EFFECT OF ADDING DIFFERENT LEVELS OF DAMASCUS FLOWERS WATER (*ROSA DAMASCENA*) TO BROILER CHICKENS DRINKING WATER ON CARCASS AND HISTOLOGICAL CHARACTERISTICS

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ABSTRACT

Through previous studies, we have found only a small number of studies that have discovered the effects and importance of rose water for animals. The aim of this research was to evaluate the effect of various concentrations of aqueous extract of damask flowers water on body weight, carcass weight and measurements, and some histological characteristics of the jejunum and large intestine of broiler chickens. The commercial Ross308 broiler chicks were randomly divided which it number is 250 chicks into 5 groups at the first day (50 Chicks for each group). The chicks were fed a starter diet from the age of 1-10 days, a growth diet from the age of 24-14 days, and a finishing diet from the age of 25-42 days. In treatment T1 plain water was used without adding (the control treatment), while in treatment T2 and T3, damask flowers water was added to the drinking water at a rate of 5% and 10% for 24 hours, and in treatment T4 and T5, damask flowers water was added to the drinking water at a rate of 5% and 10% for a period of 24 hours. 5% and 10% for 12 hours only, respectively. The results showed that in both coefficients T2 and T5, there was a statistically significant increase in some of the main and secondary carcass qualities of the coefficients under study, while there was a varying effect of the transaction on some histological qualities of the broiler carcasses under study.

Keywords: weight gain, feed consumption, water consumption.

تأثير إضافة مستويات مختلفة من المستخلص المائي لأزهار دمشق (*Rosa damascena*) إلى ماء الشرب في وزن الجسم و وزن الذبيحة وبعض مقاييسها والصفات النسيجية للقناة الهضمية لفروج اللحم

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المستخلص

من خلال الدراسات السابقة، لم نجد إلا عدداً قليلاً من الدراسات التي كشفت تأثيرات وأهمية ماء الورد بالنسبة للحيوانات، كان الغرض من هذا البحث هو تقييم تأثير تراكيز مختلفة من المستخلص المائي لأزهار دمشق الى ماء الشرب في بعض صفات الذبيحة وبعض الصفات النسيجية للصائم والامعاء الغليظة لفروج اللحم. تم تقسيم أفراخ فروج اللحم Ross308 التجارية عشوائيا والبالغ عددها 250 فرخ إلى 5 مجموعات في اليوم الأول (50 كتكوت لكل مجموعة). غذيت الأفراخ على عليقة البادئ من عمر 1– 10 يوماً وعليقة نمو من عمر 14–24 يوماً وعليقة نهائي من عمر 25–42 يوماً. وكانت توزيع المعاملات كالاتي: في المعاملة T1 تم استخدام الماء العادي دون الاضافة (معاملة سيطرة)، بينما في المعاملة T2 و T3 ، تم إضافة ماء الزهر إلى ماء الشرب بنسبة 5%، 10% ولمدة 24 ساعة، وفي معاملة T4و T5تم أضافة ماء الزهر الى ماء الشرب بنسبة 5%و10% ولمدة 12 ساعة فقط، على التوالي. أظهرت النتائج أنه في كل من المعاملات T2 وT5 ، كانت هناك زيادة ذات دلالة إحصائية في بعض صفات الذبيحة الرئيسية والثانوية للمعاملات قيد الدراسة في حين كان هنالك تأثير متفاوت للمعاملة على بعض الصفات النسيجية لذبائح فروج اللحم قيد الدراسة.

الكلمات المفتاحية: الزيادة الوزنية، كفاءة التحويل الغذائي، كمية الماء المستهلك.

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INTRODUCTION

The use of antibiotics as a growth factor in farm animals provides significant economic benefits (2, 3) But the long-term use of antibiotics leads to an increase in resistance to antibiotics in bacteria (2, 3, 4). This situation concluded with it becoming more difficult to treat bacterial infections. Due to these negative effects, authorities have prohibited the use of antibiotics as a growth factor in animal feed. As a result of the ban on the use of antibiotics and other growth factor chemical substances, the search began for other alternative feed additive (5, 7). Researchers have utilized feed additives such as prebiotics, probiotics, enzymes, organic acids, plant extracts, and humates. Because they are environmentally friendly, they do not adversely affect animal and human health, and they increase the quality and quantity of products obtained (8, 10, 11). Aromatic plants and their extracts caught the attention of the scientific world in the search for new feed additive substances. Plant extracts have antifungal, antibacterial, antiviral, antioxidant, and anti-lipidemic properties. (11, 12, 13). Rosa damascena Mill is a plant native to Europe and Asia, particularly the Middle East, that belongs to the Rosaceae family (11, 13). Rosa damascena Mill is the most important species in the production of rose oil. The main rose oil producers in the world (15). The main components of the essential oil belonging to the Rosa damascena plant are β-citronellol. Rosa damascena Mill is an indigenous plant to Europe and Asia, namely the Middle East, it is classified under the Rosaceae family (15, 16). Rosa damascena Mill is the predominant species utilized for the extraction of rose oil. Turkey and Bulgaria are the primary global producers of rose oil (11, 15). The main components of the essential oil derived from the rose damask plant are beta-citronellol (23%), nonadecane (16%), geraniol (16%), henicosane (5%), kaempferol, quercetin, gallic acid, cyanidin 3.,5, and D-. glycoside. Other volatile fatty acids of Damask rose flower are β-citronellol, nerol (15, 16). Phytochemical components such as flavonoids, glycosides, terpenes, and anthocyanins were extracted from the leaves and petals of Rosa damascena by researchers (16). Roses possess antiseptic, antispasmodic, antiviral, and antibacterial properties, as documented by (17). Rose water was employed by the general population for medicinal applications. Rose water is purported to provide therapeutic properties for several ailments such as chronic bronchitis, asthma, skin disorders, cancer, ulcers, and wrinkles (18, 19). Oral administration of rose oil did not exhibit any toxicity or negative effects (20). In recent years, several investigations have been undertaken by researchers on aromatic plants and their extracts. However, there is a scarcity of evidence in the existing literature about the effects of including rose water into broiler on performance and intestinal histomorphology parameters. The objective of this study is to investigate the effects of varying queans extract of rose added to broiler drinking water on certain carcass characteristics, and on histomorphology of the intestines. This study expands upon prior studies that demonstrated the plant and its extract to possess beneficial properties.

MATERIALS AND METHODS

This Study Was Carid Out From 18th of March Until 23th of April 2023 In Poultry Farm /Department of Animal Production /College of Agricultural Engineering Sciences/ Uni. of Baghdad.

Baird's feeding, management and treatments: To studying the effect of the aqueous extract of the damask rose flower on chicken production, 250 one-day chicks of the commercial Ross 308 breed were randomly distributed to five treatment groups. The chicks were divided into five treatments (50 birds/treatment) and five replicates for each treatment (10 birds/replicate). Such combinations are observed from the age of 1 to 42 days. The experimental Transactions included the following:

T1- The Control (Without adding).

T2-Add (5%) of concentrated Damascus Rose water and dilute it 100 times with water (for 24 hr.).

T3- Adding (10%) of concentrated Damascus Rose water and diluting it (100) times with water (for 24 hr.).

T4-Adding (5%) of Damascene Rose water and diluting it (100) times with water and serving it for half a day (12 hr. only).

T5-Adding (10%) of Damascene rose water and diluting it (100) times with water and serving it for half a day (12 hours only). used in this study was the broiler chicks of the modern company, as shown in Table (1).

Table 1 . Chemical components of Doxa Broiler Diets in 3 stages

Materials	Stage 1	Stage 2	Stage 3
Corn	48.8	46.1	49.2
Soybean Meal	36	33.9	31
Wheat flour	10	-	-
Rice	-	15	15
Sun flower oil	2.5	2.5	2.5
Premix	1.5	1.5	1.3
$CaCO_3$	1.2	1	1
Humidity / gram	12.7	12.69	13.1
Metabolic energy (kcal/kg live weight)	2900	3020	3155
Protein / %	21.5	19.5	18
Calcium/ %	0.87	0.87	0.80
Available phosphorus/%	0.44	0.49	0.38
Methionine/%	0.56	0.58	0.52
Lysine/gram	11.7	12.27	11.48
Lipids /gram	21.27	29.43	42.69
Fibers /gram	26	24.40	21.59
Methionine + cysteine /gram	11.30	10.29	8.20
Ash / gram	64.45	60.32	42.98

Table 1 shows three stages of nutrition, Stage1: Broiler starter, stage 2: broiler grower, stage 3: broiler finish

Table 2. Percentages of some effective compounds of Rose Damascus

Active substance	Reten time(min)	Area (mv.s)	Height (mv)	Area (%)	Height (%)	WO5
	3.99	48399.96	3.77	95.9	0.3	1.67
Panthophil	6.21	62.64	17.11	0.1	1.5	0.06
Glycerin	8.64	77.15	9.36	0.2	0.8	0.12
Tri chloroethene.	14.44	50.49	5.36	0.1	0.5	0.15
Cymene.	15.88	34.20	30.67	0.1	2.7	0.02
Camphor.	17.52	185.22	105.60	0.4	9.2	0.03
Tetra chloroethane.	19.10	357.84	186.82	0.7	16.4	0.04
Dibromochloroethan	20.54	226.07	148.42	0.4	13	0.03
Limonene.	21.85	108.93	92.51	0.2	8.1	0.02
Chlorobenzene..	23.05	197.14	137.20	0.4	12	0.03
Camphene.	24.17	328.40	174.79	0.7	15.3	0.03
1,3-diChlorobenzene	25.20	274.47	143.50	0.5	12.6	0.04
Cineol..	26.31	128.89	66.54	0.3	5.8	0.03
A-Pinen	27.56	39.13	20.40	0.1	1.8	0.02
	Total	50470.51	1142.40	100	100	

Rose water active ingredients

A number of samples of the water extract of Damascus flowers were taken, which are available in a capacity of 0.5 liters in the local markets (German, Syrian, local). An examination was conducted to estimate the active ingredients and determine the level of purity in the laboratories of the Department of Environment and Water –The Ministry of Science and Technology using the HLPC device of German origin. It was found that the highest purity and concentration of the active substance is in the aqueous extract of Syrian origin, as shown in Table (2).

Carcass characteristics parameters

On the 42th day of the study, one chicken was taken randomly from each replicate, its live weight was taken, then it was slaughtered and cleaned, then its internal entrails were extracted, then the cleaned carcass devoid of entrails was weighed to calculate the cleansing percentage, then the carcass was cut into main

and secondary pieces, and the weights of the heart, liver, and gizzard were taken.

Histomorphology Measurements

At the end of the experiment (42 day old), one bird specimen from each replicate was chosen at random. The birds were culled and euthanized using an appropriate way, and the gastrointestinal system was promptly excised. Tissue samples were collected from the jejunum and ileum for histomorphology investigation. In order to achieve consistency in the samples, a section of the mucosal segments of the jejunum and ileum measuring approximately 2 cm in length was removed. This was done by excising 8 cm of the jejunum located 8 cm before Meckel's diverticulum, and 8 cm of the ileum located 8 cm before the ileo-cecal junction. The tissue samples were washed and immersed in a 10% formalin for 24 hours to preserve them. They were then rinsed with tap water and gradually dehydrated using different concentrations of ethanol. After that, they were treated with xylol to remove any remaining water and then embedded in paraffin. The intestinal segments were sliced into sections with a microtome, each measuring 5 μm in thickness. We conducted cross-sectional analyses and applied Mallory's triple stain, as modified by Crossman, to assess the intestinal morphometry (21). Villus height, which refers to the distance from the top of the villus to the crypt mouth were measured. Additionally, crypt depth as the extent of invagination between neighboring crypt mouths were measured. The breadth of the villus at its base was quantified following the methodology outlined by (23). The histological sections were analyzed using a light microscope (Leica DM 2500, Leica Microsystems GmbH, Wetzlar, Germany) and captured with a Leica DFC450 (Leica Microsystems, Heerbrug, Germany) digital microscope camera. The photos were assessed utilizing the ImageJ program developed by the US National Institutes of Health, located in Bethesda, MD, USA. After washing the carcasses, the body length was measured by using measure tape divided by millimeters. The measures were taken from the neck back (the beginning of collar bone) to the tail end (end of lumbar vertebrae) and chest beast circumference by wrap the measure tape around the breast in touch from the upper wing area and thigh circumference by wrap the measure tape around the thigh (1) and back circumference by wrap the measure tape around the back after thigh connection with body (6) and the flier repletion of body and breast was concluded according to the following equation:

Flier repletion of body degree = Carcasses weight (gm) / Body weight (gm)

Flier repletion of breast degree = Breast circumference (cm) / Body length (cm)

A factorial experiment using Complete Randomize Design (CRD) in analyzing the data between the treatments. Significant differences between the means of the treatments were measured using the Duncan test at the level of significance of 0.05. The ready-made statistical program SAS (31) was used to analyze the data.

RESULTS AND DISCUSSION

Tables (3, 4, 5, 6) displays the impact of incorporating varying concentrations of damask flower aqueous extract in broiler drinking water on carcass qualities. The first treatment exhibits a noteworthy increase in live body weight compared to the other treatments, whereas the fifth treatment demonstrates a significant decrease in live body weight compared to the other treatments. The inclusion of eaten internal entrails in the second and fifth transactions substantially enhanced the clearing rate in comparison to the remaining transactions. Additionally, these transactions exhibited a larger proportion of the thigh piece. No notable disparities were detected between the drummer's stick piece and the other transactions under investigation. The second and fourth transactions in the chest portion had a substantial ($P \leq 0.05$) rise in comparison to the other transactions being examined, however no notable increase or variation was detected in the % of the wings. Table 3 displays the impact of incorporating varying concentrations of water extract derived from damask flowers into the drinking water of broiler chickens. It examines how this addition affects the characteristics of carcass. There were no notable disparities in the proportion of neck relative weight among all the transactions examined. Nevertheless, there

was not a substantial in liver %. there was a notable augmentation (P≤0.05) in the Brest circumference, thigh circumference, and length of the sternum in T2 and T5 in comparison to the other transactions. The first and second transactions exhibited a substantial augmentation (P≤0.05) in body length, quantified in centimeters, in contrast to the remaining transactions examined. Overall, the second and fifth transactions of supplemented group had a direct impact.

Table 3. Effect of adding different levels of aqueous extract of damask flowers in broiler drinking water on carcass performances

TREATMENTS	Live Body Weight (gram)	Carcass Weight (gram)	Dressing percentage with Giblets %	Dressing percentage without Giblets %
T1	3028.10±146.71*	2205.59±124.22	72.82±1.50	66.26±0.52
T2	3375.30±129.49	2552.40±124.63	75.62±1.55*	69.16±0.50*
T3	3185.80±125.71	2310.34±125.16	72.52±1.52	66.30±0.52
T4	3104.80±124.89	2298.48±125.18	74.03±1.52	67.81±0.50
T5	3321.30±122.20*	2508.24±124.39	75.52±1.52*	69.00±0.50*
SIGNIFICANT	0.05	NS	0.05	0.05

T1, T2, T3, T4, and T5 represent the addition coefficients of the different proportions of the aqueous extract of Damascus flowers. (*) indicates the presence of significant differences between the treatments at a significant level (P≥0.05).

Table 4 Effect of adding different levels of aqueous extract of damask flowers in broiler drinking water on carcass performances

TREATMENTS	Thigh %	Dram stick %	Brest%	wings%
T1	13.52±0.04	12.34±0.01	30.13±0.12	11.03±0.02
T2	15.80±0.02*	12.90±0.01	31.33±0.13*	11.09±0.02
T3	13.62±0.04	12.30±0.01	30.10±0.12	11.02±0.01
T4	15.92±0.03	12.35±0.01	31.21±0.13*	11.08±0.02
T5	13.55±0.02*	12.42±0.01	30.16±0.16	11.44±0.01
SIGNIFICANT	0.05	NS	0.05	NS

T1, T2, T3, T4, and T5 represent the addition coefficients of the different proportions of the aqueous extract of Damascus flowers. (*) indicates the presence of significant differences between the treatments at a significant level (P≥0.05)

These results are consistent with the findings of (Yildirim et al., 2018) who hypothesized that the use of varying concentrations of damask flower extract led to improved properties of muscle tissue, and an increase in the weight of organs and segments, due to increased protein synthesis in the muscles, and with the findings of (14). The effect of Damascus rose extract in various treatments was demonstrated in the presence of antioxidant factors in the extract, including vitamins, polyphenols, and minerals (27).

Table 5. Effect of adding different levels of aqueous extract of damask flowers in broiler drinking water on carcass characteristics

TREATMENTS	NECK %	BACK %	HART %	LIVER %	GIZZARD %
T1	7.60±0.22	20.62±0.52	0.60±0.02	3.22±0.12	2.32±0.02
T2	7.82±0.20	21.05±0.05*	0.62±0.01*	3.42±0.10	2.42±0.01
T3	7.61±0.23	20.45±0.15	0.60±0.02	3.32±0.12	2.30±0.03
T4	7.72±0.22	20.48±0.52	0.60±0.02	3.30±0.11	2.32±0.02
T5	7.80±0.20	21.12±0.05*	0.62±0.01*	3.45±0.12	2.45±0.01
SIGNIFICANT	NS	0.05	0.05	NS	NS

T1, T2, T3, T4, and T5 represent the addition coefficients of the different proportions of the aqueous extract of Damascus flowers. (*) indicates the presence of significant differences between the treatments at a significant level (P≥0.05)

Table 6. Effect of adding different levels of aqueous extract of damask flowers in broiler drinking water on carcass characteristics

TREATMENTS	(cm) Brest circumference	(cm) Thigh circumference	Sternum length (cm)	Body Length (cm)
T1	37.33±1.22	17.51±0.3	12.90±0.50	24.24±0.69*
T2	41.61±1.25*	19.52±0.04*	14.38±0.52*	27.02±0.66*
T3	39.27±1.23	18.42±0.3	13.57±0.52	13.57±0.52
T4	38.27±1.23	17.95±0.3	13.23±0.51	13.23±051
T5	40.94±1.22*	19.20±0.4*	14.15±0.53*	14.15±0.53
SIGNIFICANT	0.05	0.05	0.05	0.05

T1, T2, T3, T4, and T5 represent the addition coefficients of the different proportions of the aqueous extract of Damascus flowers. (*) indicates the presence of significant differences between the treatments at a significant level (P≥0.05)

Tables (7, 8) displays the impact of incorporating varying concentrations of damask flower extract on certain histological characteristics of broiler chickens. The control treatment exhibited a significant reduction (P≤0.05) in villi height compared to the other treatments. Conversely, the fourth and fifth treatments demonstrated a significant increase (P≤0.05) in crypt depth and to mucus muscle layer thickness compared to the other treatments. No effect was found in the muco muscle layer in T1 or any of the other treatments under investigation. In the second transaction, there was a notable augmentation in the muscle layer compared to the other transactions being examined. Conversely, the first transaction had a marked reduction in the scrous layer and wall-thick layers in comparison to the remaining transactions. Utilizing medicinal and fragrant herbs as feed for broilers can enhance their appetite, improve their digestive efficiency, promote daily weight increase, and optimize food use. In addition, they can contribute to the establishment of a beneficial microbe community in the intestines by eliminating harmful germs (24, 25). Incorporating aromatic herbs and extracts into animal feeds yields a beneficial impact on performance.

Table 7. Effect of adding different levels of aqueous extract of damask flowers in broiler drinking water on Some histological parameters

TREATMENTS	VILLI HIGHT	Cript	MUCOSMUSCLE	TOTMUCOSMUSCLE
T1	346.17±16.60*	56.22±3.19	7.00±0	475.60±14.62
T2	413.14±12.74	56.20±3.14	7.00±0	474.30±14.63
T3	412.14±14.25	56.20±3.13	7.00±0	476.37±14.63
T4	412.18±14.24	60.20±3.16*	7.00±0	540.3216.632*
T5	516.12±14.25	62.20±3.16*	7.00±0	589.33±16.64*
SIGNIFICANT	0.05	0.05	NS	0.05

T1, T2, T3, T4, and T5 represent the addition coefficients of the different proportions of the aqueous extract of Damascus flowers. (*) indicates the presence of significant differences between the treatments at a significant level (P≥0.05)

Table 8. Effect of adding different levels of aqueous extract of damask flowers in broiler drinking water on Some histological parameters

TREATMENTS	MUSCLELAYER	SEROUSLAYER	WALLTHICK
T1	55.90±6.03	2.34±0.54*	510.90±25.55*
T2	63.92±5.21*	3.30±0.51	651.90±25.54
T3	55.91±5.79	3.31±0.57	652.90±25.51
T4	55.92±6.95	3.22±0.56	651.90±25.50
T5	53.93±6.49	3.35±0.54	652.90±24.53
SIGNIFICANT	0.05	0.05	0.05

T1, T2, T3, T4, and T5 represent the addition coefficients of the different proportions of the aqueous extract of Damascus flowers. (*) indicates the presence of significant differences between the treatments at a significant level (P≥0.05)

Essential oils enhance the activity of digestive enzymes and promote the functioning of animals' digestive systems (26, 28). Essential oils have a beneficial impact on performance measures due to their specific qualities. Additional research is needed to investigate the impact of volatile fatty acids found in Rosa damascene mill and its extracts on performance and intestinal health, with a focus on determining the optimal dosage levels. Many research has revealed that many aromatic herbs and extracts have a beneficial impact on the body weight of broiler chickens when included in their feed (30, 32). Alterations in the morphology of the small intestine, such as the dimensions of the villi (height and breadth) and the ratio of villus height to crypt depth (VH: CD), might enhance the digestive and absorptive capabilities of chickens, hence improving their

overall performance in nutrient utilization (33). No significant impact of incorporating rose water into the broiler diet was seen on the histology of the ileum, specifically on villus height, crypt depth, and the ratio of villus height to crypt depth, on both the 21st and 42nd days of the experiment. Nevertheless, the inclusion of rose water had a beneficial impact on the heights of the villi in the ileum and jejunum on the 21st day of the trial, as well as the heights of the villi in the ileum on the 42nd day of the study. The results show that the histological characteristics have improved in the thickness of the layers of the intestinal wall, as well as the length of the villi and the depth of the crypts. This may be attributed to the role of the components of the extract, which are essential fatty acids, which work to increase the absorption of substances and improve the digestion process. This reflects its effect on the development of the digestive system, improving its secretions, and reducing the waste. pathogenic bacteria, enhancing the bird's immunity and thus improving its overall performance (22). (34) also showed that phenols have an important role in removing free radicals and protecting the body from the damage they cause to various body cells. Phenols and flavonoids also contribute to increasing the growth of The villi rise and the damaged tissues are replaced with new cells to maintain the function and continuity of the villi (9), and (29) pointed out that the length and depth of the crypts is an indicator of the digestive capacity of the intestine and corresponds to increased digestion and the ability to absorb nutrients.

CONCLUSIONS

The inclusion of 5% and 10% in broiler drinking water had a beneficial impact on both carcass weight and intestinal health. Nevertheless, the inclusion of rosewater had no impact on performance or the weights of any internal organs. Incorporating rose water into broiler water has the potential to enhance profitability in the poultry business by positively impacting both the hot carcass quality and intestinal health. The literature study provides little information on the performance and intestinal histomorphology parameters associated with the utilization of rose water in broiler. Upcoming investigations using avian creatures of various species and dosage levels will provide insights into the feasibility of utilizing rose water as a dietary supplement. Our work serves as a valuable reference for future research in the field of literature.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

DECLARATION OF FUND

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