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The Effect of Aqueous Extract of Cinnamon and Licorice Powder and Their Mixture on the Productive Performance of Japanese Quail

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Abstract **Original Research Article**

This study was conducted at the College of Veterinary Medicine, Tikrit University, to study the effect of aqueous extracts of medicinal herbs on Japanese quail. I used 120 Japanese quail with an average weight of 45 grams. The animals were randomly divided into four groups. Group T1: control group without additives. Group T2: 10 ml/L of cinnamon extract in drinking water. Group T3: Add 10 ml/L of licorice extract to drinking water. Group T4: Add 10 ml of a mixture of cinnamon powder extract and licorice extract to drinking water. The results showed that groups T2, T3, and T4 led to a significant improvement in the productive performance of Japanese quail compared to Group 1T and Group T4. Using a mixture of aqueous extract of cinnamon powder and licorice led to the most noticeable results.

Keywords: Water extract, Cinnamon, licorice, productive, Japanese quail.

INTRODUCTION

Medicinal plants are important and have several medicinal properties, including their antioxidant activity [1]. As a result, researchers have been interested in these plants because they are free of side effects and have a wide therapeutic range [2-4].

Cinnamon is a medicinal herb that originated in Mediterranean countries [5]. It is considered an antioxidant and has the ability to activate oxidative enzymes. Oils extracted from cinnamon have been used as food and therapeutic additives in chicken feed to prevent or delay the formation of oxygen free radicals, so broiler chickens [6].

Cinnamon was first discovered in Asian countries and spread throughout the world after the fourteenth century [7]. It can be found in mountainous areas. Ingredients: Cinnamon contains dietary fiber and small amounts of vitamins such as B6, niacin, magnesium, potassium, and zinc. Cinnamon has many uses and is important for health, which makes it one of the well-known plant extracts used by many people due to its many therapeutic benefits. Cinnamon stick is a medicinal plant that has been used for four centuries [8]. It is also considered a supplement for digestive problems, coughs and an anti-bacterial and anti-viral infection [9].

Cinnamon has many properties, including antibacterial [10], anti-atherosclerosis [11], anti-cancer, anti-viral [12], and anti-fungal. Cinnamon is an herb with nutritional importance and medicinal properties, especially in its leaves. It has also been used in ancient times as a stress-reducing ingredient in diets, drinks, and medical treatments [13]. Cinnamon contains natural antioxidants [14], which also reduce oxidative damage [15]. Cinnamon supports a variety of physiological functions and is used to treat a variety of diseases. It also plays a role in strengthening the immune system, is beneficial for the liver, and removes toxins from the body [16]. The current study aimed to determine the effect of aqueous cinnamon extract, aqueous licorice extract, and their mixture on the productive traits of Japanese quail.

MATERIALS AND METHODS

This research was conducted at Tikrit University / College of Veterinary Medicine in Tikrit City. From December 24, 2023 to February 13, 2024, 120 birds were randomly assigned to Four groups, and each group had three replicates (10 chicks per replicate), and the experiment A.

The T1: Free of any additive, T2: Aqueous cinnamon extract was added at a concentration of 10 ml per liter of perfusion water, T3: Aqueous licorice extract was added at a concentration of 10 ml per liter of perfusion water, T4: The aqueous extract, a mixture of

cinnamon and licorice, 5 ml/liter of distilled water, was added to each preparation. The process was started by washing the cinnamon and licorice well and drying them under the heat of the sun for 72 hours, stirring constantly to avoid rotting. The powder was ground using an electric grinder (Morter) and stored in plastic bags at room temperature until use.

The aqueous extraction procedure was performed according to [17]. Which included mixing an amount of dry powder of both cinnamon stick and licorice root with distilled water in a ratio of 100 g: 200 ml, placing it in bath water at a temperature of 60 degrees Celsius for 1 hour, and leaving it for 1 hour. 24 hours at room temperature, The powders were filtered through several layers of sterile gauze, so that the concentrated liquid was ready for use.

The birds were fed freely on growth and production ration: the starter diet for 14 days, balanced with protein and energy, and the growth diet for 14 days until the end of the experiment at 49 days of age, which contains 18% protein and 2850 calories per kilogram of feed. Birds' energy and protein requirements were calculated using the breed guide.

Table 1: Shows the proportions of the chemical components of the cinnamon plant before and after the water extraction process

Active Substance	Phenol	Phytate	Tannin	Oxalate	Saponin	Alkaloids	Flavonoids
Before the extraction process %	3.50	0.96	1.11	3.16	4.87	1.59	2.88
After extraction process %	2.15	0.55	0.57	2.09	3.76	0.98	0.53
Decrease percentage (%)	37.12	45.89	40.17	35.31	24.27	41.95	83.48

Table 2: Shows the percentage of chemical components of licorice root before and after extraction

Active Substance	Phenol	Phytate	Tannin	Oxalate	Saponin	Alkaloids	Flavonoids
Before the extraction process %	5.60	2.16	1.87	4.06	4.68	2.20	4.15
After extraction process %	3.45	1.47	0.93	3.50	3.94	1.74	2.98
Decrease percentage (%)	38.23	31.63	49.99	13.70	15.89	20.70	28.34

The study included production traits, namely average body weight, weight gain, feed conversion factor, and feed consumption. Data analysis was performed in a completely randomized design using SPSS, and means were compared between treatments using Duncan's multiple range test.

RESULTS AND DISCUSSION

The results in Table (3) show the effect of cinnamon aqueous extract and licorice powder mixture on the body weight of Japanese quail. There were no statistically significant differences between the experimental treatments (two weeks), but the T4 treatment increased significantly ($P<0.05$) compared to the T2 treatment. There were no statistical differences between the rest of the treatments, T2 and T3 or T3 and T4. In the sixth and eighth weeks of the birds' life, the T4 treatment outperformed T3 and T2 when compared. The average final weights of the transactions were 1627.35, 1844.57, 1893.29, and 1967.30 g, respectively.

Table (4) shows the effect of aqueous extract of cinnamon powder and licorice root and their mixture on the total weight gain of Japanese quail. T4 found a significant increase ($P \geq 0.05$) compared with T2 and control treatment. In comparison, there were no significant differences between treatments T2 and T3 or T3 and T4. In the sixth and eighth weeks, the weight gain of the T4 treatment was greater than that of the T3 treatment. The total weight gain was 1585.35, 1802.57, 1851.29, and 1925.30 grams, respectively.

Table (5) indicates the effect of aqueous extract of cinnamon powder, licorice powder, and their mixture on the rate of feed consumption of Japanese quail. T4 was significantly increased compared to T2 at the age of 4 weeks. Treatments T2 and T3 indicated a significant increase ($P<0.05$) compared to treatment. Control during the sixth week of the birds' life. In contrast, there were no highly significant differences between the control and T4 treatments or between the T2, T3, and T4 treatments.

In the last week of life, in the total feed consumption, all treatments with aqueous extract of cinnamon, licorice powder, and their mixture showed a significant increase at the level ($P<0.05$) compared to the control treatment. The total rate of feed consumed was 5605.57, 5978.01.

Table (6) indicates the effect of aqueous extract of cinnamon powder, licorice powder, and their mixture on the feed conversion factor. Treatments T3 and T4 led to a significant improvement in the birds' performance ($P<0.05$) compared to the control treatment in the fourth week of age. There are no differences in the level of significance between treatments T1, T2, T3, and T4. In the sixth week of life, the T4 treatment showed a significant improvement ($P<0.05$) compared to the T2 treatment, which showed a significant improvement ($P<0.05$) over the control treatment.

There was no significant differences appeared between the T2, T3, and T4 treatments. It was found that in the eighth week of life, the birds' feed conversion

factor showed a noticeable improvement ($P<0.05$) for the T4 side compared to T3, followed by T2 and T1. The treatments had an average total feed conversion factor of 3.54, 3.32, 3.24, and 3.16 grams of feed per gram of weight gain, respectively.

Our research results showed that the use of water extract treatments for both cinnamon powder and licorice root powder led to a noticeable improvement in all production characteristics of Japanese quail. T4 (a mixture of cinnamon and licorice) has the best effects ever. The improvement in production performance can be linked to the beneficial components found in both cinnamon and licorice, the most important of which are saponins, tannins, and flavonoids, which did not change significantly after the extraction process (Tables 1 and 2).

Cinnamon and licorice have a significant effect on feed consumption and growth by enhancing the processes of digestion and absorption of substances, as well as the rate of blood flow to the mucous membranes of the digestive tract [18, 19]. The result led to an increase in the general health of birds as a result of the antiviral and antibacterial properties of the active compounds, in addition to their role as antioxidants, which reduce free radicals [20].

Table 3: Shows the effect of aqueous cinnamon extract, licorice powder, and their mixture on the body weight (g) of Japanese quail ± standard error

Treatments	Age (day)			
	21	28	35	42
T1	88.05 ±1.61	133.77 ±3.21c	165.22 ± 5.11d	193.58 ± 11.55d
T2	87.98 ±2.05	135.00 ±4.25b	168.09 ±4.62c	201.21 ±10.42c
T3	88.02 ± 1.33	136.65 ± 2.15ab	172.03 ± 6.31b	212.38 ± 10.81b
T4	88.07 ±2.03	138.85 ±3.37a	175.42 ± 5.46a	219.55 ± 12.03a
Moral level	N.S	*	*	*

Table 4: Shows the effect of aqueous cinnamon extract, licorice powder, and their mixture on the weight gain per two weeks (g) of Japanese quail ± standard error

Treatments	Age (day)			
	21-28	29-35	36-42	Total
T1	45.52 ±1.63	31.45 ±3.12c	28.36 ± 3.77d	105.33 ± 7.56d
T2	47.02 ±2.08	33.09 ±4.28b	33.12 ±9.28c	113.23 ±4.03c
T3	48.63 ± 1.36	35.38 ± 2.17ab	40.35 ± 6.64b	124.36 ± 8.50b
T4	50.78 ± 2.13	36.57 ±3.39a	44.13 ± 10.68a	131.48 ± 8.49a
Moral level	N.S	*	*	*

Table 5: Shows the effect of aqueous cinnamon extract, licorice powder, and their mixture on the average feed intake (g) of Japanese quail ± standard error

Treatments	Age (day)			
	21-28	29-35	36-42	Total
T1	105.25 ±9.41	136.21 ±.1222c	173.27 ±20.17b	414.73 ± 24.27b
T2	104.01 ±6.80	139.87 ± .941b	184.00 ±18.25a	427.88 ±19.24a
T3	105.12 ±8.79	142.10 ±10.45ab	184.23 ±22.22a	431.45 ±29.05a
T4	105.11 ± 9.05	147.22 ±13.11a	185.34 ±19.33ab	437.67 ± 21.03a
Moral level	N.S	*	*	*

Table 6: Shows the effect of aqueous cinnamon extract, licorice powder, and their mixture on the feed conversion ratio (feed/weight gain/g) for Japanese quail ± standard error

Treatments	Age (day)			
	21-28	29-35	36-42	Total
T1	2.13 ±0.008	4.33 ±0.011	6.10 ±0.016b	3.93 ± 0.010d
T2	2.21 ± 0.004	4.22 ±0.010	5.55 ±0.014ab	3.77 ±0.015c
T3	2.16 ± 0.004	4.01 ±0.0014	4.56 ±0.012ab	3.46 ± 0.012b
T4	2.06 ± 0.006	4.02 ±0.0012	4.19 ±0.014a	3.32 ±0.014a
Moral level	N.S	N.S	*	*

CONCLUSIONS

The use of aqueous extracts of cinnamon and licorice in drinking water significantly increased the productivity of Japanese quail compared to the control treatment. Using the aqueous extract of a mixture of

cinnamon powder and licorice resulted in much better results than using the aqueous extract alone.

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