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Effect of Adding Different Levels of Olive Leaves on Productive Performance and Cecal Bacterial Acount in Laying Hen

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Abstract

This study was conducted at the poultry farm animal Production Department, College of agricultural Engineering Sciences, University of Baghdad, during the period from 5/3/2022 to 27/5/2022 (12 weeks) . to study the Effect of adding different levels of olive leaves on productive Performance and Bacterial a count in Laying hen. A total of 126 Lohmann Brown Classic Laying hens 52 weeks of age were used randomly distributed among seven treatments, each treatment contained 18 hens, with three replicates and each replicate contained 6 hens per replicate. The females of the first treatment (T1) were fed a standard diet for Laying free of addition, while the other treatments T2, T3, T4, T5 , T6 and T7 were added the different levels of olive leaves powder (20, 40, 60, 80,100 and 120)g /kg diet respectively. The result showed that adding different levels of olive leaves powder to layer hens significant increase ($p \leq 0.05$) total average HD%, at period 2, 3 and total average egg weight, period 3 and total average on egg production, Feed a consumption rate three periods and total average, some egg quality and Lactobacilli and decrease significant ($p \leq 0.05$) in *E. coli* in duodenum and Jejunum.

Keyword: Laying hen, Egg production, Haugh unit, Lactobacilli, E. coli.

I. INTRODUCTION

Nutrition represents the largest protein of operational production costs, which can reach more than 75% of total rearing cost (khan et al., 2012).

Therefore researchers have sought to find dietary additives such as the use of medicinal plants their oils or extract in the production of meat with healthy properties ,Free of toxins and chemical compounds these are called functional foods which are safe for the consumer such as: chamomile oil , a nice , thyme essential oils , Gum Arabic and turmeric powder (Al-Mashhadani et al.,2011; Al-Mashhadani et al.,2013; Abd-AL-Fahad and Al-Mashhadani,2023 and Al-Mashhadani,2025) .These alternatives. include medicinal plants, essential oils, plant extracts and organic acid with the aim of improving the productive performance, egg production and egg quality in laying hens (Lokaewmanee et al.,2009 and zhao et al.,2013) .Among these plants that have received significant attention in recent years is the olive tree (*Olea europaea*) which is perennial, evergreen tree(Botsoglou et al.,2012) .The olive leaves is rich in bioactive compounds such as Phenolics (oleuropein), glycosides, flavonoids and inthocyanins, in addition to the presence of phenolic acid (Keceli,2000;Bouaziz et al.,2008 and Filik,2009). Olive leaves possess properties with significant roles

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as antioxidants, anti-inflammatory, antimicrobial, anti-allergic, anti hypertensive, anti atherosclerotic, anti-tumer, anti-hyperglycemic and cholesterol-lowering agents (Visioli and Galli, 2002 and Butsoglou et al., 2013.) .The aim of this study was to investigate the different levels of olive leaves powder to layer hen diets on productive performance .

Due to the scarcity of local studies on the use of olive leaves in laying hen diets , the current study aimed to added different levels of olive leaves powder to investigate their effect on productive performance

II. MATERIALS AND METHODS

This experiment was conducted at the poultry farm, Animal production Department, College of Agricultural Engineering Sciences, University of Baghdad for the period from March 5th, 2022 to May 27th, 2022. 126 hens 52 weeks age raised in cages were used and they were randomly distributed to 7 treatments each treatment had 3 replicates (6 hens /replicate) for a period of 12 weeks. They were fed balanced diets of energy and protein (Table 1). Water and feed were available throughout the experiment period *(Ad libitum*) freely. The birds were equipped with 16 hours of light/day olive leaves powder was added as an addition to the diet as follows:

T1: control without adding olive leaves powder.

T2: 20g olive leaves powder/kg diet.

T3:40g olive leaves powder/kg diet.

T4: 60g olive leaves powder/kg diet.

T5: 80g olive leaves powder/kg diet.

T6: 100g olive leaves powder/kg diet.

T7: 120g olive leaves powder/kg diet.

Productivity traits were calculated (egg weight, egg production%, Feed consumption (g1h/d), Feed conversion ratio (g feed /g egg), hen day, egg quality and bacterial a count), as indicated by (Naji and Hanna, 1999 and Ibrahim, 2000). Three birds were randomly selected from each replicate internal content of bacterial a count in duodenum and Jejunum were collected.

Olive leaves

Freash *Olea europaea* leaves were procured from a single local source .The leaves were than naturally air – dried in a shaded area to produce naturally dried olive leaves.

Statistical analysis

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The experiment data were analyzed using complete randomized design (CRD) to determine the effect of adding different levels of olive leaves powder on studied traits. The significant means were Compared using multiple range rang test and used Statistical analysis system (Duncan, 1955 and SAS, 2018).

TABLE 1. The chemical compositions of the experiment diet.

Ingredients	46- 65 weeks
Yellow corn	30
Wheat	28.8
Soybean meal	22
Protein concentration (1)	5
Fat	3
Dicalicum phosphate (DCP)	10
Salt	0.3
Colveat	0.2
Total	100
Crude protein %	18.20
Metabolic energy k cal/ kg	2816.66
Lysine%	1.02
Methionine %	0.42
Meth. % + cys.%	0.65
Calcium %	4.21
Phosphors %	0.44

1- The protein concentrate (WAFI) each kg contains: 40%, crude protein, 2120.6 kcal/kg feed metabolisum energy, 3.50% Calcium 4.75% phosphors available, 3.75% Lysin, 2.85% methionine 3.27% meth.+cys., 5% crude fat, 2.57% crude fiber.

2- Calculated Chemical analysis of the diet according to (NRC, 1994).

III. RESULTS AND DISCUSSION

It was noticed from the data shown in table **(2)** that there were no significant at period 1,2 and 3 while there was a significant increase ($P \leq 0.05$) for all adding olive leaves powder compared with Control group.

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TABLE 2. Effect of adding different levels of olive leaves powder to the diet on the percentage of egg production H.D % of layer hen (mean ± standard error)

Treatment [1]	Periods			Total average
	1	2	3	
	53- 56 weeks	57-60 weeks	61-64 weeks	
T1	80.13± 5.26	80.54± 2.96	70.4± 5.03	72.69± 1.66 b
T2	89.68± 2.44	81.55± 4.46	82.54± 2.88	84.59± 2.019a
T3	84.52±3.96	82.94± 6.95	80.95± 3.28	82.80± 2.57 a
T4	82.14± 1.23	83.35± 1.93	79.76 ± 3.87	81.75±1.13 a
T5	81.74± 4.24	80.16± 2.62	76.39± 2.01	79.43±1.45 a
T6	80.75± 1.29	77.38± 5.41	73.41±4.48	77.18±2.29 a
T7	83.14 ±2.01	80.35± 2.55	83.53±4.29	82.34±1.89 a
Sign. Levels	N.S	N.S	N.S	*

[1]Treatment: T1: Control, T2, T3, T4, T5, T6 and T7 olive leaves Powder addition at (20, 40, 60, 80, 100 and 120) g/kg diet respectively.

a,b means within the same column with different letters are significantly different (P≤0.05) respectively

. N.S. No significant.

Table (3) shows the effect of adding olive leave, powder for the three period on mean egg weight (g) there were no difference between all treatments at Period 1while 2,3 and total average were significant increase (p≤0.05) for adding of olive leaves powder compared with T1

TABLE 3. Effect of adding different levels of olive Leaves powder to the diet on egg weight (g) of Layer hen (mean Standard error)

Treatment [1]	Periods			Total average
	1	2	3	
	53- 56 weeks	57-60 weeks	61-64 weeks	
T1	64.13± 0.21	63.36±1.77 b	60.35± 2.38 b	62.61 ±1.99 b
T2	66.25± 0.82	61.84±0.41 a	62.48±0.47 a	63.52± 0.41a
T3	65.91± 1.68	64.24± 1.11 a	63.94± 0.13 a	64.69± 0.97a
T4	64.71± 1.37	62.16 ±0.51 a	65.91± 0.49 a	64.26± 0.62 a
T5	64.67±0.21	68.97± 0.77 a	64.47±0.25 a	66.03 ± 0.69 a
T6	66.19±1.29	62.39± 0.57 a	65.13± 0.38 a	64.57 ± 0.40 a
T7	67.25±0.43	63.36 ± 0.37 a	65.70± 0.23 a	65.43± 0.42 a
Sign. Levels	N.S	*	*	*

[1]Treatment: T1: Control, T2, T3, T4, T5, T6 and T7 olive leaves Powder addition at (20, 40, 60, 80, 100 and 120) g/kg diet respectively.

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a,b means within the same column with different letters are significantly different (P≤0.05) respectively.

N.S. No significant.

Table (4) illustrates the effect of adding olive leaves Powder for period 1and 2 we didn't notice any differ between treatments while period 3 and total average were significant increase (p≤0.05) for the addition compared with control group

TABLE 4**.** Effect of adding different levels of olive leaves Powder on egg production % to Layer hens (mean ± standard error)

Treatment [(1)]	Periods			Total average
	1	2	3	
	53- 56 weeks	57-60 weeks	61-64 weeks	
T1	63.88±2.40	62.25±0.26	60.31±1.79 c	62.14± 1.27 b
T2	66.29± 1.79	66.53±2.36	60.35±0.48 b	64.39± 0.39 a
T3	65.79±3.72	62.36±1.97	61.95± 0.56 b	63.36± 0.62 a
T4	63.83± 0.69	63.20±0.74	61.65± 0.53 b	62.89± 0.48 a
T5	68.42±1.04	65.11±2.51	60.42± 0.04 a	64.65±0.49 a
T6	61.72±2.99	61.54±0.21	62.54 ± 0.17 a	61.93 ± 0.18 a
T7	63.66±2.77	63.21±1.36	61.56± 0.13 a	62.81 ± 0.77 a
Sign. Levels	N.S	N.S	*	*

[(1)]Treatment: T1: Control, T2, T3, T4, T5, T6 and T7 olive leaves Powder addition at (20, 40, 60, 80,100 and 120) g/kg diet respectively.

a,b means within the same column with different letters are significantly different (P≤0.05) respectively.

N.S. No significant.

Table (5) shows a revealed significant difference (P≤0.05) in feed consumption rate at period 1, 2, 3 and total average of olive leaves powder addition, treatments compared with control treatment.

TABLE 5. Effect of adding different levels of olive leaves powder on feed consumption rate (g/h/d) to layer hens

(mean ± standard error)

Treatment [(1)]	Periods			Total average
	1	2	3	
	53- 56 weeks	57-60 weeks	61-64 weeks	
T1	100.00±1.15 b	99.00± 1.15 b	99± 1.82 b	99.33± 1.21 b
T2	106.00± 1.00 a	101.00± 0.32 a	101.00±0.52 a	102.66±0.18 a

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T3	104.00±1.15 a	103.00±0.63 a	100.00±0.57 a	102.33±0.52 a
T4	104.00±1.61 a	101.00±0.57 a	101.00±0.57a	102.00±0.55a
T5	103.00±1.58a	102.00±1.04 a	100.96±0.52a	101.98±0.73a
T6	102.00±1.17a	106.00±0.57 a	105.00±1.52 a	104.33± 0.55a
T7	105.00±1.00a	102.00±1.00 a	103.00± 1.52a	103.33±0.38 a
Sign. Levels	*	*	*	*

(1)Treatment: T1: Control, T2, T3, T4, T5, T6 and T7 olive leaves Powder addition at (20,40,60, 80,100 and 120) g/kg diet respectively.

a,b means within the same column with different letters are significantly different (P≤0.05) respectively.

N.S. No significant.

Table (6) shows the influence of adding levels of olive leaves powder to layer hen diets on Feed conversion ratio, we didn't notice difference between all treatments at three periods and total average

TABLE 6. Effect of adding different levels of olive leaves powder on Feed conversion ratio (g feed/g.egg) (means ± standard error)

Treatment(1)	Periods			Total average
	1	2	3	
	53- 56 weeks	57-60 weeks	61-64 weeks	
T1	1.94± 0.11	2.03± 0.10	2.29±0.17	2.09±0.80
T2	1.78±0.05	2.01 ±0.11	1.96±0.07	1.92±0.05
T3	1. 87± 0.03	1.96±0.17	2.08±0.16	1.97±0.10
T4	1.95±0.04	1.96±0.11	2.12±0.13	2.01±0.04
T5	1.95±0.11	1.88±0.20	2.15±0.07	1.99±0.06
T6	1.91±0.03	2.09± 0.22	2.19±0.16	2.06±0.12
T7	1.79±0.06	1.92±0.07	1.92±0.13	1.88± 0.05
Sign. levels	N.S	N.S	N.S	N.S

(1)Treatment: T1: Control, T2, T3, T4, T5, T6 and T7 olive leaves Powder addition at (20,40,60, 80,100 and 120) g/kg diet respectively.

a,b means within the same column with different letters are significantly different (P≤0.05) respectively.

N.S. No significant.

The egg quality of Layer hen at table (7) shows no significant in albumin and egg mass while there were significant increase (P≤0.05) at Yolk, shell thickness and Haugh unit for the adding olive leaves powder compared with T1.

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TABLE 7. Effect of adding different levels of olive leaves powder on egg quality to layer hen (men ± standard error)

Treatment[(1)]	Albumin g	Yolk g	Shell thickness (mm)	Haugh unit	Egg mas (g/ h/ d)
T1	38.58±0.49	38.50±0.36 b	0.48±0.02 b	79.02± 1.32 b	50.91 ± 1.64
T2	42.10± 0.56	41.66±0.32a	0.59±0.01 a	84.63±0.65 a	53.74±1.49
T3	40.49±2.26	41.17± 1.02 a	0.58±0.02 a	84.42±1.33 a	52.5±2.27
T4	39.42±0.73	41.31±0.81a	0.58±0.02 a	82.95± 0.85 a	50.95± 1.11
T5	42.28±0.87	41.44± 0.48 a	0.59±0.01 a	86.71±1.86 a	51.66± 1.89
T6	39.58±0.73	40.63±0.26 a	0.59± 0.01a	83.78±1.43 a	48.63±2.95
T7	39.65±1.18	40.43±0.55 a	0.59± 0.01a	83.78 ±1.78 a	52.25± 1.19
Sign. levels	N.S	*	*	*	N.S

[(1)]Treatment: T1: Control, T2, T3, T4, T5, T6 and T7 olive leaves Powder addition at (20, 40, 60, 80,100 and 120) g/kg diet respectively.

a,b means within the same column with different letters are significantly different (P≤0.05) respectively.

N.S. No significant.

The addition of medicinal plants to poultry diets plays a role in regulating digestive activity by increasing digestive juices ,which work to stimulate appetite and increases feed consumption (Akcicek and otles ,2011) which play a role in scavenging free radicals and delaying the lipid oxidation process, with the potential to reduce the production of volatile compounds resulting from the decomposition of hydrogen peroxide, poly phenols are considered natural antioxidants that are directly responsible for flavor and color by enhancing health and improving food quality (Souto et al.,2019 and Wojtunik et al.,2020) The significant improvement in some productive traits of Laying hens may be attributed to the presence of Oleuropein , which is considered one of the most important bioactive compounds in olive leaves. Oleuropein plays a key role in enhancing pepsin enzyme activity. There by improving the efficiency of nutrient utilization from the provided feed, in addition to its role in protecting the epithelial cells of the gastrointestinal tract(Durlu-Özkaya et al.,2011; Zeng et al.,2015; Sarica and Toptas, 2014 and Wang et al.,2022) The eggs of poultry are essential in nutrition Sources for human additives such as zinc, Selenium and poly unsaturated fatty acids incorporated into poultry feed are typically deposited into the egg yolk there by enhancing its nutritional profile and increasing Consumer appeal (Elbayoumi et al.,2019), this in turn, regulates digestive enzymes, which stimulate appetite, and feed intake, there by positively and directly reflecting on the productive performance .(Erener et al., 2009 and Özdemir and A zman, 2016)

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Table (8) shows the decrease significant (P≤0.05) in *E-coli* for duodenum and jejunum to all adding treatments compared with T1, while there were increase significant (P≤0.05)for *Lactobacilli* in duodenum and jejunum to adding olive leaves powder compared with control group.

TABLE 8. Effect of adding different levels of olive powder on *E. coli* and *Lactobacilli* (mean ± standard error)

E. coli (CFU/ml)			*Lactobacilli* (CFU/ml)	
Treatment [(1)]	Duodenum	Jejunum	duodenum	jejunum
T1	6.44±0.74 a	7.12±65 a	8.22±0.95 b	5.21±0.06 b
T2	6.29±0.02 b	6.68 ±0.29 b	6.31±0.05 a	7.22±0.06 a
T3	5.11± 0.03 b	5.41± 0.02 b	7.22±0.04 a	7.10±0.03
T4	5.61± 0.19 b	5.61±0.13b	7.94±0.09 a	7.36±0.02
T5	4.62± 0.13 b	4,27± 0.09b	7.97±0.07 a	7.43±0.04a
T6	4.38±0.13 b	4.20±0.11b	7.91±0.07 a	7.44± 0.02
T7	4.21±0.19 b	4.70± 0.20b	7.89 ± 0.03 a	7.51 ± 0.06 a
Sign. levels	*	*	*	*

[(1)]Treatment: T1: Control, T2, T3, T4, T5, T6 and T7 olive leaves Powder addition at (20, 40, 60, 80, 100 and 120) g/kg diet respectively.

a,b means within the same column with different letters are significantly different (P≤0.05) respectively.

N.S. No significant.

Many researchers have reported that the use of medicinal plants plays a role in improving the health status of poultry by increasing the beneficial micro flora at the expense of *E. coli* , it could be The beneficial effects of olive leaves may be attributed to their content of bioactive compounds such as polyphenols, Olive leaves are characterized by containing many active compounds, including oleuropein, hydroxytyrosol, and verbascoside, which are considered natural antioxidants(Branciari et al.,2017 and Papadopoulou et al.,2017).

IV. CONCLUSIONS

It was concluded from this study that adding different levels of olive leaf powder and the best level was 80 g/kg to the diet had a positive effect on some productive performance parameters, with an increase in *Lactobacilli* and a decrease in *E. coli* in layer hens.

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