5. Number of hens/cage (replicate) = 2.

³ Number of eggs (replicates)/treatment/determination (14th, 28th, 42nd and 56th day) = 5.

Conclusions

- ▶ Basil essential oil supplementation up to 2,000 mg/kg did not affect productive performance of laying hens.
- ▶ Most egg-quality traits remained unchanged.
- ▶ Internal egg quality improved, as shown by higher albumen index and Haugh units.
- ▶ Shell weight and shell thickness decreased, so further research is needed before recommending higher inclusion rates.