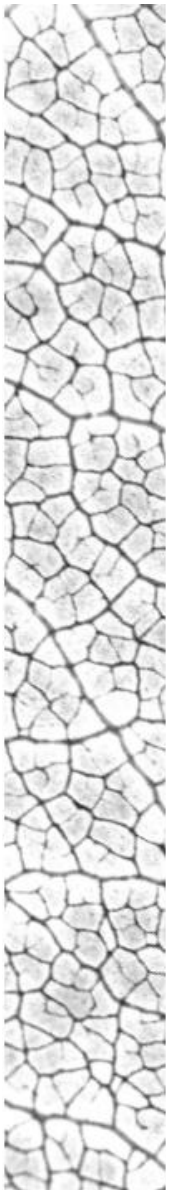

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Effect of adding different levels of crushed laurel leaves (*Laurus nobilis*) to the diet of broiler chickens on some physiological blood traits

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Abstract
This experiment was conducted in the field of Poultry birds belonging to the Department of Animal Production, College of Agriculture, Al-Qasim Green University to investigate the effect of adding different amounts of crushed laurel leaves (*Laurus nobilis*) to feed broilers on some chickens' physiological blood traits. 180 unsexed broiler chickens (ross 380 strain) one-day old were used, randomly divided into four treatments at a rate of 45 birds per treatment, and each treatment consisted of three replicates (15 birds per replicate). The experimental treatments included the first treatment (control) in which no crushed laurel leaves were added to the food, the second treatment in which crushed laurel leaves were added in an amount of (1 g / kg of feed), and the third treatment in which crushed laurel leaves in an amount of (2 g / kg of feed) and the fourth treatment in which crushed laurel leaves in an amount of (3 g / kg of feed) were added. The experiment included the concentrations of glucose albumin, globulin, total cholesterol, triglyceride, high-density lipoprotein, low-density lipoprotein, very-low-density lipoprotein, ALT enzyme, AST enzyme and uric acid, and also globulin/albumin (G / A) ratio and total protein. The results indicated that the addition of crushed laurel leaves (2-3 g / kg of feed) led to an increase in the concentration of high-density lipoproteins and globulins as well as a significant decrease in glucose, total cholesterol, triglycerides, and low-density lipoproteins. The present experiment indicated that adding laurel leaves can improve some physiological blood traits in broilers.

Keywords: broiler chickens, laurel leaves, physiological blood traits

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INTRODUCTION

Modern science had provided conclusive evidence that the plant kingdom was rich in by-products that were characterized by their biological bioactivity and their physiological effect against the incurable diseases that affect humans, animals, birds and other organisms. The cultivation of medicinal, aromatic plants and herbs had spread in most parts of the world. Their uses had been varied and their characteristics for their pharmacological effectiveness and the speed of healing in diseases without complications, whether in the form of whole herbs or powder or pastes or used capsules and others. Recently, numerous medicinal plants have been used to feed broilers and laying hens, including Parsley leaves (Nihad et al. 2016), moringa leaves (Aqeel et al. 2018) and white tea leaves (Nihad et al. 2019). One of these plants was *Laurus nobilis*, the English name for the Bay tree, which was also called sweet bay tree or Grecian tree. The laurel tree had olive-like fruits which were characterized by their dark brown color and a clusters shape. It was classified as an evergreen herbal medicinal plant of the Lauraceae family, and used for the treatment of gastrointestinal diseases and gastric ulcers. *Laurus nobilis* was found in Asia Minor and grew in North Africa. It was obtained from the fruits of volatile laurel oil (Eugenol), had percentage about (1 to 3%) and had many active ingredients such as Monoterpenes, Cinnamaldehyde, Thymol, and Carvacrol. Due to the contained the phenolic compounds and antibacterial property, it also had an antioxidant effect. The laurel leaves were used as fresh or dried aromatic plants (as a spice) in cooking to take advantage of their distinctive aroma and flavor. Mohammed (2018) who was observed when using laurel leaves with quail diet in productive traits compared to the control group. Fdam et al. (2016), improved some broiler yield characteristics when using laurel leaves added to the diet, improving in productive traits compared to the control group. In view of the foregoing and the lack of research into the use of *Laurus*

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nobilis in poultry feed, the present study aimed to determine the effect of laurel plant leaves added to the diet on the physiological traits of broilers chickens (Ross 308) and to know the best percentages that can be used in the diet.

MATERIALS AND METHODS

The present study was conducted in the field of Poultry birds in the Animal Production Department of the College of Agriculture, at Al-Qasim Green University for the period from 21/3/2019 to 25/4/2019 and lasted 35 days. 180 unsexed broiler chickens (strain Ross 380), with an average weight of (40 g / chicken) were used. The chickens were reared in-ground cages, and were randomly distributed into 4 treatments, each consisting of 3 replicates, each replicates containing 15 chickens. The birds were Fed freely, with two feeding formulas, an initiator diet of 1st to 21st days and a final diet from 22nd to 35th days. The crushed laurel leaves were added to the diet (manual mixing) from the age of one day including first treatment (control) in which no addition of crushed laurel leaves were added to the diet, second treatment in which crushed laurel leaves were added in the amount of (1 g/kg) in feed, third treatment in which crushed laurel leaves were added in the amount of (2 g/kg) in feed and fourth treatment in which crushed laurel leaves were added with the amount of (3 g/kg) in feed. The characteristics were estimated at the end of the experiment which continued for five weeks consisted of the concentrations of glucose, albumin, globulin, cholesterol, triglyceride, high-density lipoprotein, low-density lipoprotein, very low-density lipoprotein, ALT enzyme, AST enzyme and concentration of uric acid, globulin/albumin (G/A) ratio, and total protein. Blood samples were collected after slaughtering birds in tubes that did not contain anticoagulants. Centrifugation at a speed of (300rpm) was used for separate the blood plasma for 15 min, and the serum was kept in clean tubes at 20 °C. The cholesterol (mg/100 ml) was measure using a diagnostic kit (Franey and Elias 1968). To estimate the concentration of glucose, french origin kits was used and it was calculated according to the following equation:

The concentration of glucose (mg/dl) = $\frac{\text{(A) sample}}{\text{(A) Standard}}$ × Standard concentration (100 mg/dl)

Triglycerides, low-density and high-density lipoproteins were estimated as the method that had been mentioned in (AOAC 1980), and total protein (g/100 ml) and uric acid (mg/100 ml) were estimated based on the method represented by Henry et al. (1982). To estimate the concentration of globulin, it was calculated according to the following equation:

The concentration of globulin = concentration of total protein - concentration of albumin

Liver enzymes were estimated using the method described in Reitman and Frankle research (1957).

Table 1. Percentage of feed materials included in the initial diet and final diet used in the experiment with the calculated chemical composition for both diets

Feed material	Initial diets (%) (1-21 days)	Final diets (%) (22-35 days)
yellow corn	48.2	58.7
Local wheat	8	7.5
Soybean meal (44% protein)	28.5	20.5
The concentrated Protein*	10	10
Vegetable oil (sunflower)	4	2.5
limestone	1	0.5
Food salt	0.3	0.3
Total	100%	100%
The calculated chemical analysis **		
Metabolic Energy (kg / kg)	3079.85	3102.6
Crude protein (%)	21.56	18.87
Lysine (%)	1.04	0.85
Methionine + Cysteine (%)	0.455	0.42
Raw fiber %	3.54	3.2
Calcium (%)	1.28	1.07
Phosphorus availability (%)	0.42	0.41

* the concentrated protein, each kilogram contained: 2200 kcal/kg metabolic energy, 40% crude protein, 8% fat, 3.5% fiber, 25% ash, 8% calcium, 3.1 phosphorus availability, 1.2% lysine, 1.2% Methionine, 1.8% Methionine + 70 mg, 30 mg vitamin B1, 300 mg vitamin E, 2500 IU D3, A cysteine, 2% chlorine, 10,000 IU 12 mg folic acid, 250 B12, B 120 mg pantothenic acid, 400 mg niacin, 50 mg vitamin B2 and 6, 5000 mg Choline chloride, 450 mg iron, 70 mg copper, 600 mg, C 600 mcg biotin, 1000 mg special vitamin, 750 manganese, 5 mg iodine, 1 g cobalt and antioxidants.
** The chemical composition was calculated according to the analysis of the feed materials mentioned in (NRC, 1994).

Table 1 shows the used feed materials and their calculated chemical composition during the experiment period. The completely randomized design was used to study the effect of different treatments on the characteristics examined. Significant differences between averages were compared using the Duncan's Multiple Range Test (Duncan 1955) and the Statistical package for social sciences (SAS 2010) was used to analyze the data.

RESULTS AND DISCUSSIONS

Table 2 shows the effect of adding crushed laurel leaves to the food on the biochemical traits of blood plasma for broiler chickens. The table shows significant differences between the treatments in the concentration of glucose in the blood of birds, while for the remaining treatments there was a significant superiority ($p \leq 0.05$) in favor of the control treatment. The results also indicated that there were no significant differences between the treatments in total protein and albumin concentration. For the measure of globulin concentration, the table indicated that the treatments with laurel leaves were significantly ($p \leq 0.05$) increased the globulin concentration during the first treatment (control). By measuring the G/A ratio, the control treatment recorded the highest G/A ratio, with a significant difference ($p \leq 0.05$) from the other treatments. The decrease in glucose concentration when treated with laurel leaves might be due to an increase in proteins that are not associated with glutathione, which contributed to the metabolism of various nutrients in the blood of birds, including glucose

Table 2. Effect of adding crushed laurel leaves to the diet of broiler chickens on blood plasma traitsat the age of 5 weeks

Treatments	Concentration of Glucose (mg / 100 ml)	Total protein (g / 100 ml)	Concentration of albumin (g / 100 ml)	Concentration of globulin (g / 100 ml)	A / G ratio
First treatment (control)	174.75 ± 4.85a	5.65 ± 0.40	4.68 ± 0.37	0.97 ± 0.03b	4.82 ± 0.005a
Second treatment (1 g laurel leaf)	154.25 ± 4.02b	5.58 ± 0.09	4.48 ±0.09	1.10 ± 0.01a	4.07 ± 0.002b
Third treatment (2 g laurel leaf)	155.95 ± 2.40b	5.60 ± 0.33	4.45 ± 0.14	1.15± 0.08a	3.87 ± 0.003c
Fourth treatment (3 g laurel leaf)	155.70 ± 3.72b	5.82 ± 0.09	4.47 ± 0.27	1.35 ± 0.02a	3.31 ± 0.004d
Significant level	*	N.S	N.S	*	*

NS= no significant difference between treatments *
a, b, c,d = means on the same raw (between treatments) significantly (p≤0.05)

Table 3. Effect of adding crushed laurel leaves to the diet of broiler chickens on the average concentration of cholesterol and blood lipid at the age of 5 weeks

Treatments	Concentration of Cholesterol (mg / 100 ml)	Concentration of Triglyceride (mg / 100 ml)	Concentration of high-density lipoproteins (mg / 100 ml)	Concentration of low-density lipoproteins (mg / 100 ml)	Concentration of very-low-density lipoproteins (mg / 100 ml)
First treatment (control)	189.7 ± 7.01a	94.90 ± 0.8a	81.9 ± 1.66b	102.63 ± 7.01a	18.98 ± 2.56
Second treatment (1 g laurel leaf)	170.3 ± 8.32b	84.00 ± 2.14b	88.7 ± 1.24ab	64.8 ± 8.32b	16.8 ± 1.57
Third treatment (2 g laurel leaf)	159.31 ± 7.53b	76.30 ± 2.54b	86.1 ± 1.10ab	57.95 ± 7.53b	15.26 ± 1.88
Fourth treatment (3 g laurel leaf)	154.06 ± 8.64b	74.63 ± 5.51b	93.7 ± 1.94a	45.43 ± 8.64b	14.93 ± 2.23
Significant level	*	*	*	*	N.S

NS: no significant difference between treatments
a, b = means on the same raw (between treatments) significantly (p≤0.05)

Table 4. Effect of adding crushed laurel leaves to the diet of broiler chickens on concentration of ALT, AST and uric acid at the age of 5 weeks

Treatments	The concentration of ALT (IU / L)	The concentration of AST (IU / L)	The concentration of uric acid (mg / 100 ml)
First treatment (control)	119.160 ± 0.17	20.391 ± 0.16	2.765 ± 0.09
Second treatment (1 g laurel leaf)	122.275 ± 0.55	21.00 ± 0.25	2.661 ± 0.10
Third treatment (2 g laurel leaf)	120.105 ± 0.225	21.163 ± 0.39	2.712 ± 0.29
Fourth treatment (3 g laurel leaf)	120.385 ± 0.94	21.161 ± 0.17	2.762 ± 0.20
Significant level	N.S	N.S	N.S

NS = no significant difference between treatments

(Thakare 2004). The reasons for the increase in average globulin in the treatments with laurel leaves were due to the fact that they were considered medicinal plants and helped improve digestion in birds. This contributed to an increase in nutrient contents, including the proteins associated with glutathione in the liver, which increased the percentage of Y-Globulin protein in the blood (Gardziete wska et al. 2003).

Table 3 shows the effect of adding crushed laurel leaves in the diet on the average concentration of cholesterol and blood fat in the broiler chickens. The results showed significant differences between the treatments in the concentration of cholesterol, triglycerides, and lipoproteins. **Table 3** also indicated a significant improvement in these traits with the exception of lipoproteins and very-low-density lipoproteins which showed no significant differences between treatments and control group in the average of these parameters. The results showed that the treatments with laurel leaves (second, third and fourth treatments) indicated a significant decrease in the total cholesterol, triglycerides, concentrations of low-density lipoprotein compared to the first treatment (control) which recorded the highest concentrations in these parameters. To determine the concentration of high-density lipoproteins, the fourth treatment (3 g of laurel leaves) had significantly ($p \leq 0.05$) the highest concentration compared to the control group, which had the lowest concentration for this parameter. On the other hand there are no significant differences between the second and third treatments from control treatment on the one hand and the fourth treatment on the other. The decrease in concentrations of cholesterol, triglycerides, and low-density lipoprotein for the treatments of laurel leaves could be due to the role of laurel leaves, which reduced liver enzymes that formed fatty acids; or, could be due to inhibiting the Acetyl-CoA Synthetase, which was an essential enzyme in the synthesis of fatty acids (Musa et al. 2011, Titilayo et al 2018). The significant increase in the concentration of high-density lipoproteins in the fourth treatment with laurel leaves could be attributed to the role of lysine and polyunsaturated fatty acids in laurel leaves that accelerates the association of high-density lipoproteins with liver membranes and rid the body of harmful low-density lipoprotein molecules (Ali et al. 2007). In addition to the role of active substances in laurel leaves, which could inhibit the activity of free radicals because they had antioxidant effect within the body as considering it one of the most important types of natural antioxidants (Arora et al. 2000).

Table 4 shows the effect of adding crushed laurel leaves in the diet on the concentration of ALT and AST and the concentration of uric acid in the blood serum of broiler chickens. It appears that the concentrations of Transaminase and uric acid had no significant differences among all treatments, since the rise and decrease in the levels of these enzymes reflects the health status of the bird and the functional and health status of the liver (Ganong 2005).

CONCLUSION

In this study, the results improve that adding laurel leaves can improve some physiological blood traits in broilers

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