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Influence of Adding Sage and Juniper Plant Powder and Their Mixture in the Productive Traits of Broiler (Ross 308)

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Abstract. *This study was conducted to know-effect of adding some medicinal plants represented by sage and juniper powder to the broiler chicks' diet, and the extent of their effect productive. Two- hundred-forty , unsexed broiler chicks (1 day old) broiler chickens were used, strain Ross (308), were reared for* five *weeks in animal production farm affiliated to College of Technology / Al-Musaib. The chicks were fed on a* basal *diet without* any addition which represented *(T1), adding 5 g/kg feed with juniper leaf powder represented (T2) adding 5 g/kg feed with sage powder represented (T3) adding 5 g/kg feed with juniper leaf powder + 5 g/kg feed with sage powder represented (T4). The chicks were reared under controled conditions for breeding of temperature, light and humidity. birds reared in four groups with eight replicates. Each treatment contained 60 chicks divided into two equal repeats with-30 chicks for each replicate. The results showed that adding plant powder sage and juniperwere recorded significant improvement livebody weight of birds and body weight gain duringexperimental period (5 weeks). The addition of these medicinal plants reduced feed consumption, improved feed conversion ratio, and increased carcass weight compared with control group.*

Keywords: *sage; juniper; productive performance; broiler.*

1. INTRODUCTION

Poultry represented-a major and effective part of human feeds and is thus economically one of important sources of animal proteins, so that poultry industry has made great progress recently, and the production of poultry has increased significantly with high efficiency, and this is a result of great efforts that have been made in scientific and applied nutritional science [1] In the last two decades attention has focused to finding food additives used in poultry diets as an alternative for antibiotics that-World Health Organization considers harmful to public health[2].Therefore, studies and research have tended to use aromatic medicinal plants and their extracts in poultry feeds, as it improves appetite and feed intake [3] and increases weights and immunity because it contrnt of ntibacterial and antioxidant agents [4] most medicinal plants used in poultry diets is sage *(saliva officinalis)*, is a perennial herbaceous plant of the *Lamiaceae* family. The active substances in sage plant are thujone, flavonoids, phenols and others[5]. Juniper *(juniperus)* is an evergreen aromatic tree belong to *cupressaceae* family that spreads throughout cold and temperate regions of the northern regions of earth [6]. Juniper plant has been used in ancient medicine to treat a wide range of diseases due to its anti-inflammatory properties[7] antifungal [8],analgesic [9], antifungal [10] The active substances in juniper plant are flavonoids, volatile oils, coumarins [11] terpenic acids, eucanthocyanidins, gum, and lignin[12]. Due to the lack of research concerned with effect of medicinal plant powder and its effect on the productive traits, sage powder and

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juniper plant powder were added to broiler diets (Ross 308), and study its effect on productive characteristics of broiler.

2. MATERIALSAND METHODS

2.1. Experimental scheme

This experiment was conducted in poultry farm belong to-animal Production Techniques department at the College of Technology / Al-Musaib. 240 chicks Ross 308 were used at 1 day old, with an average initial weight of 43g. Chicks were distributed randomly 4 Treatment, 60 chicks for each treatment (30 chicks / replicate). The chicks were reared for 5weeks. Sage and juniper plant powder were used to study its effect on the productive characteristics (body weight, weight gain, feed consumption, feed conversion ratio) of broilers strain Rose 308. A standard feed was used whose components and chemical composition are inTable 1. The groups which used in this experiment are control treatment (T1) without any addition, second treatment (T2) add 5g /kg feed of sage plant powder to the standard feed, third treatment (T3) add 5 g / kg feed of juniper plant powder to the standard feed, fourth treatment (T4) add 5 g / kg of feed from the powder of the sage plant mixed with 5 g / kg of feed from the juniper plant powder to the standard feed.

Table 1. Ingredient and chemical composition of experimental diets

Feed Ingredients (%)	Starter (1 – 21 days)	Finisher (21-35)
yellow corn	30	30
Soybean meal	28	28
Wheat	27.7	29.7
Animal protein concentrate	10	7.8
Vegetable oil	3	3
Salt	0.3	0.3
Limestone	1	1.2
Total	100	100
Metabolizable energy	3078	3125.2
Crude protein%	22.74	20.16
energy:protein ratio	135.35	155.01
Calcium%	0.97	1.0
Bio phosphorus%	0.41	0.48
Methionine + Cysteine	0.83	0.75
Lysine	1.02	0.95

The chemical composition was calculated according to the analyzes of substances in feed from [13].

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2.2. Statistical analysis

Statistical Analysis System –SAS [14] was used in data analysis to study the effect of different parameters on studied traits according to a complete random design (CRD). The significant differences between the averages were compared with the Duncan [15] polynomial test.

3. RESULTS AND DISCUSSION

3.1. Average body weight

The results of the average body weight of the treatments are shown in Table (2) which indicates the presence of significant differences at (P <0.01) in favor of addition treatments. At the first week recorded first treatment (T1) 148 g and the second treatment (T2) gave the highest average weight ~~of~~ 167.5 g, while the ~~two~~ treatments (T4) and (T3) amounted to 163 and 157 g, respectively. At the second week of study, the second and fourth treatments outperformed all treatments followed by treatment (T1) while the third treatment recorded the lowest average body weight. At third week, T2 and T4 also outperformed trial treatments, recording 983.5 and 963 g, respectively, control treatmentsignificant increase as compared with third treatment with 930 and 922 g, respectively. In the fourth week of the trial, second treatment achieved highest mean live body weight, while third treatment recorded lowest average. At fifth week of the experiment, second treatment significant increase as compared with all experimental treatments, and the third treatment recorded lowest average live body weight. Results of body weight of were consistent with [16]who observed an improvement in body weight when adding sage leaf powder to a broiler diet compared with control group, Also,results agreed with[17] who noted body weight improved by adding uniper fruits to quail diet. The positive effects by adding powder of these plants may be due to the fact that these plants positively influence the secretion of digestive enzymes and improve digestion process because they contain natural anti-bacterial compounds, anti- fungi and anti- oxidant [10].

Table 2. Effect of adding sage and juniper powder to diets on body weight (g)

Treatment	Mean ± standard error (g)				
	first week	second week	third week	fourth week	fifth week
T1	148± 2.00 c	427.5± 2.50 c	930± 10.00 c	1395± 5.00 c	2250± 10.00 d
T2	167.5± 2.50 a	465± 5.00 a	983.5± 350 a	1525± 25.00 a	2420± 30.00 a
T3	157.**5**± 2.50 b	384.5 ± 5.50 d	922± 2.00 d	1357.5± 7.50 d	2270 ± 0.00 **c**
T4	163± 3.00 ab	447.5± 7.50 b	963± 7.00 b	1465± 5.00 b	2357.5± 7.50 b
Significance	**	**	**	**	**

**Averages bearing different letters within a single column were significantly different (P<0.01).

3.2. Average weight gain

The effect of adding sage and juniper plant powder on body weight gain is shown in Table 3, which indicates presence of significant differences for addition treatments–(P <0.01) compared with control group. Second treatment (T2) significant increase as compared with all treatments at first week, followed by treatment (T4) 124 and 120 g, respectively, while treatments (T1) (T3) recorded the lowest average

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weight gain 105 and 114.5 g respectively. At second week treatments (T2) and (T4) recorded a significant increase as compared with all the studied treatments. In the third week treatment (T3) outperformed all treatments followed treatment (T2) while treatment (T1) recorded the lowest level of weight gain. At the fourth week treatments (T2) and (T4) also recorded a significant increase as compared with (T1) and (T3). While during fifth week treatment (T3) recorded highest weight gain, treatment (T1) recorded lowest weight gain 912.5 and 855g respectively. As for the cumulative weight gain increase second and fourth treatments significantly increase compared to all transactions by 2376.5 and 2314 g respectively. The results were in agreement with findings [18] who observed an improvement in body weight gain by adding sage oil to broiler feed compared with control diet. The results were also in agreement with findings[19] which observed significant improvement in body–weight gain by adding juniper oil to diet of quail compared to control diet. The results did not agree with findings [20] which indicated that there were no significant effect on bodyweight gain of broilers when adding a mixture of essential oils including juniper oil into drinking water compared to control.

Table 3. Effect of adding sage and juniper powder to diets on (g)

Treatments	Mean ± standard error (g)					
	first week	second week	third week	fourth week	fifth week	Cumulative
T1	105± 3.00 d	279.5 ± 2.00 c	502.5 ± 1.00 c	465± 2.50 c	855 ± 7.50 c	2207 ± 8.00 d
T2	124± 3.00 a	297.5 ± 500 a	518.5 ± 7.50 b	541. 5 ± 500 a	895 ± 2,00 b	2376.5 ± 40.50 a
T3	114.5 ± 5.50 c	227 ± 4.00 d	537.5 ± 2.50 a	435,5 ± 3.00 d	912.5 ± 2.50 a	2227 ± 6.50 c
T4	120 ± 3.00 b	284.5 ± 5.00 b	515.5 ± 3.00 b	502 ± 6.50 b	892.5± 10.00 b	2314 ± 27.5 b
Significance	**	**	**	**	**	**

** Averages bearing different letters within a single column were significantly different (P<0.01).

3.3. Average feed consumption

Table (4) shows effect of adding sage and juniper plant powder on feed consumption, which indicates presence of significant differences between all treatments during experimental period. At first week second treatment (T2) achieved lowest values consumed feed, followed by fourth treatment (T4) while (T1) and (T3) treatments recorded highest feed consumped . At second week of experiment third treatment recorded highest feed consumped , followed by first treatment, while treatments T2 and T4 recorded lowest feed consumped . At third week control treatment achieved highest rate of consumed feed, while at second treatment recorded lowest values 861.66 and 788.33 g, respectively. In the fourth week of experiment, first and third treatments achieved highest values of consumed feed, while second treatment recorded lowest value of consumed feed. At the fifth week of experiment, third treatment recorded highest rate of consumed feed, followed by control treatment. As for the cumulative feed consumed (T1) and (T3) achieved highest consumed feed value which recorded 4225.21 and 4218.15 g, respectively. while treatments (T2) and (T4) recorded lowest consumed feed values which recorded 3913.32, 3960.98 g, respectively.These results were consistent with [21] who noticed a decrease in consumed feed by adding sage oil diets of Japanese quail. The results did not agree with [20] who not noticed significant effect on feed consumption by adding an amount of juniper with other plant oils to drinking water of broilers

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compared with control group. [22] did not notice significant differences between treatments infeed consumption when feeding to diets containing sage oil.

Table 4. Effect of adding sage and juniper powder to diets on feed consumption (g)

Treatments	Mean ± standard error (g)					
	first week	**second week**	**third week**	**fourth week**	**fifth week**	**accumulative**
T1	193.56± 192.50 b	486.66 ± 100 b	861.66 ± 50 a	1255 ± 150 a	1428.33 ± 150 b	4225.21 ± 242.50 a
T2	173.33± 100 c	446.66 ± 100 c	788.33 ± 150 d	1155± 150 d	1350 ± 500 d	3913.33 ± 1000 d
T3	200.83± 475 a	495 ± a 150	831.66 ± 20 b	1245.66± 70 b	1445 ± 350 a	4218.15 ± 925 b
T4	179.33 ± 120 c	453.33 ± 100 c	796.66 ± 100 c	1166.66± 0.00 c	1365 ± 450 c	3960.98 ± 770 c
Significance	**	**	**	**	**	**

**Averages bearing different letters within a single column were significantly different (P<0.01).

3.4. Average feed conversion ratio

Table (5) shows effect of adding sage and juniper plant powder on feed conversion ratio, results indicate that significant differences between treatments. At the first week-(T2) and (T4) treatments achieved best dietary conversion ratio compared with control (T1). At the second week, third treatment (T3) recorded worst feed conversion ratio, followed by treatment (T1) while second and fourth treatments recorded best dietary conversion ratio. At third week, control treatment achieved highest value of the food conversion, while second treatment recorded lowest value of conversion ratio, while there no significant differences between third and fourth treatments. the fourth week of the experiment, there were deterioration of the feed conversion ratio for experimental treatments, for-first and third treatments achieved highest value for the feed-conversion ratio, while the second treatment recorded lowest percentage of the feed conversion ratio. At the fifth week of the experiment, there were significant improvement in feed conversion factor, wkile-first treatment (control) recorded highest feed conversion ratio, reaching 1.67 g feed / g weight gain, while the second and fourth treatments recorded the lowest percentage for feed conversion ratio-at 1.50 g feed / g. weight gain. As for the average conversion efficiency, second and fourth coefficients achieved best dietary conversion ratio, while other experiment treatments recorded the worst feed–conversion ratio.These results are in agreement with [23] who noticed a significant improvement in feed conversion ratio by different levels of sage and thyme oil were added to pigeon diets.

4. CONCLUSIONS

The addition of medicinal plant powder represented by sage and juniper plant powder or both, led to a significant increase in production characteristics (live-body weight, body weight gain, with a significant decrease in feed consumption for treatments T2 and T4 and a positive improvement of feed conversion ratio for two mentioned treatments).

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Table 5. Effect of adding sage and juniper powder to diets on feed conversion ratio (g)

Treatments	Mean ± standard error (g)					
	first week	second week	third week	fourth week	fifth week	accumulative
T1	1.84± 0.03 a	1.74 ± 0.02 b	1.71± 0.00 a	2.69 ± 0.00 b	1.67± 0.01 a	1.93 ± 0.01 b
T2	1.39± 0.01 d	1.5 ± 0.01 d	1.52 ± 0.01 c	2.13 ± 0.00 c	1..50 ± 0.01 c	1.60 ± 0.01 d
T3	1.75 ± 0.02 b	2.18± 0.00 a	1.54 ± 0.01 b	2.86 ± 0.01 a	1.58 ± 0.00 b	1.98 ± 0.00 a
T4	1.49 ± 0.02 c	1.59 ± 0.001 c	1.54 ± 0.01 b	2.32 ± 0.00 c	1.53 ± 0.01 b	1.69 ± 0.00 c
Significance	**	**	**	**	**	**

**Averages bearing different letters within a single column were significantly different (P <0.01)

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