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PERFORMANCE, EGG QUALITY, AND SOME SERUM PARAMETERS OF LAYERS FED DIFFERENT PARTS OF STINGING NETTLE (*URITICA DIOICA*)

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ABSTRACT

This study aimed to evaluate the effect of dried stinging nettle plant parts (roots, leaves, seeds) on performance, egg quality, and some biochemical serum parameters. The experiment used 96 Hy-Line W-36 layers, of 28 weeks of age, and was randomly divided into four dietary treatments: the first group fed a diet without nettle as a control (CG), the second group (RG) fed a diet treated with 1% nettle roots, the third group (LG) fed a diet treated with 1% nettle leaves, and the fourth group (SG) fed a diet treated with 1% nettle seeds. Each experimental unit used four replicates, six layers each. The density of 595 cm^2 / bird. The experimental period lasted 16 weeks. The results demonstrated that supplementing 1% roots, leaves, or seeds of stinging nettle to layers diets did not show any significant differences in egg production, egg mass, egg weight, feed intake, and feed conversion ratio (FCR). Likewise, yolk%, albumen%, eggshell%, yolk index, and Haugh units, serum levels of total protein, total cholesterol, triglyceride, glucose, AST, and ALT, as well, egg yolk cholesterol concentration did not show significant differences (P>0.05). Generally, the use of 1% of stinging nettle parts, such as roots, leaves, and seeds did not improve performance, egg quality, and biological serum parameters.

Keywords: Egg quality, ALT, AST, cholesterol, Haugh units.

INTRODUCTION

The global production of table eggs has increased by 24.4% over the past decade, bringing production to 76.7 million tons in 2018, which is expected to increase further because of the high demand for animal-originated protein (Dilawar *et al.*, 2021). This high demand has triggered the need for intensive poultry production (Olobatoke & Mulugeta, 2011), which causes an increased incidence of disease, chronic stress, and Compromised production. With the improvement in living standards and the popularization of dietary and nutritional knowledge, consumers are paying more attention to the relationship between dietary structure and health, and have higher expectations for egg quality (Li *et al.*, 2022). Dietary supplementation of herbs, essential oils, and active components stimulates the productive performance, egg quality, digestibility of nutrients, and some blood

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biochemical parameters of laying hens (Abdel-Wareth & Lohakare, 2020).

Urtica dioica commonly known as "stinging nettle," is a perennial herb with various pharmacological activities, such as antioxidative, anti-inflammatory, anti-ulcer, antihyperglycemic, and antibacterial (Devkota *et al.,* 2022). The medicinal properties of these plants are attributed to their secondary metabolites, and the efficacy of these compounds depends on their concentration, combination, and incorporation into animal feed (Aguilar *et al.,* 2013). Different parts of the Urtica dioica plant, including the whole plant, roots, trichomes, roots, and leaves, have been subjected to qualitative phytochemical analysis. The analysis has revealed the presence of various bioactive compounds, such as flavonoids, silica, tannins, ascorbic acid, polysaccharides, sterols, lignans, and fatty acids (Bhusal *et al.,* 2022). These findings highlight the diverse array of medicinal components in stinging nettle, further supporting its potential as a valuable resource to improve layers' health and performance. Mirsaiidi Farahani & Hosseinian., 2022 reported that dietary stinging nettle could be used as a feed additive in poultry diets to improve the health status and defence mechanisms of birds under stressful conditions. Previous studies (Nobakht *et al.,* 2011; Moula *et al.*, 2019; and Zhang *et al.,* 2020) used the whole stinging nettle plant in laying hen diets, regardless of results. We pose the following question: does the inclusion of the stinging nettle in laying hen diets result in positive or negative effects? This study aimed to investigate which part of stinging nettle may affect the performance, egg quality, and some biological serum parameters of laying hens.

MATERIALS AND METHODS

Plant parts Preparation:
The freshly picked verdant Stinging Nettle was obtained from a field adjacent to a secluded farm, situated in Binnish City within the Idlib Governorate of the Syrian government. Carefully selected stinging nettle leaves were plucked, while the remaining components of the plant, including roots, leaves, and seeds were also gathered. Promptly, these aforementioned parts were subjected to a process of air-drying, sheltered from direct sunlight, while maintaining a temperature range of 15°C to 35°C for four days. The extraction of the seeds and leaves from the stems involved gentle rubbing, while the roots were fine-cut by scissors. After which the resulting dried leaves, seeds, and roots of the stinging nettle were pulverized into a fine powder using a grinder equipped with a 1.5-mm sieve. The powder was then stored in a securely sealed container that was impervious to light until added to the experimental diets.

Birds and Breeding Conditions:
This study was conducted on a poultry farm belonging to the Department of Animal Production at the College of Veterinary Medicine, Idlib University. 96 Hy-Line W-36 layers, 28 weeks old, were distributed following a completely random design to four groups. Each experimental group consisted of four replicates and each replicate consisted of 6 layers. The laying hens were housed in cages (65 × 55 × 65 cm). The hens were kept at a stocking density of 595 cm^2/bird. The first group fed a diet without nettle as a control (CG), the second group (RG) fed a diet treated with 1% nettle roots, the third group (LG) fed a diet treated with 1% nettle leaves, and the fourth group (SG) fed a diet treated with 1% nettle seeds. The formulation of the control diet (Table 1) was determined based on (Hy-line w-36) management guide. The diets did not include growth promoters or antibiotics, and layers had free access to feed and water (*ad libitum*). The lighting program followed a cycle of 16 h of light and 8 h of darkness (16L:8D), using fluorescent lights controlled by timers until the end of the experiment, with a consistent light density of 40 lux. The building was ventilated, and temperatures

ranged from 15°C at night to 25°C during the day in the laying hens' house. The experiment lasted for 16 weeks. According to Adhikari *et al.* (2016), the gross energy of stinging nettle leaf powder recorded the following value: 307 (kcal/100g) likewise, while according to Bagade *et al.*, (2021), the gross energy of stinging nettle leaf powder recorded values ranged from 350 to 400 (kcal/100g). On the other hand, according to Tarasevičienė *et al.,* (2023) the nutritional profile of stinging nettle leaves and roots, showed the following values: a crude protein content of 14.53%, and 13.66%, crude fat content of 2.62% and 1.65%, crude fiber content 10.58% and 31.65%, crude ash content 18.86% and 18.41%, respectively. In addition, according to Jafari *et al.*, (2020), the nutritional profile of stinging nettle seeds showed the following values: a crude protein content 21.89%, crude fat content of 34.12%, crude fiber content 30.24, crude ash content 4.47%. Previous nutritional profile values of stinging nettle parts inserted into the diets of RG, LG, and SG were used to calculate the analysis of the experimental diets.

Laying Performance:

The hens were weighed at the start of the experiment, and thereafter, their weight and feed intake were weekly recorded at the same time for each replicate. The egg weight was recorded daily. The daily feed intake per hen was calculated by dividing the consumed feed quantities in weeks by 7 days. Egg production (EP) %, egg mass and feed conversion ratio (FCR) were calculated as follows:

■(EP %) = Total number of eggs produced / Total number of hen-day × 100

■(Egg mass) = EP % × Average egg weight (g)

■(FCR per kg egg mass) = Kg of feed consumed / Kg of egg produced

Egg Quality:

At the end of the experiment, a total of 48 eggs, 3 eggs per replicate were randomly gathered. Haugh unit was calculated using the formula described by (Haugh, 1937).

Haugh Unit = 100 log (H - 1.7 W0.37 + 7.57).

Where H was the albumin thickness (mm) and W was the weight of the entire egg (g).

Yolk index, albumen weight %, egg yolk weight %, and eggshell weight %, as previously stated by Malfatti *et al.*, (2021). The eggshell thickness (excluding the membrane) was measured using a digital micrometer with a precision of 0.001 mm. Measurements were taken at three points: the two narrower ends and the middle part of the egg. A total of 32 eggs, 2 eggs per replicate, were randomly collected, to determine the yolk content of cholesterol, using the method outlined by Pasin *et al.*, 1998. The samples were prepared and analyzed by UV spectrophotometric method (Biosystems BTS-350) using a specific cholesterol kit, Biosystems, Spain.

Serum Biochemical Parameters:

The laying hens were deprived of food overnight, at the end of 16th week of the experiment. Subsequently, a total of 32 blood samples (2/ replicate), were randomly taken from the brachial vein of laying hens. The serum samples were centrifuged (1500 rpm, 15 minutes), and stored at -20°C. The serum content of total cholesterol, tri-glycerides, glucose, aspartate aminotrans-ferase (ALT), alanine aminotransferase (AST), and total protein (TP), were determined by UV spectrophotometer using commercial kits.

Statistical Analysis:

The data were analyzed by one-way analysis of variance (ANOVA) using IBM SPSS Statistics version 21 for Windows (Corp, 2021) was used to conduct statistical analysis. To identify significant effects, we compared means using Duncan's multiple comparison test, which helped us discern specific differences among the means. In our analysis, statistical significance was designated at a threshold of (P<0.05).

RESULTS

Production Performance:

The body weight means of four trial groups are recorded in Table (2), with no significant differences (P>0.05) observed. The highest numerical body weight mean of layers was in the group fed 1% of stinging nettle seeds 1617g, while the lowest numerical body weight mean was in the group fed 1% of stinging nettle roots 1606 g. Feed intake, egg production, egg weight, egg mass, and FCR, were summarized in Table (3). LG layers showed a decrease in feed intake of 124.6 g/bird/day, and egg production 90.21%, but both of the eggs weighed 58.37g, and FCR 2.36 was the best. Per contra, the RG layers showed the highest average feed intake 128.51 g/bird/day, and the CG layers showed the highest egg production 92.53%, and egg mass 53.03 g. In addition, RG layers showed the lowest egg mass 52.45 g, and the worst FCR 2.45. Unfortunately, this study did not record significant differences (P>0.05) when comparison means of performance indicators were conducted on the trial groups. No mortality was recorded during the 16-week experimental period.

Egg Quality:

Table (4) shows no significant differences (P>0.05) were also recorded between means of yolks %, albumin%, shell%, yolk index%, Haugh units%, and the shell thickness mm for layers groups had fed on 1% roots RG, leaves LG, and seeds SG, of stinging nettle and control CG. However, we found that the yolk% mean of LG layers had relatively increased to 24.55%, while the yolk % mean of CG layers reached 24.36%. However, the yolk % mean of RG layers and SG layers were lower; 23.48% and 23.54% respectively. On the other hand, the LG layers showed the lowest albumin% mean 62.51%, while RG had the highest average 64.27%. Eggshell% mean was 12.45%, 12.61%, and 12.38% for RG, LG and SG layers respectively, while the CG layers showed the lowest eggshell% mean 11.74%. In contrast, the yolk index means showed the lowest value 0.413% in the SG layers compared with the yolk index means of CG, RG, and LG layers, 0.422, 0.420% and 0.426%, respectively. Haugh unit showed decreasing in LG layers eggs, 85.39% followed by SG, 86.54%, but both CG and RG group layers recorded higher values of Haugh unit was convergent 89.04%, 89.14%, respectively. The CG layers recorded the lowest shell thickness mean 0.351 mm, while the shell thickness means of RG, LG, and SG layers increased to 0.373, 0.382, and 0.376 mm, respectively.

Table (6) shows yolk cholesterol concentrations in 1g yolk and whole yolk. The SG layers of yolk recorded less cholesterol concentration in 1g yolk (15.46 mg/1g yolk) between all trial groups, while the yolk cholesterol concentration in 1g yolk of LG, RG, and CG layers increased to 15.79, 16.01, and 16.03 mg/1 g yolk, respectively. Also, for yolk cholesterol concentration Table (6) showed that the yolk cholesterol concentration of SG layers was the lowest at 236.36 mg/yolk, but the yolk cholesterol concentration of LG layers showed the highest cholesterol concentration at 247.65 mg/yolk, while the yolk cholesterol concentration of both CG, and RG were convergent 244.22, and 241.50 mg/yolk.

Biochemical Serum Parameters:

Biochemical serum parameters of the trial group layers were inserted in Table 5. Unfortunately, with no significant differences (P>0.05). Firstly, the serum glucose level of RG layers was low at 161.01 mg/dl, while glucose levels increased to 162.94 and 163.69 mg/dl for CG and LG layers serum but, serum glucose level of SG layers reached 165.69 mg/dl. On the other hand, LG layers serum showed the lowest serum cholesterol and triglyceride levels 122.29 mg/dl and 854.16 mg/dl, respectively, whereas, the highest values of serum cholesterol and triglyceride were recorded in CG layers 131.00 mg/dl, and 927.13 mg/dl, respectively. Serum total protein levels of RG layers showed the lowest value 3.42 g/dl, but serum total protein of LG, SG, and CG layers were convergent at 3.82, 3.87, and 3.92g/dl, respectively. Finally, the serum AST and ALT levels of RG, LG, and SG layers were 255.41, 253.08 U/L and 252.25, 63.09, 62.05, and 63. 93 U/L, respectively. These values were low when compared with the serum AST and ALT levels of CG layers 263.25 U/L and 65.9 U/L, respectively. No significant differences (P>0 05) were recorded.

Table 1: Dietary ingredients, nutrient composition, and metabolizable energy of the experimental diet (%)

Ingredients	**Experimental Groups**			
	CG	RG	LG	SG
Corn	50	50	50	50
Barley	6	5	5	5
Wheat	10	10	10	10
Soybean (44%)	23	23	23	23
Vegetable oil	1	1	1	1
Dicalcium phosphate	1	1	1	1
Limestone	7.5	7.5	7.5	7.5
Lysine	0.1	0.1	0.1	0.1
Methionine	0.15	0.15	0.15	0.15
Salt (NaCl)	0.5	0.5	0.5	0.5
Premix*	0.75	0.75	0.75	0.75
Stinging nettle	0	1	1	1
Calculated analysis				
Metabolizable energy, Kcal/kg	2830	2825	2834	2843
Crude protein, %	16.56	16.59	16.60	16.67
Crude fiber, %	3.71	3.93	3.72	3.92
Lysine. %	0.88	0.88	0.88	0.89
Methionine, %	0.39	0.39	0.39	0.39
linoleic acid, %	1.84	2.06	2.05	3.92
Calcium, %	3.19	3.20	3.23	3.21
A. Phosphorus, %	0.26	0.26	0.27	0.26

CG = basal diet without nettle; LG = with 1% nettle leaves group; RG = with 1% nettle roots group; SG = with 1% nettle seeds group.

*Premix provides the following per kg of diet: Vit A 16,000 IU, Vit D3 3,300 IU, Vit E 250 mg, Vit K3 3.00 mg, Vit B1 2.50 mg, Vit B2 6.00 mg, calcium pantothenate 10.00 mg, niacin 18.00 mg, Vit B6 5.00 mg, Vit B12 0.023 mg, folic acid 0.90 mg, biotin 0.075 mg, Zn 80.00 mg, Cu 8.00 mg, Fe 60.00 mg, Mn 100.00 mg, I 1.20 mg, Se 0.25 mg.

Table 2: Effect of stinging nettle parts on laying hen weight (g).

		Experimental Groups					
Variables	Age (week)	CG	RG	LG	SG	SEM	P value
Hen layer weight (g)	28	1512	1488	1514	1501	5.91	0.44
	44	1612	1606	1614	1617	10.35	0.87

There were no significant differences, CG = basal diet without nettle; LG = with 1% nettle leaves group; RG = with 1% nettle roots group; SG = with 1% nettle seeds group; SEM = standard error of the mean.

Table 3: Effect of stinging nettle parts on the performance of laying hens.

	Experimental Group					
Variables	CG	RG	LG	SG	SEM	P value
Feed intake (g/bird/day)	126.33	128.51	124.6	125.3	2.54	0.96
Egg Production %	92.53	90.88	90.21	92.26	1.85	0.99
Egg weight(g)	57.31	57.71	58.37	57.15	0.98	0.98
Egg Mass (g)	53.03	52.45	52.66	52.73	1.04	0.97
FCR (g diet/g egg)	2.382	2.450	2.366	2.376	0.08	0.99

There were no significant differences, CG = basal diet without nettle; LG = with 1% nettle leaves group; RG = with 1% nettle roots group; SG = with 1% nettle seeds group; FCR = food conversion ratio; SEM = standard error of the mean.

Table 4: Effect of stinging nettle parts on yolk weight (%), shell weight (%), albumen weight (%), yolk index (%), Haugh unit % and shell thickness (mm).

Variables	Experimental Groups					
	CG	RG	LG	SG	SEM	P value
Yolk %	24.36	23.48	24.55	23.54	0.35	0.67
Shell %	11.74	12.45	12.61	12.38	0.31	0.83
Albumen %	63.61	64.27	62.51	63.72	0.52	0.74
Yolk index1 %	0.422	0.420	0.426	0.413	0.01	0.77
Haugh Unit2 %	89.04	89.14	85.39	86.54	0.79	0.26
Shell thickness (mm)	0.351	0.373	0.382	0.376	0.009	0.30

There were no significant differences, CG = basal diet without nettle; LG = with 1% nettle leaves group; RG = with 1% nettle roots group; SG = with 1% nettle seeds group; SEM = standard error of the mean.

Table 5: Effect of stinging nettle parts on serum content of glucose (mg/dl), cholesterol (mg/dl), TAG (mg/dl), total protein (g/dl), AST (U/l), and ALT (U/l).

	Experimental Groups					
Variables	CG	RG	LG	SG	SEM	P-value
Glucose mg/dl	162.94	161.01	163.81	165.69	5.25	0.718
Cholesterol mg/dl	131.00	124.96	122.29	125.06	2.42	0.661
TAG mg/dl	927.66	857.5	854.16	894.69	19.61	0.575
Total protein g/dl	3.92	3.42	3.82	3.87	0.31	0.321
AST U/L	263.25	255.41	253.08	252.25	2.47	0.593
ALT U/L	65.90	63.09	62.05	63.93	1.91	0.934

There were no significant differences, CG = basal diet without nettle; LG = with 1% nettle leaves group; RG = with 1% nettle roots group; SG = with 1% nettle seeds group. AST = aspartate aminotransferase; ALT = alanine aminotransferase; TAG = triacylglycerol; SEM = standard error of the mean.

Table 6: Effect of stinging nettle parts on egg cholesterol content in yolk (mg).

		Experimental Groups					
Variables		CG	RG	LG	SG	SEM	P-value
Cholesterol /1g yolk	mg	16.03	16.01	15.79	15.46	0.43	0.97
Cholesterol/yolk	mg	244.22	241.50	247.65	236.36	8.43	0.98

There were no significant differences, CG = basal diet without nettle; LG = with 1% nettle leaves group; RG = with 1% nettle roots group; SG = with 1% nettle seeds group; SEM = standard error of the mean

DISCUSSION

Production Performance:

Results showed no significant effects due to feeding layers on stinging nettle roots, leaves, or seeds on the productive performance. However, we can notice clearly that the LG group layers had a little decrease in feed intake compared with other trial group layers, which may have led to a decrease in both egg production and egg mass in the same group. The decrease in feed intake of LG group layers may be due to the unpalatable and stinging taste of the nettle leaves, which are more pronounced in leaves than roots and seeds, this agrees with Diddana *et al.*, (2021) who mention that adding nettle leaf flour by 5, 10, 15% to unleavened maize flatbread results in the mean of all sensory quality parameters decreasing with increasing the proportion of nettle flour. The control sample had the highest rating, and the treatment group rated from liked moderately to like slightly. The increasing feed intake of RG group layers may be due to the high fiber content of roots 31.65% compared to fiber content of leaves 10.8% according to Tarasevičienė *et al.,* (2023) leading to the decreased caloric content of the diet. The mean egg weight slightly increased in the layers group fed the nettle leaves LG and this may be due to an increase in the leaf content of crude protein (14.53%), and linoleic acid (18:2) 21.92% according to Tarasevičienė *et al.,* (2023) both are playing an essential role in egg weight, but this does not appear in egg weight mean of SG layers fed stinging nettle seeds that content 64,63% of linoleic acid (18;2) according to Jafari *et al.,* (2020) may be resulting to high seeds content of fibers 30.24%. In this study, no significant differences (P>0.05) in performance indicators were found. This finding is consistent with previous studies that used while whole stinging nettle plant powder, and stinging nettle oil at broiler (Keshavarz *et al.,* 2014), or whole stinging nettle plant powder (Mierlita., 2022), stinging nettle oil only (Kavan *et al.,* 2023) in laying hens that found no significant influence on performance egg mass, feed conversion ratio, and feed intake in laying hens. On the other hand, the results of this study contradict the findings by Bagno *et al.,* (2023) who suggested that the use of Urtica Dioica extracts in hen feed at a dose of 15 mg/kg of body weight led to a significant increase in production and improved egg parameters. Likewise, the results of this study conflict with Bagno *et al.,* (2023) who conducted a study using different levels of nettle powder (0.5, 1, and 1.5%) on aged quails, for nine weeks, and found that egg production increased by 4.76%, 8.5%, and 7.71%, respectively, compared to the control group. This study found that egg production of hens fed on stinging nettle parts decreased compared with the control group. The results differences may be attributed to the birds used in the previous study were 62-week compared with layers in this study 28 weeks. Using stinging nettle as added feed for aged birds may help to show the greater positive effect of stinging nettle plant. Since the birds in old age had exposed more to productive stress, which associated with regression in most metabolism progresses. According to

Gu *et al.,* (2021), increasing age can adversely affect liver metabolism and function of laying hens.

The results showed that values of egg yolk % were similar among the trial groups; there were no significant differences (P > 0.05) due to the treatment. However, the group of layers fed on nettle leaves LG relatively improved in yolk%. This may be attributed to the high-fat content of the leaves 2.62%, compared with the fat content of the roots 1.65% as reported in the study conducted by (Tarasevičienė *et al.,* 2023). Likewise, the increase in yolk % may lead to a decrease in egg albumen% of LG layers. In the current study, the inclusion of stinging nettle in laying hen diets was associated with increased eggshell thickness and eggshell percentage for RG, LG, and SG layers compared to CG layers. This may be attributed to the good calcium content of the nettle plant (178.77 mg/100g) according to the study by (Adhikari *et al.,* 2016), or it could be due to improved metabolism and absorption of calcium in the intestine. According to (Ebeid *et al.,* 2012) an important eggshell formation factor in the avian uterus, calbindin plays a primary role in Ca2+ transportation. Also, (Zhang *et al.*, 2020) assumed that supplementation with stinging nettle (*Urtica cannabina*) may increase the calcium transport by calbindin due to its anti-inflammatory effect, thus increasing shell calcification which consequently leads to improvements in shell quality features. That may be beneficial, especially for hens reared in cages. On the other hand, our results disagreed with (Bagno *et al.,* 2023) that feeding layers with stinging nettle extract at doses of 5, 10, 15, 20, and 25 mg/kg of body weight caused a decrease in relative yolk and eggshell content. Likewise, the current study agrees with the results by Kavan *et al.*, 2023 who mentioned that no change in egg quality characteristics was found in birds fed 100 and 200 mg/kg of stinging nettle oil. However, further research is required to investigate the effect of the inclusion of increased nettle levels in the diet. Also, for total yolk cholesterol concentration of trial group layers did not show significant differences (P>0.05). This disagrees with the findings of Grigorova *et al.,* (2022), which suggested a significant reduction in total yolk cholesterol in hens when supplemented with 0.3% dried nettle in their diet, our study does not support this claim. Additionally, the research conducted by Moula *et al.,* (2019) demonstrated a reduction in egg yolk cholesterol in quails when nettle was included in their diet at a 6% level. However, in our current study, despite feeding the laying hens with only 1% nettle parts, a slight decrease in yolk cholesterol levels was observed in groups supplemented with nettle parts compared to the control group. It may be necessary to incorporate levels more than 1% in layers diet to further investigate its effects on yolk cholesterol levels.

Serum biochemical indicators can provide insight into the body's metabolism and overall health condition. According to the results adding 1% of stinging nettle parts as roots, leaves, and seeds to laying hen diets did not show significant effects on serum glucose, total cholesterol, triglyceride, ALT, AST, and total protein. These findings agreed with Keshavarz *et al.,* (2014) who reported that the blood parameters such as ALP, ALT, glucose, cholesterol and triglyceride were not affected by dietary treatments when 5g/kg, and 10 g/kg of stinging nettle or 5g/kg, and 10 g/kg of stinging nettle oil were added to broilers diet but only AST level in serum birds of the group fed 10g/kg stinging nettle and 5g/kg stinging nettle oil showed a significant decrease, while the group fed 10g/kg stinging nettle oil not affected. On the other hand, our results disagree with Grigorova *et al.*, 2022 who reported that the inclusion of 0.3% dried nettle in the diet significantly lowered serum concentrations of total cholesterol and triglycerides (P<0.01), while 0.5% nettle powder supplementation led to a significant decrease in total cholesterol

(P<0.01) without affecting triglycerides. Similarly, a study by Mansoub., (2011) observed a significant reduction in serum total cholesterol, triglycerides, and LDL levels in the group supplemented with 2% nettle powder compared to the control group (P<0.01). Also, in contrast with Moula *et al.*, 2019 results when investigating the effects of nettle in quails and reporting reduced levels of serum total cholesterol and triglycerides at a 6% supplementation level. In the current study supplementing the diet with 1% stinging nettle roots, leaves, and seeds did not have a significant impact on serum glucose levels (P>0.05) compared to the control. This result contradicted the findings of Grigorova *et al.*, (2022) who observed a significant reduction in serum glucose levels in laying hens fed a diet supplemented with 0.3%, and 0.5% stinging nettle powder (P<0.01). Also, the supplementation of 1% stinging nettle roots, leaves, and seeds did not have a significant effect on serum concentration of total protein (P>0.05). This finding aligns with a previous study Mansoub., (2011) who found no significant differences in serum levels of total protein among trial groups (P>0.05). The activities of ALT and AST are commonly used indicators to assess the health status of the heart and liver. In this study, serum AST and ALT levels showed no significant differences (P>0.05) among the trial groups, but according to Table (5) showed serum ALT, AST levels we can clearly see a little decrease in both ALT, and AST levels in RG, LG, SG layers compared with CG layers, this may support the results of Mirsaiidi Farahani & Hosseinian., (2022) who mentioned that the serum levels of ALT, AST, and creatinine kinase increased in stress-heat broilers and the supplemented diet with stinging nettle at a level of 4 % decreased the serum levels of AST, ALT, and CK in the broilers exposed to chronic heat stress. Low serum ALT, AST levels was considered good according to Bintvihok & Kositcharoenkul., (2006) because the liver and myocardial cells have the highest levels of AST and ALT activity, while the levels in the serum are very low. However, if there is tissue damage or increased permeability, AST and ALT can escape into the bloodstream, leading to an increase in serum AST and ALT activity.

CONCLUSION

The present study showed that adding 1% stinging nettle parts (roots, leaves, and seeds) to layering hen diets had no effect on performance, egg quality, or serum biological parameters. Further research into these two points is required.

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الأداء ونوعية البيض وبعض معايير مصل الدجاج البياض الذي غُذِي على أجزاء مختلفة من نبات القراص (URITICA DIOCA)

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هدفت الدراسة إلى تقييم تأثير أجزاء نبات القراص المجففة (الجذور والأوراق والبذور) على الأداء الانتاجي ونوعية البيض وبعض المؤشرات الحيوية لمصل الدجاج البياض. استخدم في التجربة ٩٦ دجاجة بياضة من نوع هايلاين Hy-Line W-36، بعمر ٢٨ أسبوعًا، وُزعت عشوائيًا إلى أربع مجموعات: غُذيت المجموعة الأولى على خلطة علفية لا تحوي نبات القراص كمجموعة ضابطة (CG)، وغذيت المجموعة الثانية (RG) على خلطة علفية معاملة بـ ١٪ من جذور نبات القراص، وغذيت المجموعة الثالثة (LG) على خلطة علفية معاملة بـ ١٪ من أوراق نبات القراص، وغذيت المجموعة الرابعة (SG) على خلطة علفية معاملة بـ ١٪ من بذور نبات القراص. استخدم في كل وحدة تجريبية أربع مكررات، كل مكرر يضم ٦ دجاجات بياضة. ربيت في نظام الأقفاص وكانت كثافة التربية طائر/٥٩٥ سم٢ استمرت التجربة لمدة ١٦ أسبوعًا. أظهرت النتائج أن إضافة ١٪ من جذور أو أوراق أو بذور نبات القراص إلى الخلطات العلفية للدجاج البياض لم تظهر أي فروق معنوية في معدل نسبة إنتاج البيض وكتلة البيض ووزن البيض وكمية العلف المستهلك ونسبة التحويل الغذائي (FCR). كما لم تظهر أي فروق معنوية في نسبة الصفار، ونسبة البياض، ونسبة قشرة البيض، ومؤشر الصفار، ووحدات هوف، ومستويات البروتين الكلي، والكوليسترول الكلي، والدهون الثلاثية، والجلوكوز، ومستوى AST، وALT في المصل، وكذلك تركيز الكوليسترول في صفار البيض ($P>0.05$). وبشكل عام، فإن استخدام ١٪ من أجزاء نبات القراص، كالجذور والأوراق والبذور، لم يحسن من الأداء الانتاجي، ونوعية البيض، كما لم يؤثر على المؤشرات الحيوية في مصل الدجاج البياض.