Effect of adding *salvia officinalis* oil to the ration in some blood traits of broiler ross 308

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Abstract

This study becomes conducted to analyze the impact of supplementing sage oil to the ration of Ross 308 chicks on some hematological parameters. 117 broiler chicks are used at one day old were randomly occupied to three treatments (by 3 replicates per treatment; 13 chicks per replicate), and treatments were as follows: Control group: without adding *Salvia officinalis* to the diet, First treatment group: adds *Salvia officinalis* by 1% and Second treatment group: add *Salvia officinalis* by 2%. The experiment included a study of the following hematological parameters: Red Blood Corpuscular Count, Packed Cell Volume, Estimation of Hemoglobin and Differential Leukocytes Count. The results improved that the addition of *Salvia officinalis* by 1 and 2% to broiler diet led to a significant increment ($p<0.05$) in RBCs count, PCV, and Hb concentration. From other hand, significant decreasing ($p<0.05$) in H/L Ratio. The ameliorating that happens in chicks hematological traits attribute to be added *Salvia officinalis* their ration .

Key words: *Salvia officinalis* Oil, Blood Traits, Broiler Ross

المستخلص

أجريت هذه التجربة في حقل الطيور الداجنة التابع لقسم الانتاج الحيواني في كلية الزراعة /جامعة القاسم الخضراء لدراسة تأثير إضافة زيت المريمية إلى العليقة في بعض صفات الدم لفروج اللحم Ross 308 . استخدم 117 فرخ فروج لحم بعمر يوم واحد سلالة Ross غير مجنس ، قسمت عشوائياً إلى ثلاث معاملات بواقع 39 طير لكل معاملة، وكل معاملة تكونت من ثلاث مكررات (13 طير لكل مكرر). وكانت معاملات التجربة كما يأتي : المعاملة الاولى (السيطرة) من دون إضافة زيت المريمية إلى العليقة ، المعاملة الثانية : إضافة زيت المريمية بمقدار 1% ، المعاملة الثالثة : إضافة زيت المريمية بمقدار 2% . وتضمنت التجربة دراسة الصفات الأتية : عدد خلايا الدم الحمر ومكداس الدم وتركيز الهيموغلوبين والعد التفريقي لخلايا الدم البيضاء .

أشارت النتائج إلى أن إضافة زيت المريمية بمقدار 1 و 2 % الى العليقة أدت إلى تحسن معنوي ($p<0.05$) في في عدد خلايا الدم الحمر وتركيز الهيموكلوبين ومكداس الدم وانخفاض معنوي ($p<0.05$) في نسبة الخلايا المتغايرة الى الخلايا اللمفية .

يستنتج من التجربة الحالية ، الى أن إضافة زيت المريمية إلى العليقة يمكن أن يؤدي إلى تحسين بعض الصفات الدمية لفروج اللحم .

الكلمات المفتاحية : زيت المريمية ، صفات الدم ، فروج اللحم

Introduction

Herbal feed components of plant origin are generally believed to be more secure healthier for people and animals (1). In recent years, essential oils and extracts of many plants have been studied for promoting of hemostasis and improving blood traits especially in productive animals (2). Herbal medicine is utilized by about more than 60% of the world population especially in the developed countries where modern medicines are predominantly used, which showed different effects on the physiological characteristics through its contain of natural chemicals (3).

Sage oil (*Salvia officinalis*), Notwithstanding its profitable seasoning attributes, sage oil can contain as much as 50% Thujone by weight (4). Sage plant (*Salvia officinalis*) is one of the important medicinal plants because it contains active compounds, that play more important role in promoting of erythropoiesis stages and hemoglobin formation (5). The main chemical components of sage oil are phenols, flavones, flavonoid, glycosides, a-pinene, camphene, b-pinene, myrcene, limonene, 1- 8cineole, a-thujone, b-thujone and borneol , Sage extract contains an important unsaturated fatty acids as: α-Linolenic acid, Stearidonic acid, Arachidonic acid, Palmitoleic acid and oleic acid. In addition; arsenic, tannic, ursolic, carnosic, carnosol, fumaric, niacin and chlorogenic acids (6).

Blood is a decent pointer to decide the health of an organism. It is a good pathological depiction of the body homeostasis. The cellular part of blood is important in immunotoxicology to assess immunotoxic capabilities of a compound (7). To this end, hematological parameters are critical in building up the body's useful status subsequently of introduction to toxicants. Therefore, antioxidant as the name suggests, act against the oxidants or free radicals in the body, which are the main causes drooping of homeostasis of the body (8).

Sage essential oil protected liver cells from oxidation processes and could be used as an alternative option to synthetic antioxidants (9). The Latin name for the Sage plant is salvia and the exacting significance is genuine or a friend in need. The plant has a good reputation in prolonging ages, so there was a saying in the fourteenth century said (No body deserve to die and In his garden a sage plant).

That means the sage plant has the advantage of preventing various diseases and give health and wellness for those who taken it (10). Researches that attend *Salvia officinalis* oil influences necessity on poultry performance, so this study was directed to determine the effect of Sage oil on some hematological parameters.

Materials and Methods

This study was attained at the chicken farm followed to the private district in the county of Babylon, for the period from 20/04/2015 up to 25/05/2015. 117 broiler Ross 308 were used, an average weight of 40 g/chick. Has been raising chicks in cages ground in (2×2) m^2 dimensions.

The chicks were distributed randomly on three groups, each of which consists of three replications, with each duplicate contained 13 chicks. It has been giving food to

the winged animals uninhibitedly and encouraged the feathered creatures on the starter apportion at the age 1 - 21 days and cultivator proportion from the age 22 - 35 days (Table 1). Sage oil has been included to the diet from the first day of the age, as follows:

Control group: without supplying *Salvia officinalis* oil to the diet.

First treatment: supplying *Salvia officinalis* oil by 1% concentration.

Second treatment: supplying *Salvia officinalis* oil by 2% concentration.

The following characteristics were estimated in the fifth week of the experiment: Red Blood Corpuscular Count, Packed Cell Volume, Estimation of Hemoglobin and Differential Leukocytes Count, as was the collection of blood occur in the fifth week that has been taken randomly from nine birds from each experimental group (3 birds of each duplicate).

As the collection of blood from brachial vein by using Potassium EDTA tubes container. PCV values have been detected by especial anticoagulant capillary tubes (11). Hemoglobin was estimated by using Drabkins reagent (12). Red Blood Corpuscular Counted depended on method of Natt and Herrick (13). Monolayer movies made by pushing around of blood over a standard magnifying lens slide were dried quickly by a hot air stream (14). At least 200 leukocytes for each slide were sorted into classifications small or medium lymphocytes monocytes heterophils run of the mill variation and exemplary sorts basophils (15).

Data were subjected to an ANOVA using the Completely Randomized Design (C.R.D.), significant means were isolated by utilizing Duncan test (16). Data results were analyzed by using SAS statistical program (17).

Table 1. Chemical composition of experimental ration

Ingredients (%)	Starter (%)	Grower (%)
	1 – 21 days	22 – 35 days
Yellow corn	56.1	65.1
Soybean meal (44% protein)	30	21
Protein concent. average (1)	10	8
Vegetable oil (9000 kcl/kg Energy)	2	4
Limestone	1	1
Salt	0.3	0.3
Methionine	0.15	0.15
Lysine	0.15	0.15
Vitamins and Minerals	0.3	0.3
Total	100%	100%

Calculated chemical structure (1)

Crude protein (%)	25.31	21.7
Metabolic Energy (Kcal / Kg)	2819.32	3035.3
Lysine (%)	2.814	2.545
Methionine (%)	2.004	1.927
Crude fiber (%)	3.78	3.42
Calcium (%)	1.15	0.94
Phosphorus	0.403	0.378

1kilogram per gram of it contains: DI-Methionine 350mg, Vit.B1(Thiamine) 500 mg, Vit.k 4000000IU, Vit.D3 2000000IU, Vit.E acetate 15000mg, Vit.B2 1500mg, Vit.B6 (Pyridoxine Hydyochloide 1000 mg, D-Pantothenic acid 3333mg, Vit.K3 (Menadione) 667mg, Vit.B12 5 mg, Folic acid 300mg, Choline Chloride 40000mg, Iron (Ferrous Carbonate) 30000mg, Manganese (Manganese oxide) 33333mg, Copper (Cupric Sulphate) 3333mg, Selenium (Sodium Selenite) 100mg, Zinc (Zinc Oxide) 25000mg.

(1) Chemical structure was calculated according to the analysis of diet material found in (18).

Results and Discussion

In of current study, results revealed in table 2 that 1% and 2% Sage oil treatment groups had a significant increasing ($P<0.05$) in all parameters.

The increasing in RBCs count, Hematocrit and Hemoglobin concentration may return to presence flavonoids, glycoside and Fumaric acid, which these compound have been demonstrated to be responsible for most of the bioactive properties of Sage oil which are powerful antioxidants prevent cells and tissues from oxidative damage, lipid peroxidation and also improve Hemostasis and productivity against stress (19).

Red blood cells membranes contain lipids rich in unsaturated fatty acids. The effect of FFAs on erythrocytes membrane summarized by working up on refinement the activity of the their sodium pump. And, on the other hand, all of α-Linolenic, Stearidonic, Arachidonic, Palmitoleic and oleic acids have been shown inserting ability between the phospholipids membrane, determines important changes in the flexibility of the cells, improving their deformability (20). This effect is very important for the blood cells such as erythrocytes, in fact، they acquire the ability to pass more easily and quickly through capillaries (21), thus assure an exceptional oxygen and blood supply to all cells.

RBCs are a lot of oftentimes exposed to oxygen than other body tissue and thus are more susceptible to oxidative damage. RBC membrane was hemolysed when invased by peroxidants. Moreover, the hemoglobin in RBCs is a strong catalyst which may initiate lipid peroxidation (22). These have fundamental contribution in maintenance of erythrocytes and increase hemoglobin level in the treated groups, the improving mechanism is through the ability of the hydroxyl groups and other features of the antioxidants found in sage extract in scavenging the harmful reactive oxygen species and free radicals preserve erythrocytes from oxidation damage effects (23).

Other studies have shown oral consumption of flavonoid and glycoside antioxidants in animals to be effective in preventing oxidative stresses which damage RBCs (24).
Earlier studies have validated that prompted hemolysis in RBCs is successfully inhibited by means of natural antioxidants. The beneficial effect of Sage oil against oxidative damage of hemoglobin caused by hydroperoxides could be due to the ability of flavonoids to scavenge ferryl hemoglobin (25). Sage oil has appreciable antioxidant and free radical scavenger properties by which it could maintain cellular and tissue integrity with restoring Hb level. Four weeks treatment with oleic acid, ursonic acid, ursolic acid, carnosol and carnosic acid of *Salvia officinalis* improved hemodynamic, hematologic parameters, and erythropoietin content (26).
Evidence that the above components stimulated the expression of erythropoietin (EPO), the central regulator of red blood cell mass and a erythropoietin hormone that controls red blood cell production prove that *Salvia officinalis* administration lead to increasing in erythropoietin level in plasma which lead to increasing of RBCs production from bone marrow (27).
Heterophile per lymphocyte ratio is an indicator to stress state of the chickens. Using of Sage oil lead to decreasing in Heterophiles and increasing in Lymphocytes, lymphocytes may provide valuable and easily accessible biomarkers of the general health state (28). Supplementation of sage oil extracts into the feed of experimental chickens a induced considerable growth of mitogen activated lymphocyte proliferation. The effect of Sage on the proliferation of activated lymphocytes demands to perform further investigations to find its precise immunomodulatory activity (29).
Some of the vital activities of Sage can be assigned to its phenolic compound material. Many of principal features that can account for the health benefits of phenolic compounds, especially flavonoids, is their antioxidant activity, which is expedient in trapping superoxide anion, hydroxyl and peroxyl radicals (30). An immunomodulatory activity within the comitogenic thymocyte test that is interpreted as being an in vitro correlate of adjuvant pastime further to their mitogenic activity (31).
These polysaccharides from Sage extract has previously shown to stimulate the immune function of bone marrow cells and in this regard several European demostic herbs have been analysed biologically for active polysaccharides components and reported that these polysaccharides are good modulators of the immune system (anticancer, anti-inflamantory, anti-ulcer, complement activating potency، macrophage phagocytosis stimulation and induction of cytokines) (32). These augmentations of humoral and cellular immune responses involve mainly four immune cells (Neurophils, Macrophages and T- and B-lymphocytes) (33).

Table (2) Effect of adding of Sage oil to the ration of broiler Ross 308 on blood traits (5 weeks age)

Traits \ Treatments	Control	First treatment 1% Sage oil	Second treatment 2% Sage oil
Total RBCs (million/mm^3)	1.84±0.32 B	2.45±0.25 A	2.62±0.14 A
PCV (%)	28.21±2.46 B	30.19±1.71 A	31.82±1.33 A
Hb conc. (gm/100 ml)	9.4±0.15 B	10.06±0.1 A	10.6±0.17 A
H/L ratio	0.33±0.05 A	0.27±0.09 B	0.29±0.06 B

* Different letters within row indicated to significant variation between experimental treatments at ($p \leq 0.05$)

Conclusion

As a result, it is concluded that, the findings of the present study well demonstrated the improving in general blood statement in the chicks which fed of 1% and 2% of Sage Oil (*Salvia officinalis)* with take into account that there is no any Distinct preference between mentioned sage oil concentrations.

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