

Article

Use of Chamomile Flower Powder (*Matricaria Recutita*) and its Effect on the Physical and Chemical Indicators in the Blood of Broiler

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Abstract: This study was conducted in the poultry farms of the Animal Production Unit/College of Medicinal and Industrial Plants/University of Kirkuk, from 15/5 to 18/6/2024 to determine the effect of adding chamomile flowers to the diets of Rose 308 broiler chickens on some physical and biochemical blood characteristics for a period of 35 days. Unsexed Rose 308 chicks were used, divided into 4 treatments and 4 replicates. Each treatment included 60 chicks (15 chicks per replicate) in a floor-rearing system using 90 x 200 cm cage. The chicks were randomly distributed among the following treatments: Treatment (T1) was the control with no feed additives; (T2) received 1 g/kg of chamomile flower extract; (T3) received 2 g/kg of chamomile flower extract; and (T4) received 3 g/kg of chamomile flower extract. The results showed significant differences ($p < 0.05$) in protein, albumin, globulin, glucose, cholesterol, and LDL concentrations when ginger powder was added compared to the control treatment. The addition of different levels of chamomile flower powder contributed to an improvement in serum lipid profile, with a significant decrease in total cholesterol, triglycerides, low-density lipoprotein (LDL), and very-low-density lipoprotein (VLDL) concentrations, and a significant increase in high-density lipoprotein (HDL) concentration, compared to the control treatment. The results also showed that the addition of chamomile flower powder did not negatively affect some basic hematological parameters, such as hemoglobin concentration, indicating its safety and lack of adverse hematological effects. Furthermore, an improvement in red blood cell count was observed in the chamomile-supplemented treatments compared to the control treatment, reflecting a supportive effect on the overall health of the birds.

Keywords: Chamomile Flowers Powder, Physiological Traits, Broilers, serum lipid profile.

Introduction

Growth promoters (antibiotics, probiotics, enzymes, etc.) play an important role in the breeding and production domestic birds [1]. The addition of various growth promoters from different sources to poultry feed is now common and widely used to improve utilization nutrients [2]. However, its use may have side effects as a result of its accumulated to their products and then transmitted to the consumer, and thus will cause health problems for them. Thus recent research has turned towards the

use of medicinal plants as food additives to improve the physiological, immune and productive performance of domestic birds instead of the use of antibiotics. In addition, the use of medicinal plants does not negatively affect the health of the consumer of a part of the active compounds of plants in bird products has a positive effect on the health of the consumer[3,4].Which leads to increased interest in replacing artificial materials with natural and effective compounds such as medicinal and aromatic plants, as these plants have been widely used in treating some diseases for a long time[5]. However, recent research has focused on the use of medicinal plants as feed additives to improve the physiological, immune, and production performance of poultry, as an alternative to the use of antibiotics and growth promoters, some of which are transferred into poultry products and are therefore passed on to the consumer, causing health problems. However, the use of medicinal plants does not negatively affect the health of either the bird or the consumer, and the transfer of some of the active compounds of the plants into poultry products has a positive impact on consumer health [6].

Chamomile flowers are one of the medicinal plants used in ancient times it contains compounds with high therapeutic value , namely Bisabolol, Beta-trans-Farnesene, and Chamaxulene. The flowers also contain flavonoids, the most important of which are flavonoid glycosides[5]. Chamomile flowers have positive effects on the digestive and respiratory systems, and play an important role in enhancing immunity. They act as anti-inflammatory, antispasmodic, and antibacterial agents. They have been used as additives in poultry feed because they improve the physiological performance of the bird. It has been shown that adding chamomile flowers to laying hens' feed led to a reduction in the levels of triglycerides and cholesterol in the blood serum [7,8,9,10,11].

The aim of the study was to determine the effect of adding chamomile flowers on the blood physical characteristics, triglycerides, total cholesterol, high-density lipoproteins and low-density lipoproteins of blood serum of broiler chickens.

1. Materials and Methods:

1.1. Location and Management of the Experiment:

This experiment carried in the poultry fields of the Animal Production Unit/College of Medicinal and Industrial Plants/University of Kirkuk, for the period from 15/5to 18/6/2024, to study the effect adding chamomile flower powder on the physical and biochemical characteristics of blood for 35 days. has been used 60 unsexed Rose308 chicks were used divided into 4 treatments by 4 replicates, each treatment includes 60 as 15 chicks for each replicate according to the ground breeding system, a ground cage with dimensions (90 * 200) cm. Table (1) below shown the experiment diet:

1.2. Experiment Transactions:

Chamomile flower powder was used and the experimental treatment were as follows:

The first treatment (T1): is the control treatment without any additives.

The second treatment (T2): contains 1% chamomile flower powder.

The third treatment (T3): contains 2% chamomile flower powder.

The forth treatment (T4): contains 3% chamomile flower powder.

Table (1) below shown the experiment diet:

[1] Table (1). the experiment diet.

S.No	Ingredient Name	Starter1	Grower2	Finisher3
1	Soya DOC 46%	348	325	273
2	Oil-Soyabean	5	9	10
3	Corn, (ganmashamy)	507	527	578
4	Wheat Flour(Ard)	100	100	100
5	Lime Stone(kis) 33%	15	14	14
6	BIRMIX M 111 PLUS L STR	25	-	-
7	BIRMIX M 112 PLUS L GRO	-	25	25
Total		1000	1000	1000
Nutrient Menu				
S.No	Nutrient Name	Starter1	Grower2	Finisher3

1	Crude Fiber (%)	3.499	3.270	3.114
2	Crude Protein (%)	22.515	21.029	19.513
3	M.E (kcal/kg)	3005.33	3051.13	3150.99
4	EE (%)	2.9956	3.2923	4.3064
5	Calcium (%)	1.0512	0.9330	0.8380
6	Available Phosphorus(%)	0.5140	0.4610	0.4550
7	Chloride (%)	0.2077	0.2083	0.2077
8	Potassium (%)	0.9082	0.8431	0.7775
9	Sodium (%)	0.1625	0.1635	0.1634
10	Dig. Methionine (%)	0.6230	0.5800	0.5650
11	Dig. Lysine (%)	1.4560	1.2815	1.1830
12	:Dig. Meth+Cyst (%)	0.9350	08775	0.8490

¹According to [12].

2.3. Studied characteristics:

Blood samples were collected from the jugular vein at 35 days of age, with 15 birds per experimental group. The blood samples were stored in two types of tubes: sterile tubes containing anticoagulants, used to measure physical properties (total red blood cell count, hemoglobin level, packed cell volume, and mean corpuscular volume); and sterile tubes without anticoagulants, used to measure chemical properties. The serum was separated by centrifugation (3000 rpm) for 10 minutes and then stored in a deep freezer at -20°C until analysis. Laboratory tests were performed to measure total cholesterol, triglycerides, high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very-low-density lipoprotein (VLDL).

2.4. Statistical Analysis:

Data collected were subjected to analysis of variance (ANOVA) according to steel [13]. And means were separated using Duncan's multiple rang test significant differences between means were accepted at the $P \leq 0.05$ level of significance.

2. Results and Discussion:

The results of the statistical analysis in Table (2) showed the effect of the experimental treatments on the physical blood characteristics (RBC count, Hb, PCV and MCV), where no significant differences were observed between the treatments for blood hemoglobin, while there were significant differences in the volume of packed blood cells. Treatment T1 was significantly superior ($P < 0.05$) compared to the rest of the experimental treatments. As for the total of red blood cell count a significant superiority ($P < 0.05$) was observed for the treatments to which chamomile flower powder was added compared to the control treatment T1. A significant superiority ($P < 0.05$) was also found for the mean volume of red blood cells in the control treatment T1 compared to the treatments to which chamomile flower powder was added.

Table 2. Effect of adding different levels of chamomile flower powder to the diet on the Biochemical Parameters of the Blood of broilers (mean \pm standard error).

Treatment	RBC count 10 ⁶ /ml ³	Hb mg/dl	PCV %	MCV fL
T1	3.56 \pm 0.18 b	9.51 \pm 0.49 a	28.61 \pm 0.80 a	112.10 \pm 1.28 a
T2	3.356 \pm 0.33 a	10.05 \pm 0.11 a	27.75 \pm 0.27 b	115.32 \pm 1.33 b
T3	3.30 \pm 0.01 a	10.49 \pm 0.76 a	28.22 \pm 0.84 bc	102.76 \pm 0.89 b
T4	3.25 \pm 0.03	10.08 \pm 0.79	27.21 \pm 0.79	108.46 \pm 0.36

	a	a	c	b
Significant	*	*	*	*

* Different letters within the same column indicate significant differences ($P > 0.05$) between treatments.

** Treatments: (T1) Control (no feed additives), (T2) Addition of 1 g/kg of chamomile flowers to the feed, (T3) Addition of 2 g/kg of chamomile flowers to the feed, (T4) Addition of 3 g/kg of chamomile flowers to the feed

The results in Table (3) indicated a significant reeducation ($p < 0.05$) in the level of cholesterol in the blood plasma of broiler for all treatments to which chamomile flower powder was added compared to the control treatment. As for the level of triglycerides, a decrease ($p < 0.05$) was observed in treatments T2 and T4, respectively, compared to the control treatment. The level of high-density lipoproteins (HDL), that there was no significant differences between treatments T2, T3 and T4, to which different levels of flower powder were added, but they significantly superior ($p < 0.05$) the first treatment. while the level of low-density lipoproteins (LDL) Treatments T2, T4 and T2 recorded a significant decrease, compared to the first treatment. and a significant decrease ($p < 0.05$) was recorded in the levels of very low-density lipoproteins (VLDL) in treatments T3 and T4 compared to the control treatment T1, which recorded the highest value.

The decrease in total cholesterol, triglycerides, high-density lipoproteins (HDL), and low-density lipoproteins (LDL) in the blood serum of birds fed diets containing chamomile flowers is consistent with what was reported by [11]. when they used chamomile powder or its extracts in bird food. This decrease may be due to the effect of some chamomile compounds on metabolic activities, as it reduces the activity of the enzyme acetylcholine esterase in the blood serum [14]. [15] also found that giving chamomile flower powder to mice orally at concentrations of 500-1000 mg/kg of live weight led to a decrease in blood glucose concentration and total lipids, as well as a decrease in the activity of the enzyme acetylcholine esterase in the blood serum, which is responsible for cholesterol formation in the liver. It may also be due to the effect of the compounds present in chamomile flowers, especially the B-chamomile concentrate, on the state of antioxidants in the blood. By scavenging free radicals resulting from metabolic processes and inhibiting lipid peroxidation in the body [16].

Table 3. Effect of adding different levels of chamomile flower powder to the diet on the Physical characteristics of the Blood of broilers (mean \pm standard error).

Treatment	Cholesterol mg/dl	triglyceride mg/dl	HDL mg/dl	LDL mg/dl	VLDL mg/dl
T1	122.36 \pm 2.93 a	99.56 \pm 0.48 a	30.41 \pm 0.97 b	72.03 \pm 1.28 a	19.91 \pm 0.08 a
T2	110.11 \pm 0.73 b	93.28 \pm 0.80 b	40.11 \pm 0.93 a	51.34 \pm 1.68 b	18.65 \pm 0.16 b
T3	102.16 \pm 1.72 b	90.87 \pm 0.96 bc	40.84 \pm 0.73 a	43.14 \pm 2.28 d	18.17 \pm 0.19 bc
T3	105.06 \pm 0.14 b	87.37 \pm 0.68 c	39.44 \pm 0.69 a	48.15 \pm 2.28 c	17.46 \pm 0.41 d
T4	105.06 \pm 0.14 b	87.34 \pm 0.68 c	39.44 \pm 0.69 a	48.15 \pm 2.28 c	17.46 \pm 0.41 c
Significant	*	*	*	*	*

* Different letters within the same column indicate significant differences ($P > 0.05$) between treatments.

** Treatments: (T1) Control (no feed additives), (T2) Addition of 1 g/kg of chamomile flowers to the feed, (T3) Addition of 2 g/kg of chamomile flowers to the feed, (T4) Addition of 3 g/kg of chamomile flowers to the feed

Blood cholesterol decreased as a result of the flavonoids found in chamomile flowers. In addition to altering the protein molecules that carry cholesterol and the rates at which it is secreted from the liver into the bloodstream, these flavonoids also have the common effect of reducing cholesterol in liver cells by blocking the action of the HMG-CoA reductase enzyme.

The results of this study are consistent with the results of the study by [16], which stated that using chamomile in broiler feed at a concentration of (5) grams leads to a significant decrease in the concentration of cholesterol in blood plasma. [17] also indicated that using chamomile leads to a significant decrease in the concentration of cholesterol and triglycerides in blood plasma. High levels of HDL in the addition coefficients are considered good because it is known as beneficial cholesterol, as it reverses the transfer of cholesterol from adipose tissue to the liver to convert it into bile acids [18]. Since cholesterol and triglyceride levels decreased, Low-density lipoprotein (LDL), which carries lipids from the liver to the tissues, is seen in lower concentrations. Thus, in order to create bile acids, the liver will require triglycerides and cholesterol from the adipose tissues. The concentration of high-density lipoprotein (HDL) rises because it is a better protein for transporting lipids from the tissues to the liver for processing. Both LDL and HDL concentrations decreased when chamomile extract was added to broiler feed[17].

Conclusion:

Based on the above, we conclude that chamomile flower powder is a natural feed additive and is used as a safe alternative to modern synthetic stimulants in broiler feed substitutes, in order to help improve the physiological and health indicators of birds, in line with trends towards the use of safe plant additives in poultry production.

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