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EVALUATE THE EFFECT OF SALVIA OFFICINALIS AND CARDAMOM ON ANIMAL PRODUCTIVITY OF BROILER CHICKENS

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Abstract: It is in considerable demand to produce poultry meat and eggs of superior quality at affordable costs without using growth promoters or antibiotics, so the current study aimed to evaluate the effect of Salvia officinalis and Cardamom on animal productivity of broiler chickens. This experiment was carried out at the poultry field of the Agricultural Experiment Station, College of Agriculture, Tikrit University. Ninety unsexed, one-day-old Ross 308 broiler chicks were employed. The results showed that the hemoglobin concentration, RBC counts and PCV of S. officinalis boilers and cardamom boilers indicated a significant (P≤0.05) elevated compared to the standard diet boilers. While, WBC count of S. officinalis boilers and cardamom boilers indicated non-significant (P≤0.05) elevated compared to the standard diet boilers. For antioxidant enzymes, the glutathione and catalase levels of S. officinalis boilers and cardamom boilers indicated a significant (P≤0.05) elevated compared to the standard diet boilers. Finally, total protein and albumin activities of S. officinalis boilers and cardamom boilers indicated a significant (P≤0.05) reduced compared to the standard diet boilers. It is concluded from the current study that both S. offcinalis and cardamom showed a stimulating effect on blood parameters and raising protein levels. S. offcinalis and cardamom can be considered an enhancer of the performance of broiler chickens.

Keywords: : S. officinalis; Cardamom; broiler; Hemoglobin.

Introduction

The production of nutrient-dense animal products with the required organoleptic qualities can only be ensured by high-quality feed combined with appropriate sanitation, drinkable water, and management [1]. To obtain good animal products, it is imperative to maintain the health of farm animals. The use of natural origin additives in animal and human nutrition has been promoted for the past ten years [2–3]. One potent medicinal plant that is well-known for its potent aroma is sage (Salvia officinalis L.). Salvia officinalis in question is members of the Lamiaceae (Labiate) mint family, and they represent an option that may be added to feed [4-5]. *Salvia officinalis* is utilized in broiler and laying hen feed because it has a number of active compounds with antibacterial, immunomodulatory, antiviral, anticancer, and anti-oxidative activities. role in several bodily systems, including the immunological and endocrine systems, as well as inhibitory effects on infections. *Salvia officinalis* has been shown to improve digestion and appetite, but it can also have an impact on other physiological processes that support animal welfare, health, and product quality. Research has demonstrated that linalool stimulates animal digesting processes and has appealing characteristics [6–8]. Cardamom, a sweet spice from the Zingiber aecea family, is used as a flavoring agent in medicine and has been shown to have digestive, antioxidant, anti-inflammatory, appetite-stimulating, and carminative qualities. It also works well as an additive in poultry feed [9-10]. In the past, cardamom was referred to as the "Queen of All Spices." Gram negative bacteria are resistant to the antibacterial probiotics found in cardamoms [11]. Cardamom is a useful carminative, fragrant, and digestive stimulant. The essential oil found in cardamom is the source of all these therapeutic qualities. Diuretic, expectorant, antispasmodic, antitussive, antacid, antiemetic, and antioxidant are some of its other qualities. Cardamom promotes blood flow, lowers blood toxin levels, and speeds up the body's removal of these toxins by causing a slight diuresis [12]. The current study aimed to evaluate the effect of Salvia officinalis and Cardamom on animal productivity of broiler chickens.

Methods

Animals

From February to April of 2024, This experiment was conducted at the Agricultural Experiment Station, College of Agriculture, Tikrit University, in the poultry field. One-day old, ninety unsexed Ross 308 broiler chicks were used. The chicks were raised in two-story batteries in a hall measuring forty by ten meters, with a cage measuring one and a half meters on each floor.

Components of diet

The standard diet consisting of the materials mentioned in Table (1) was used, which was used in the control group, while in the second group, 1.5% of sage extract was added, and in the third group, 1.5% of cardamom oil was added.

Table (1): Components of diet

Chemical analysis	Value
Fat	10.25%
Protein	9.07%
Energy ME	6.16 Mega
Ash	13.0%
Dry matter	85.50%
Carbohydrates	41.49%
Lignin	38.20%
Zinc	97.20 mg/ kg
Calcium	2.30%
Phosphorus	0.30%
Magnesium	10.00 mg/ kg
Fiber	30.25%
Potassium	1.10 mg/ kg

Study design

Chicks were randomly distributed to three experimental treatments, 30 chicks for each treatment for 35 days, the treatments were as follows:

- ❖ T1: Control group.

- T2: Add 1.5% S. officinalis to the diet.
- T3: Add 1.5% cardamom oil to the diet.

For the first seven days of each treatment period, the chicks were given a primary diet. After that, for the next seven to thirty-five days (or until the experiment concluded), the diet was changed to one of three types for each treatment.

Studied characteristics

After the end of the study period, 15 chickens from each treatment were slaughtered, then 5 ml of blood was placed in tubes without anticoagulant to obtain the serum using a centrifuge at a speed of 4000 rpm for 15 minutes, and the serum was kept at a temperature of (-20) until use to measure each treatment. Of liver enzymes (AST and ALT), antioxidants (glutathione and catalase), and proteins (total protein and albumin), the study was done using kits from the French company Biolabo, and the tests were performed according to the manufacturer's instructions. On the other hand, 3 ml of blood was taken and placed in tubes containing an anticoagulant for the purpose of conducting blood tests, which included the concentration of hemoglobin, the volume of package cells, and the counts of red blood cells and white blood cells.

Statistical analysis

Minitab, a statistical tool, was utilized to evaluate the paramters data. ANOVA was used to examine the difference in the means of the experimental group [13].

Results and Discussion

Hematological parameters

Hemoglobin concentration and percentage of PCV of *S. officinalis* boilers (12.73±0.85; 37.25±2.59) and cardamom boilers (12.55±0.61; 37.11±1.73) indicated a significant (P≤0.05) elevated compared to the standard diet boilers (10.82±0.32; 31.64±1.91). RBC count of *S. officinalis* boilers (2.62±0.23) and cardamom boilers (2.69±0.15) indicated a significant (P≤0.05) elevated compared to the standard diet boilers (2.41±0.17). while, WBC count of *S. officinalis* boilers (101.49±7.13) and cardamom boilers (93.11±9.31) indicated non-significant (P≤0.05) elevated compared to the standard diet boilers (96.46±5.13), as shown in table (2).

Table (2): the hematological parameters in studied treatments

Treatments / Parameters	Standard diet	*S. officinalis* diet	Cardamom diet
Hemoglobin (mg/dl)	10.82±0.32 b	12.73±0.85 a	12.55±0.61 a
PCV %	31.64±1.91 b	37.25±2.59 a	37.11±1.73 a
RBC (mil/ mlm^3)	2.41±0.17 b	2.62±0.23 a	2.69±0.15 a
WBC	96.46±5.13 a	101.49±7.13 a	93.11±9.31 a

* Similar letters indicate that no significant differences (P≤0.05) exist. Different letters mean no significant (P≤0.05) differences.

The findings demonstrated that include powdered *S. officinalis* leaves in the food of broiler chicks increased PCV and red blood cell counts significantly (P<0.05). The body's requirement to carry nutrients and oxygen to cells when the metabolic rate of birds increases when they ingest powdered *S. officinalis* leaves was the cause of the rise in red blood cell numbers. Alternatively, most likely as a result of the powdered *S. officinalis* leaves' antioxidant properties, which aid in shielding red blood cells from potential oxidative damage [14]. The rise in hemoglobin concentration indicated in table (2) was comparable to the increase in red blood cell counts, as hemoglobin concentration is directly correlated with RBC counts [15]. Research indicates that administering S. officinalis raises plasma erythropoietin levels, which in turn raises bone marrow synthesis of red blood cells. Red blood cell mass is primarily regulated by erythropoietin (EPO), a hormone that also regulates red blood cell synthesis. The flavonoids and glycosides of *S. officinalis* have been shown to stimulate the expression of EPO [16]. On the other hand, there was no direct effect of *S. officinalis* plant extract on white blood cell counts in the current study. However, the current study discovered that cardamom oil had a beneficial effect because using it raised red blood cell counts and hemoglobin levels. The high quantity of antioxidant substances found in cardamom fruits and seeds counteracts free radicals and stops oxidation before it starts. A study [17] revealed a significant antioxidant capacity for the oleoresins of methanol, ethanol, chloroform, and diethyl ether as well as the extract of cardamom essential oil. Another study that looked at the antioxidant activity of methanol extract of various important plants, including E. cardamomum, found that the cardamom plant had a small amount of activity [18].

Antioxidant enzymes

Table (3) showed the glutathione and catalase levels of *S. officinalis* boilers (0.833±0.041; 1.72±0.12) and cardamom boilers (0.872±0.037; 1.85±0.44) indicated a significant ($P \leq 0.05$) elevated compared to the standard diet boilers (0.621±0.028; 1.24±0.18).

Table (3): the antioxidant enzymes in studied treatments

Treatments / Parameters	Standard diet	*S. officinalis* diet	Cardamom diet
Glutathione (nmol/ml)	0.621±0.028 b	0.833±0.041 a	0.872±0.037 a
Catalase (nmol/ml)	1.24±0.18 b	1.72±0.12 a	1.85±0.44 a

* Similar letters indicate that no significant differences ($P \leq 0.05$) exist. Different letters mean no significant ($P \leq 0.05$) differences.

In the current study, the phenolic and/or non-phenolic contents of S. officinalis extracts may have contributed to their effective reduction of free radicals and their ability to scavenge them, which may have contributed to their protective properties. The most popular radical-scavenging assays, which use the 1,1-diphenyl-2-picrylhydrazil (DPPH) radical [19] and 2,20 -azino-bis-3-ethylbenzthiazoline-6-sulphonic acid (ABTS) radical [20], as well as their oxygen radical absorbance capacity (ORAC) [21], have already been used to assess the antiradical effects of S. officinalis. S. officinalis demonstrated antioxidant activity in the HepG2 cell culture after tert-butyl hydroperoxide treatment [22]. According to the results of the current investigation, cardamom oil has positive antioxidant activity. It was found that the plant's water and methanol extracts had in vitro antioxidant activity in a study examining the antioxidant qualities of cardamom fruit extracts. Moreover, it was found that, out of all the extracts, the water extract had greater activity [23]. Similar research using cardamom fruit water extract revealed that the plant possesses antioxidant properties [24]. The prevention or treatment of serious illnesses including diabetes, Alzheimer's, and stroke—diseases that can arise from oxidative or cellular damage brought on by free radicals—is one of the goals of using antioxidant-based medications [25, 26]. Important research is done on obtaining natural antioxidants from aromatic and medicinal plants because it is believed that the synthetic antioxidants used today are unreliable [26–27].

Proteins

Table (4) showed total protein and albumin activities of *S. officinalis* boilers (8.93±0.34; 4.88±0.42) and cardamom boilers (9.05±0.62; 4.62±0.51) indicated a significant (P≤0.05) reduced compared to the standard diet boilers (7.22±0.45; 3.18±0.21).

Table (4): the proteins in studied treatments

Treatments / Parameters	Standard diet	*S. officinalis* diet	Cardamom diet
Total protein (mg/dl)	7.22±0.45 a	8.93±0.34 b	9.05±0.62 b
Albumin (mg/dl)	3.18±0.21 a	4.88±0.42 b	4.62±0.51 b

* Similar letters indicate that no significant differences (P≤0.05) exist. Different letters mean no significant (P≤0.05) differences.

The results of the current study showed an improvement and increase in the levels of total protein in the serum of broiler chickens when treated with *S. officinalis*. The effective role of the *S. officina*lis extract is due to the active role and direct effect on the structure of the lining of the small intestine, which increases the absorption surface, as well as the fact that *S. officinalis* has Antioxidant effect, which improves the performance of muscle cells and increases the absorption of proteins from the diet [28-29]. Cardamom has been shown to increase rat pancreatic lipase activity as well as intestinal lipase, disaccharides, sucrose, and maltase activities, according to Patel and Srinivasan's [30] research, this enhances the absorption of proteins in the intestine and thus increases the levels of total protein and albumin in the blood of broiler chickens in the current study after treatment with cardamom.

Conclusion

According to our investigation, endometritis, an overall postpartum infection outcome, and the probability of incident hospitalization postpartum fever/hypothermia are all independently correlated with cesarean delivery. Longer hospital stays, as well as fewer prenatal clinic visits compared to the recommended four, were significant risk factors in postpartum infection. It is essential to maximize efforts to lower the high percentage of cesarean births, increase prenatal care attendance, and shorten hospital stays and days spend with urethral indwelling catheters.

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