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Article

Effect of adding a combination of herbal powders (turmeric, cumin, anise, Cinnamon and coriander) in broiler diets on the percentage of dressing, qualitative traits of the carcass, physiological traits and some indicators of oxidation of meat

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ABSTRACT

The experiment was conducted in the poultry field of the Department of Animal Production - College of Agricultural Engineering Sciences - University of Baghdad / Abu Ghraib from 20/9/20/2021 to 10/31/2021 (42 days). To study the effect of adding a blend of herbal powders (Turmeric powder, anise, coriander, cumin, Cinnamomum) to broiler diets on some physiological traits and some indicators of oxidation in meat. In the field experiment, 240 broiler chicks, 308 Ross, obtained from Al-Shukr Broiler Production Company, located in Baghdad / Abu Ghraib province, with an average initial weight of 40.28 g, were used. Each treatment included four replicates of 10 chicks/duplicate, and the experimental treatments were as follows: T1 control (free of adding herbs), and T2 control treatment containing antibiotic (oxytetracycline 0.05%) and T5, T4, T3 and T a mixture of herbs in proportions (0.25, 0.50, 0.75, 1%)As this mixture includes five types of aromatic plants (Turmeric powder, anise, coriander, cumin, Cinnamomum), The results showed that there were no significant differences in the percentage of dressing, the treatment T4 (0.50%) achieved the highest weight of the chest and neck piece. In contrast, T5 and T6 achieved a significant decrease in the weight of the neck. There were no significant differences in the relative weight of the edible internal viscera, abdominal fat, and Vibricia gland; as for the physiological traits, the two treatments, T5 and T6, achieved a significant decrease in the urea concentration, and there was no significant difference between the treatments in creatine. There was a significant decrease in cholesterol concentration for all additional treatments. In contrast, for oxidation indicators, the T5 treatment achieved a decrease in the value of peroxide, with a significant increase in the value of glutathione before storage and 30 days after storage.

Keywords: herbal powders, turmeric, cumin, anise, Cinnamon, coriander, broiler diets, oxidation of meat

INTRODUCTION

The world is currently moving towards nature in food, such as meat, eggs, vegetables and fruits that are produced naturally without resorting to the use of chemical additives or growth stimulants and drugs that lead to harm to the health of the consumer [1], As the World Health Organization in the European Union worked to prevent the use of antibiotics as stimulants or growth stimulants in poultry diets because of their negative effects and explained this due to the emergence of resistance to pathogens as well as the accumulation or deposition of these antibiotics in chicken meat and its products [2]. For this reason, the World Health Organization for Food and Drugs has shown great interest in what is known as the biological product in the search for natural alternatives to antibiotics. Medicinal plants and essential oils extracted from the roots, seeds, leaves and fruits of these plants have become more important due to their antimicrobial role and stimulant action for the work of the digestive system in Animals [3] Medicinal herbs and their extracts contain effective, safe and environmentally friendly chemical compounds that have a biological and therapeutic activity that contributes to improving the productive, physiological and immune status of domestic animals [4]. In light of this, trends are increasing significantly in the addition of medicinal plants to bird diets, either in a raw form or in the form of oil or water extracts or food additives in order to improve the productivity and health status of animals [5]. Based on what has been shown, there are current trends toward plant feed additives, including aromatic plants and their oils, because they have an antibacterial and inhibitory effect on the growth of pathogenic microorganisms [6, 7, 8]. It was also found that some of them have antioxidant properties [9, 10] and improve the digestion process and animal palatability for feed, which improves the food conversion process [11, 12, 13]. When some plants have active compounds similar to steroid hormones and plant hormones, they increase the synthesis of proteins and activate their work, thus increasing the growth rate. This made it one of the modern strategies for feed additives in the future because of its more benefits than antibiotics, as it is safer for animal health because the consumer is due to the accumulation of antibiotic residues in animal products. Moreover, its use is more economical than antibiotics because of its ease of handling [15]. Therefore, this study aims to Know the effect of the weed mixture on the percentage of purification and qualitative traits of the carcass and some indicators of oxidation for thigh meat before and after storage, determining the best level for adding the herbal mixture.

MATERIALS AND METHODS

Carcass traits:

Dressing percentage :

At the end of the 42-day experiment, 8 birds were taken from each treatment, 2 birds for each replicate (1 male and 1 female), and he made sure that the weights of the birds taken were close after fasting for two hours. Live birds were weighed before slaughter with an electronic scale and an individual weight. The birds were slaughtered, the carcasses were weighed, and the internal viscera were cleaned and isolated to extract dressing percentage as in the following equation referred to by [15]. The relative weight of the main and secondary carcass cuts.

$$\text{Dressing percentage \% without \% without edible internal members} = \frac{\textbf{Cleaned carcass weight (gm)}}{\textbf{live weight (gm)}} \times 100 \quad (1)$$

The carcasses were cut after being placed in the ice and weighed without the inner viscera to extract the relative weights of the carcass cuts, which include the main cuts, the breast and thighs. The secondary cuts, which included the back, neck and wings, were also weighed according to their relative weight to the carcass weight,

according to the following equation mentioned by [15]. The relative weight of edible internal organs and belly fat:

$$\text{The relative weight of carcass cuts}=\frac{\textit{cuts weight (g)}}{\textit{carcass weight (g)}}\times 100 \quad (2)$$

The edible internal viscera (heart, liver, gizzard) and belly fat were separated from each carcass from the rest of the viscera and then weighed using a sensitive scale and the relative weights were extracted according to the equation listed below, which was referred to by [15].

$$\text{Relative weight of members}=\frac{\textit{Member Weight (gm)}}{\textit{live body weight (gm)}}\times 100 \quad (3)$$

Final diet 25-42 days	growth diet 11-24 days	Starter diet 10-0 day	Feed material
48	48	48	**corn**
15.6	12.8	9.7	**wheat**
25.3	29.1	33	**soybean meal**
5	5	5	**protein concentrate**
1	1.1	1.2	**lime**
0.4	0.5	0.7	**DCP**
4.3	3.1	2	**oil**
0.2	0.2	0.2	**salt**
0.2	0.2	0.2	**Mixture of vitamins and minerals**
100	100	100	**total**
Calculated Chemical Analysis			
20.01	21.5	23.03	**raw protein**
3204.39	310.75	3001.19	**Energy represented kilocalories/kg**
0.46	0.48	0.50	**methionine**
1.11	1.22	1.32	**Lysine**
0.80	0.87	0.96	**Calcium**
0.40	0.43	0.47	**phosphorous**

Table 1. The components of the diet and the chemical composition calculated in the experiment

carbohydrates %	flavonoids %	phenols %	fiber %	ash %	moisture %	protein %	Fat %
34.109	7.365	676	18.205	6.613	6.993	16.844	**17.236**

Table 2. Analysis of the chemical compounds and active substances of the mixture of herbs ((Turmeric powder, anise, coriander, cumin, Cinnamomum)

Blood Tests

At the end of the experiment at the age of 42 days, blood was collected from 8 birds for each treatment (male, female) for each replicate by puncturing the wing or brachial vein, using a 3 ml syringe fitted with a 25 gauge needle, then emptied the blood directly into Glass tubes containing gel tubes with a capacity of 6 ml, these tubes were placed in a centrifuge at a speed of 4000 cycles/minute for 10 minutes to separate the serum from the cellular part. Al-Rabee Al-Ahly) in Baghdad province to calculate the following tests

Cholesterol concentration measurement (mg/100ml serum)

The measurement method was conducted using the standard kit produced by (SPINREACT) company, which relied on the method of enzymatic analysis to determine the cholesterol level and followed the instructions attached to the kit. According to the Kaplan method (1984), it reads the absorption at a wavelength of 505 nanometers, using a spectrophotometer.

Enzymatic colorimetric salicylate method for the determination determination of urea

The decomposition of urea is carried out by 1,2 urease in ammonia and carbon dioxide. The generated ammonia reacts with alkaline hypochlorite and sodium salicylate in the presence of sodium nitroprusside as a coupling agent, producing a green chromophore. The intensity of the color is proportional to the concentration of urea in the sample

MATERIALS AND METHODS

1. Bring reagents and samples to room temperature
2. 1 ml of the prepared reagent (working reagent) is placed with 10 µmol of the sample (the sample), as for the plank sample, 1 ml of the prepared reagent is placed, and the standard sample is placed 1 ml of the prepared reagent and 10 µmol of the standard
3. Mix and incubate for 5 minutes at 37°C or 10 minutes at room temperature (16-25°C).
4. Add 1 ml of reagent (R3) to each of the sample, plank and standard tubes.
5. 4. Mix well and incubate the tubes for 5 minutes at 37°C or 10 minutes at room temperature (16-25°C).
6. Read the absorbance (A) of the samples and the standard at 600 nm against the plank. Color stable for at least 2 hours. It is protected from light.

Calculation. accounts

Sample absorbance/standard absorbance)/standard concentration=mg/dL urea
Samples at concentrations higher than 300 mg/dL (50 mmol/L) should be diluted 1:5 with saline
and calibrated again. Multiply the results by 5.

Estimation of creatine

This procedure is based on a modification of the original spools. Creatinine, under alkaline conditions, reacts with ions of the spools, forming a reddish complex. The rate of complex formation measured by increasing the absorbance in the predetermined time interval is proportional to the creatinine concentration in the sample.

- working procedure

1. Incubate working reagent, samples and standard for reaction temperature (37°C

2. Set the photometer to 0 absorption with distilled water.

3. Add 1 ml of the prepared reagent to each of 10 µl each of the sample and standard tubes

4. Mix gently. Insert the cuvette into the temperature controller and start the stopwatch. Record the absorbance at 510 nm after 30 seconds (A1) and 90 seconds (A2) of sample or standard addition.

5. Calculations

(A2 - A1) Sample/ (A2 - A1) Standard (x C Standard = mg/dL creatinine
Samples with concentrations higher than 20 mg/dL should be
Dilute 1:4 with saline and measure again. Multiply the results by 4.
If the results are expressed as SI units, apply:
mg/dL x 88.4 = µmol/L

Measurement of liver enzymes GOT and GBT

Liver enzymes GOT and GBT was estimated by using a device from (XIAN YIMA) company and according to the instructions attached with the kits) from (BIOLABO) company. The absorption lab was read by a spectrophotometer with a wavelength (530-550) nanometers, then the sample was read, then the reagent solution And a difference of 5 minutes between them.

Estimation of oxidation indices of thigh meat:

Determination of amino acids:

- Extraction process:

The amino acids were extracted according to the method presented by the scientist (2018 Rasmus Dahl-Lassen), where a weight of (3 g) was taken from the sample and placed in a volumetric vial with a capacity of (25 ml) and (25 ml) of hydrochloric acid (6M) was added to it at a temperature of (150 m) for 3 hours. Then, the sample was dried by a rotary evaporator, and (5 ml) of sodium citrate pH 2.2 was added. The sample was filtered using a plastic filter (0.45um) and taken to the apparatus for the injection process.

- Derivation process:

Take (1 ml) of the extracted sample and add to it (200 µl) of ortho-phthalein aldehyde (5%) (OPA). The sample was agitated for (2 min), and then (100 µl) of the last mixture was taken and injected into an (Amino acid analyses) device. The tests were conducted in the laboratories of the Ministry of Science and Technology / Department of Environment and Water using an amino acid analyzer (Korean origin). The method presented by the scientist (Scriver CR, 2001) was used, where he used the carrier phase consisting of (methanol: acetonitrile: 5% formic acid) in proportions (20: 60: 20) at a flow rate (1 ml/min), using a separation column. (ZORBAX Eclipse-AAA; 3.5µm; L x i.d.=150 x 4.6 mm)

To separate amino acids, a fluorescence reagent was used to detect amino acids at wavelengths (Ex = 445 nm, Em = 465 nm) The program (Plainity 2015) was used to analyze the amino acids.

- Preparation of the standard compound:

(0.1 g) the highly purified histidine glutathione (99.9%) was dissolved in non-ionic water and transferred to a conical flask (250 ml). The volume was completed to the mark where its concentration became (250 ppm), and using the dilution law, the concentration of the injected substance was prepared in the device.

- Oxidation indicators

At the end of the experiment (42 days), 2 birds/duplicate (1 male, 1 female) (8 birds/treatment) were taken randomly and made sure that the weights were close. The birds were slaughtered, and the thighs were cut to calculate the oxidation indicators in the thigh meat at (0 days and 30 days), where the oxidation indices were calculated using the following methods.

- P.V (Peroxide Value)

The estimation was based on (Egan. H 1981), as 2 g of the extracted fat was weighed using the saxolites device and 30 ml of a mixture containing (3 parts glacial acetic acid + 2 parts chloroform) was added to it with the addition of 0.5 ml of saturated potassium iodide And 30 ml of distilled water and 1 ml of starch (1%). The mixture is crushed with a solution of sodium thiosulfate of 0.01 caliber until the disappearance of the blue color, and it is estimated based on the following equation:

$$\text{Peroxide number (mEq)} = \frac{\textbf{\textit{Number of millimeters of sodium thiosulfate}}\ x\ 0.01\ x}{\textbf{\textit{sample Weight}}}\ \mathbf{1000} \quad (4)$$

The normal value of P.V = 6 m. equivalent / 100 gm.

FSIS, Food Safety and Inspection Service. (2000). Microbiological testing program for meat and poultry. United States of Agriculture, Washington. D.C. P.20250-3700.

Estimation of the value of thiobarbituric acid (TBA):

Fat oxidation was measured in the model by estimating thiobarbituric acid according to the method (Witte 1970 et al.), which is summarized as follows: (1 g) of the model was homogenized with (25 ml) of a cold solution containing (20%) trichloroacetic acid (TCA).) dissolved in 2M phosphoric acid in the homogenizer for 2 minutes. Transfer the mixture to a volumetric flask of 50 ml capacity and complete the volume to the mark with distilled water. Shake the mixture, take 25 ml of it, and centrifuge at 30000 (rpm) for (30 minutes). Then, the mixture was filtered through filter paper No. 1, (5 ml) of the filtrate was transferred to a test tube, and (5 ml) of TBA reagent solution with a concentration (0.005 M) dissolved in distilled water was prepared by mixing all the contents except for the sample to be measured. The contents were mixed and placed in test tubes, tightly closed and kept in a dark place for (15-16 hours) at room temperature to heat. The contents were placed in a water bath for 30 minutes (Tarladgis 1964). The absorbance of product A was measured at a wavelength of 530nm using a spectrophotometer. The value of TBA was calculated by multiplying the absorbance value by a factor of 5.2, and the value was expressed based on mg Malone Dehyde (MDA) per kg of seeds and according to the following equation:

TBA value mg / MDA kg = A530 x 5.2

Normal value of T.B.A = 0.09 μmol/Kg

Measurement of the level of reduced glutathione (GSH) in the blood serum:

The level of (GSH) was estimated based on the method (Sutariya et al., 2012) using reverse-phase high-pressure liquid chromatography (RP-HPLC) method for the determination of reduced glutathione.

Statistical analysis :

CRD (Complete Randomize Design) was used to study the effect of different treatments on the studied traits, and the significant differences between means were compared with [16] multinomial tests. The SAS program was used in the statistical analysis.

RESULTS

Dressing percentage

It is noted in Table (3) the effect of adding different levels of a mixture of some medicinal herbs and the antibiotic oxytetracycline to broiler diets on live body weight. Carcass weight and dressing percentage showed no significant differences between the different treatments in the live body weight of birds prepared for slaughter and the weight of the dressing carcass after the slaughter process.

The relative weight of the main and secondary cuts of broiler carcasses

It was found from the data in Table (4) that there were no significant differences in the relative weights of each chest segment, wings, and back for all experiments. At the same time, there were significant differences at the probability level (0.05 <P) in the relative weight of the breast and neck cut. The treatment of the T4 herbal mixture with a percentage of (0.5%) recorded a significant superiority compared to the control treatment T1. At the same time, there were no significant differences between all treatments in this segment. In contrast, the treatment of T5 and T6 recorded a significant decrease in the relative weight of the neck compared with the control treatment T1. The rest of the treatments did not differ significantly among themselves in the comparison treatment and treatments of adding the mixture of herbs and antibiotics.

dressing percentage %	carcass weight (g)	live weight (g)	treatments
74.74 ± 0.75	2112.50 ± 35.89	2826 ± 34.04	T1
77.22 ± 2.42	2139.50 ±51.45	2773.50 ± 49.05	T2
75.74 ± 0.47	2076.50 ± 44.90	2740.75 ± 43.02	T3
76.83 ± 1.16	2139 ± 31.29	2785.50 ± 54.43	T4
76.31 ± 1.11	2183.50 ± 67.94	2859.50 ± 52.67	T5
77.25 ± 1.16	2150 ± 26.06	2783.50 ± 20.41	T6
N. S	N. S	N. S	significant level

Table 3. The effect of adding different percentages of the mixture of some medicinal herbs (Turmeric powder, anise, coriander, cumin, Cinnamomum) and oxytetracycline antibiotic to broiler diets in the live weight of birds prepared for slaughter (gm), carcass weight (gm) and the percentage of dressing for broilers during different periods (mean ± standard error)Level of significance: * Significant difference (P < 0.05) and **: Significant difference (P < 0.01)Treatments: T1 control treatment 0% herbal mixture, T2 control treatment containing antibiotic (oxytetracycline with a percentage of 0.05). %), T3 treatment of adding a mixture of herbs at a rate of 0.25%, T4 treatment of adding a mixture of herbs at a rate of 0.50%, T5 treatment, Adding the herbal mixture at an average of 0.75%, T6 treatment with the addition of the herbal mixture at an average of 1%.

The relative weight of the main and secondary cuts of broiler carcasses

It was found from the data in Table (4) that there were no significant differences in the relative weights of each chest segment, wings, and back for all experiments. At the same time, there were significant differences at the probability level (0.05 <P) in the relative weight of the breast and neck cut. The treatment of the T4 herbal mixture with a percentage of (0.5%) recorded a significant superiority compared to the control treatment T1. At the same time, there were no significant differences between all treatments in this segment. In contrast, the treatment of T5 and T6 recorded a significant decrease in the relative weight of the neck compared with the control treatment T1. The rest of the treatments did not differ significantly among themselves in the comparison treatment and treatments of adding the mixture of herbs and antibiotics.

Relative weights of major cuts(%)			Relative weights of secondary cuts (%)		
neck	wings	back	thighs	breast	**treatments**
5.08 $_{a}$ ± 0.23	7.47 ± 0.13	12.59 ± 0.17	21.07 ± 0.46	28.53 ^{b} ± 0.16	**T1**
4.87 $_{a}^{b}$ ± 0.32	7.57 ± 0.18	12.91 ± 0.34	21.85 ± 0.85	30.12 $_{a}^{b}$ ± 1.31	**T2**
4.41 $_{a}^{b}$ ± 0.18	7.39 ± 0.07	13.03 ± 0.57	21.27 ± 0.59	29.37 $_{a}^{b}$ ± 0.42	**T3**
4.43 $_{a}^{b}$ ± 0.12	7.27 ± 0.16	12.66 ± 0.20	20.94 ± 0.56	31.40 $_{a}$ ± 1.03	**T4**
4.28 ^{b} ± 0.13	7.34 ± 0.17	12.70 ± 0.19	21.00 ± 0.75	30.66 $_{a}^{b}$ ± 0.04	**T5**
4.16 ^{b} ± 0.23	7.61 ± 0.21	± 0.47	21.25 ± 0.57	31.64 $_{a}$ ± 0.68	**T6**
*	N. S	N. S	N. S	*	**significant level**

Table 4. Effect of adding different percentages of a mixture of some medicinal herbs (Turmeric powder, anise, coriander, cumin, Cinnamomum) and oxytetracycline antibiotic to broiler diets on the relative weight of main and secondary cuts of broilers during different periods (mean ± standard error). Level of significance: * Significant difference (P < 0.05) and **: Significant difference (P < 0.01).Treatments: T1 is a control treatment of 0% herbal mixture, T2 is a comparison treatment containing antibiotic (oxytetracycline 0.05%), T3 a treatment of adding a mixture of herbs at a rate of 0.25%, T4 a treatment of adding a mixture of herbs at an average 0.50%, T5 a treatment of adding a mixture of herbs at a rate of 0.75%, T6 Treatment of adding 1% herbal mixture.

Relative weight of edible viscera, belly fat, and vibrisha gland.

It is noted in the data of Table (5) that there are no significant differences in the relative weights of the edible internal organs (heart, liver, gizzard) between the various treatments, and there were no significant differences in the relative weights of abdominal fat and vibrio viscera among all experiment treatments.

The relative weight of edible viscera, abdominal fat and Vibrichia gland %					
Vibrisha gland	**belly fat**	**gizzard**	**liver**	**heart**	**treatments**
0.04 ± 0.005	0.74 ± 0.14	2.42 ± 0.20	1.93 ± 0.07	0.44 ± 0.05	**T1**
0.05 ±0.008	0.75 ± 0.09	2.32 ± 0.11	1.92 ± 0.15	0.52 ± 0.05	**T2**
0.06 ±0.002	0.97 ± 0.06	2.29 ± 0.15	2.15 ± 0.11	0.44 ±0.03	**T3**
0.05 ±0.005	0.74 ± 0.09	2.07 ± 0.30	2.17 ± 0.27	0.39 ± 0.02	**T4**
0.05 ± 0.005	0.71 ± 0.04	2.53 ± 0.26	1.74 ± 0.05	0.44 ± 0.03	**T5**
0.06 ±0.012	0.68 ± 0.13	2.31 ± 0.21	1.95 ± 0.15	0.43 ± 0.02	**T6**
N. S	**N. S**	**N. S**	**N. S**	**N. S**	**significant level**

Table 5. Effect of adding different percentages of a mixture of some medicinal herbs (Turmeric powder, anise, coriander, cumin, Cinnamomum) and oxytetracycline antibiotic to broiler diets on the relative weight of edible internal organs and belly fat of broilers during different periods (mean ± error standard).

Physiological traits

Table (6) data on some physiological traits of broilers at 42 days of age, as it is noted in the Table that there was a significant decrease in the urea concentration in the blood of birds in favor of treatments T5 and T6 compared to the comparison treatment T1.While not all treatments of adding herbs and antibiotics differed between them and the comparison treatment (T2, T3, T4), a significant superiority ($P<0.05$) in favor of T5 and T6 treatments was significantly superior to the treatment of adding the antibiotic oxytetracycline T2 and all the addition treatments, whether for herbs or antibiotics, did not differ with the control treatment T1 in creatine concentration. As for the level of blood cholesterol, it is noted in Table (6) that there was a significant decrease ($0.05 \geq P$) in the level of cholesterol for the treatments by adding the herbal mixture T4, T5, T6 (0.5, 0.75, 1%) compared to the control treatment T1 as well as the treatment T5 significantly. T2 antibiotic addition treatment.

cholesterol	**creatine**	**urea**	**treatments**
186.03 a ± 3.07	0.20 ab ± 0.02	36.18 a ± 1.78	T1
169.39 ab ± 13.00	0.11 b ± 0.05	34.10 ab ± 0.83	T2
161.72 ab ± 7.48	0.24 ab ± 0.06	30.48 bc ± 0.97	T3
157.43 bc ± 6.89	0.19 ab ± 0.01	34.24 ab ± 0.61	T4
140.27 c ± 6.72	0.26 a ± 0.03	29.80 b ± 0.74	T5
144.30 bc ± 8.20	0.29 a ± 0.04	29.30 b ± 1.76	T6
*	*	*	significant level

Table 6. The effect of adding different percentages of a mixture of some medicinal herbs (Turmeric powder, anise, coriander, cumin, Cinnamomum) and oxytetracycline antibiotic to broiler diets on the chemical traits of blood during different periods (mean ± standard error).

Concerning the effect of the herbal mixture and the antibiotic on the level of liver enzymes GPT, GOT and estrogen, it is noted in Table (7) that there was a significant decrease in the level of GOT enzyme for the birds of the herbal mixture treatments, especially with the treatments T4, T5, T6 compared to the comparison treatment T1 which recorded the highest values While these treatments did not differ significantly with T2, T3 treatments, except for the superiority of T4 treatment (adding the herbal mixture by 0.5%) compared with T2 and T3 treatments. The level of liver enzymes in the blood of birds indicates oxidative stress, and its decrease indicates a decrease in oxidation rates and a decrease in the rates of GOT enzyme for the T4, T5, and T6 treatments. It may be due to the role of the active compounds of the herbal mixture, especially the high percentages of addition such as flavonoids, saponins, alkaloids and tannins, which are among the most important antioxidants and are related to lowering the level of this enzyme. Concerning the level of estrogen hormone in the blood of broilers, it is noted from Table (7) that there are no significant differences between all the addition treatments when compared with the control treatment T1 at 42 days, while there was a significant decrease in the hormone level for the treatment T5 compared with the treatment T2 and T3.

E2	GPT	GOT	treatments
59.40 $_{a}^{b}$ ± 0.23	48.66 ± 8.83	25.81$_{a}$ ± 180.00	**T1**
63.46 $_{a}$ ± 4.46	64.66 ± 2.66	19.76$_{a}^{b}$ ±122.33	**T2**
64.38 $_{a}$ ± 1.98	71.00 ± 4.72	19.81$_{a}^{b}$±130.67	**T3**
57.69 $_{a}^{b}$ ± 3.41	65.00 ± 6.24	15.00c ±55.00	**T4**
50.99 ^{b} ± 2.62	63.00 ± 1.73	18.62^{b} ±80.67	**T5**
65.78 $_{a}$ ±4.66	65.33 ± 10.71	14.09^{b} ±74.33	**T6**
*	N.S	*	**significant level**

Table 7. Effect of adding different percentages of a mixture of some medicinal herbs (Turmeric powder, anise, coriander, cumin, Cinnamomum) and oxytetracycline antibiotic to broiler diets in affecting liver enzymes GOT, GPT and E2 during different periods (mean ± standard error)

Oxidation indicators

From the results in Table (8), it is noted the effect of adding a mixture of different levels of a mixture of some herbs (Turmeric powder, anise, coriander, cumin, Cinnamomum) and oxytetracycline antibiotic (at 0.05%) to broiler diets on some oxidation indicators in thigh meat before storage process and then 30 days later. It was noticed in the first period before storage that there were no significant differences in the value of the peroxide P.V between the treatments of adding the herbal mixture (T3, T4, (T6) and the treatment of adding the antibiotic T2 compared to the comparison treatment T1 except for a significant decrease in the value of the peroxide at the probability level ($0.05 \geq P$) in the treatment of adding the mixture of herbs T5 (0.75%)Compare with control treatment T1 and all addition treatments. Also, all the addition treatments, whether the addition was a mixture of herbs or antibiotics, showed a significant decrease ($P < 0.05$) in the value of TBA compared with the control treatment T1 of thigh meat before storage. As for the value of GSH-reduced glutathione, It was noticed that there was a significant improvement in favor of adding the mixture of herbs by 0.75% (T5) over the control treatment and on all other addition treatments. Also, all treatments of adding the other herbs mixture (T3, T4, T6) significantly excelled in the control treatment T1 and the treatment of adding antibiotic T2, which excelled in the T1 treatment. As for the

effect of addition and control treatments on thigh meat stored for 30 days, there are significant differences between treatments in oxidation indicators. It was noted that there was a significant decrease in all the addition treatments, whether the type of addition was a mixture of herbs or an antibiotic, in the value of the peroxide P.V compared with the control treatment T1, while all the treatments of adding the herbal mixture recorded a significant decrease compared to the treatment of adding the antibiotic T2. The treatment of adding the herbal mixture T5 recorded the lowest rates in this value compared to all treatments, and the same effect appeared in the value of TBA, as for the value of reduced glutathione GSH, as a significant superiority was observed in favor of the treatment T5 (adding the herbal mixture by 0.75%) over the control treatment and for all other addition treatments. Also, all treatments of adding the other herbs significantly excelled on the control treatment T1 and the T2 treatment (adding the antibiotic) in broiler thigh meat stored for 30 days.

after storage			before storage			
GSH (30)	TBA (30)	PV (30)	GSH (0)	TBA (0)	PV (0)	**treatments**
22.13 f ± 0.04	0.083 ^{a} ± 0.0003	5.12 ^{a} ± 0.014	35.46 f ± 0. 91	0.056 ^{a} ± 0.0008	2.90 ^{a} ± 0.325	**T1**
28.19 E ± 0.16	0.065 ^{b} ± 0.0003	4.22 ^{b} ±0.018	39.13 E ±0.31	0.052 ^{b} ± 0.0014	3.14 ^{a} ± 0.008	**T2**
40.31 ^{c} ± 0.10	0.055 d ± 0	3.97 d±0.017	47.70 ^{c} ± 0.55	0.044 c ± 0.0014	3.03 ^{a} ± 0.016	**T3**
36.50 d± 0.04	0.061 ^{c} ± 0.0003	4.06 ^{c} ±0.018	43.33 d± 0.34	0.052 ^{b} ± 0.0015	3.11 ^{a} ± 0.016	**T4**
53.46 ^{a} ± 0.06	0.040 f ±0.0003	3.39 f ±0.017	65.36 ^{a}± ±0.37	0.038 d ± 0.0008	2.41 ^{b} ± 0.020	**T5**
46.67 ^{b} ± 0.13	0.050 E± 0.0005	3.85 E ±0.029	56.46 ^{b} ± 0.38	0.042cd ± 0.0006	2.85 ^{a} ± 0.026	**T6**
*	*	*	*	*	*	**significant level**

Table 8. The effect of adding different percentages of a mixture of some medicinal herbs (Turmeric powder, anise, coriander, cumin, Cinnamomum) and the oxytetracycline antibiotic to broiler diets on some oxidation indicators in the thigh meat of broilers before and after the storage process for 30 days (mean ± standard error).

DISCUSSION

The reason for the decrease in uric acid levels in the blood of T5 and T6 treated birds by increasing the level of addition of the mixture may be due to an increase in the level of active compounds, especially phenolic compounds and flavonoids, which work to reduce oxidative damage to renal cells, as these compounds work on the renal expansion, where they are compounds that maintain the level of glomerular filtration Within the normal level [17, 18]. This, in turn, reflects positively on the performance of birds. The decrease in cholesterol concentration may be due to the treatments T4, T5, and T6 containing the herbal mixture, and the effect of these treatments was clear by the increase in the percentage of addition 19. The herbal mixture may contain active elements or compounds that increase the activity of the thyroid gland, which controls cholesterol metabolism because thyroid hormones increase cholesterol formation as well as increase the ability of the liver to excrete cholesterol in the bile [20]. The reason for the low level of cholesterol may be due to the presence of active substances, including Thymol and Cuminaldehyde, in most

of the herbs used in the mixture, as these substances affect some of the enzymatic systems that work in the manufacture of cholesterol in the liver, especially CoA reductase or Hydroxy Methy Glutar [21]. In addition to the role of saponins, tannins, and flavonoids, which act as an antioxidant and prevent the formation of free radicals to form a complex with cholesterol, which inhibits the absorption of cholesterol in the small intestine [22], As [23] showed that medicinal herbs and their oils have properties that lead to lowering the level of cholesterol by inhibiting the action of HMG-CAO and 3-Hydroxy-2-Methe enzymes in the liver.

Moreover, the reason for the significant decrease in the oxidation indices of broiler meat before and after the storage process for the mixture of herbs may be due to the role of the active compounds present in the mixture of herbs, especially phenolic compounds and flavonoids (Table 2), as well as other active compounds such as curcuminoids, curcumin and ascorbic acid (Tarlvir et al., 2017), It also contains Limonene, Myrcene, b-Pinene, p-Cmene, Tcrpinene [24], alkaloids [25], terpenes, linalool, citrullates, alph-plnene [26], cinnamaldehyde, Eumidate, Eugenol, and others (2015). Cinnamyl, eugenol, L-borneol, B-coryophyllene, caryophyllene oxide, E-nerolidol, -thujene α, cubebee-α [27], anethole [28], calcium, potassium, iron, such as Cu, C, and Zn. [29] and the B-vitamin group, Thiamin, Riboflavin, Pyridoxine, and Niacin [30], These compounds exhibit antioxidant activity, which in turn protects biomolecules, nucleic acids, polysaturated fats, proteins and sugars from oxidative damage [31]. Tissues such as catalase and superoxidase [32]

CONCLUSION

It is concluded from the study of adding a combination of medicinal herbs consisting of (Turmeric powder, anise, coriander, cumin, Cinnamomum) and oxytetracycline antibiotic during the experiment period for 1-42 days to broiler diets, which led to A significant decrease in the levels of uric acid and cholesterol in the blood of birds, a significant decrease between the treatments of adding the mixture of herbs and the antibiotic in the oxidation indicators (P.V) and thiobarbituric (TBA) and a significant increase in the value of glutathione (GSH) before storage and 30 days after storage, a decrease in the percentage of liver enzyme GOT, the best percentage of addition (0.75)% of the herbs mixture, to obtain a significant increase in the percentage of dressing, qualitative traits of the carcass and some indicators of oxidation.

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