

Effect of Oregano oil supplementation on performance and physiology in laying hens during the pullet phase

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Introduction

Optimal performance of laying hens relies on proper development and growth during the pullet phase. Any setbacks or mismanagement during this critical period can severely impact the future productivity and profitability of the operation. As a result, essential oil of oregano (EEO) has gained attention as a growth promoter in poultry thanks to its active compounds that exhibit antibacterial, antiviral, antifungal, immunomodulatory, and aromatic properties.

Study Objective

Assess the impact of dietary EEO on bird performance, gastrointestinal (GIT) traits, lipid profiles, and antioxidant capacity in laying hens during the pullet phase (0–17 wks).

Materials & Methods

Experimental Design:

A total of 290 Hy-Line Brown pullets were randomly allocated to 2 dietary treatments, each with 5 replicate pens (29 birds/pen):

- **Control (CON):** Basal corn-soybean diet.
- **Experimental (EEO):** Basal diet supplemented with 275 g/ton of Ecodiar®.

Birds were reared under standard management protocols for temperature, lighting, and feeding according to the breed guidelines (Hy-Line, 2022).

The basal diet was formulated following a phase feeding program to meet or exceed nutritional requirements, and pullets were fed a mash diet throughout the experiment.

Aspects assessed:

- **Performance Parameters:** Body weight (BW), average daily weight gain (ADWG), and average daily feed intake (ADFI) were measured biweekly.
- **GIT Traits:** 5 birds/treatment were euthanized to measure GIT, liver, and spleen weights, intestinal lengths, and gizzard pH.

Blood Samples were collected from 3 birds/pen at wks11 and 17 to analyze:

- **Lipid Profile:** triglycerides, cholesterol, and HDL levels.
- **Antioxidant Capacity:** Serum antioxidant capacity, MDA (malondialdehyde), GSH-Px (glutathione peroxidase), SOD (superoxide dismutase), ALT (alanine transferase), and AST (aspartate transferase).

Statistical Analysis: Data were analyzed using GLMM in R, with Tukey’s HSD for pairwise comparisons. Significance was set at $p \leq 0.05$.

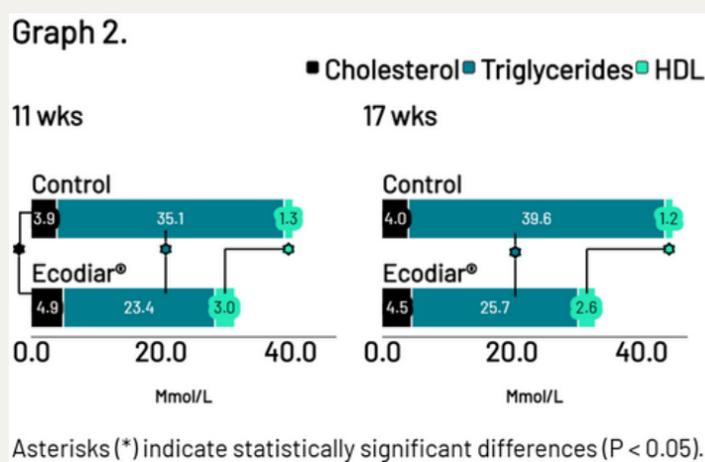
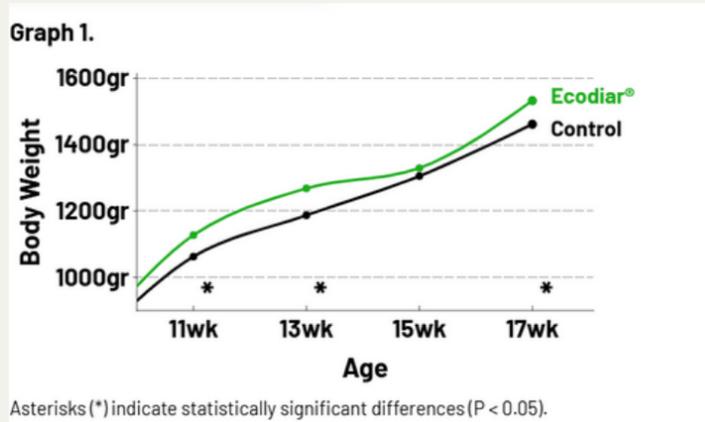
Results

Performance (Graph 1): birds supplemented with Ecodiar® were 71 gr heavier than birds fed the Control diet by wk 17 (1533 vs 1462; $P = 0.03$). Also, ADFI was similar between diets through the study ($P > 0.05$).

GIT traits: at 12 wks old, the entire GIT and empty gizzard were heavier in birds supplemented with Ecodiar® ($P \leq 0.05$), liver and spleen weights were not significantly different ($P > 0.05$).

Blood Lipid Profile (Graph 2): it was improved by the diet inclusion of Ecodiar®, increasing HDL and cholesterol levels while reducing triglycerides at 11 and 17 wks ($P < 0.05$), indicating potential benefits for cardiovascular health.

Serum antioxidant parameters (Table): Birds supplemented Ecodiar® showed higher tolerance to oxidative stress indicated by Higher TAC (Total Antioxidant Capacity), SOD and GSH-Px with lower MDA levels. Ecodiar® inclusion also showed inferior ALT and AST blood levels, which are known enzyme-markers of liver health.



Age	Diet	TAC	MDA	SOD	GSH-Px	ALT	AST
		(mmol/L)	(mmol/L)	(U/mg)	(ng/mL)	(U/L)	(U/L)
11 wks	Control	7.0 ^b	19.8 ^a	260.0 ^b	10.4 ^b	2.6 ^a	311.4 ^a
	Ecodiar®	9.8 ^a	10.7 ^b	380.6 ^a	19.3 ^a	2.2 ^b	259.5 ^b
	<i>P-value</i>	0.01	0.01	0.01	0.01	0.01	0.01
17 wks	Control	7.0 ^b	21.3 ^a	274.4 ^b	12.5 ^b	2.8 ^a	309.1 ^a
	Ecodiar®	11.4 ^a	12.7 ^b	358.1 ^a	18.1 ^a	2.3 ^b	252.8 ^b
	<i>P-value</i>	0.01	0.01	0.01	0.03	0.01	0.01

Conclusions

The addition of Ecodiar® to poultry diets during the early growth stages could lead to healthier, more productive birds. Its positive effects on growth performance, lipid profiles, liver function, and oxidative stress highlight Ecodiar® as a natural alternative to traditional growth promoters, with the potential to enhance laying performance and long-term productivity. Ongoing studies aim to validate its benefits during the laying phase.

