Plant Archives Vol. 18 No. 2, 2018 pp. 1684-1688 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EFFECT OF ADDING DIFFERENT LEVELS OF ROSEMARY LEAVES POWDER (*ROSEMARINUS OFFCINALIS*) TO THE RATION ON PRODUCTION TRAITS OF BROILER CHICKS (ROSS 308)

Saad Mohsen Kadhim

Department of Animal Production, College of Agriculture, University of AL-Qasim Green, Iraq.

Abstract

This experiment was conducted in the poultry farm of Animal Production Department, College of Agriculture, University of AL-Qasim Green to study the effect of adding different levels of Rosemary leaves powder (*Rosemarinus offcinalis*) to the ration on production traits of broiler chicks (Ross 308) using 180 broiler chicks with one day years old (unknown Gender), from Ross strain. It was randomly divided into four treatments with 45 birds per treatment, each treatment consisted of three replicates (15 birds per replicate). The treatments of the experiment were as follows: First treatment (control) without adding the leaves of the rosemary leaves to the ration, the second treatment: Add the rosemary leaves by 1 g/kg feed, the third treatment: add the rosemary leaves by 2 g/kg feed and the fourth treatment : Add the rosemary leaves by 3 g/kg feed. The study included the following traits: The average of live body weight, weight gain, feed consumption, feed conversion efficiency and mortality. The results indicated that the addition of rosemary leaves with levels (1, 2, 3 g / kg feed) resulted in a significant improvement in the average of live body weight for chicks with 6 weeks age, the average of total weight gain and a significant improvement in total feed conversion efficiency compared to the control treatment (first treatment). It is concluded from the present experiment that adding rosemary leaves in the ration can improve some of the productive traits of the broiler chicks.

Key words : Rosemary, production traits, broiler chicks.

Introduction

Medicinal plants or herbs occupy a prominent position in most parts of the world in the pharmaceutical, industrial and agricultural fields. People have known the risk of the side effects of the chemical drugs used, which led to their rush to return to the use of medicinal plants, and the main factors that encouraged their use as a safe and its side effects are low or nonexistent compared to chemical treatments (Marcus, 2002). On the other hand, many studies have shown their positive role and effective compounds, especially their volatile oils, in improving the digestion of food (Mellor, 2000) and increasing their stimulation for the secretion of digestive enzymes and secretion of yellow salts (Srinivasan, 1991). Williams and Losa (2001) showed that essential oils extracted from medicinal plants had a stimulating effect on the digestive system of poultry, improving liver function and increasing the production of digestive enzymes in the pancreatic juice. It also had a role in increasing the digestion of protein, cellulose and fat (Jamroz and Kamel, 2004), improve digestion of nutrients within the intestines, particularly the ileum (Hernández *et al*. 2004). Bassett (2000) and Langhout (2000) explained that essential oils and their active ingredients have a direct correlation with the ability of poultry birds to grow because these compounds are effective have a positive role in promoting the growth of poultry birds and then improve their capacity for productive performance. Rosemary (*Rosemarinus offcinalis*) is a medicinal plant, a perennial, aromatic shrub. Its leaves is resemble pine leaves, their leaves are used as a flavor in foods such as grilled lamb, chicken and turkey bird. It grows in warm areas, so the Mediterranean and Asia are their native habitat, but they may be present in cold weather areas and have high potential to afford the drought and long-term water shortages. Their average length is 1.5 m to 2 m. Its evergreen leaves resemble needles, narrow and long, the leaves length ranges from 2-4 cm and width of 2-5

mm. Its leaves are green from the top and white from the bottom coated with thick and short whiskers. The Rosemary contains many phytochemicals such as camphor, rosemarynic acid, caffeic acid, ursolic acid and botulinum, and a number of antioxidants such as Carnosic acid and carnosic acid [Labban et al., 2014]. Its leaves activate the blood circulation, especially in people who do not exercise, reduce headaches, treat bacterial infections and fungi, prevent gases in the digestive system, help in digestion and absorption of food in it, remove heartburn, improve the liver, digestive system and gall bladder and reduce the formation of its stones and kidney stones and bladder. It also reduces the secretion of the urease enzyme that is associated with the formation of these stones (Begum *et al*., 2013). The present study aims to evaluate the effect of adding different levels of *Rosemarinusoffcinalis* powder to the ration on production traits of broiler chicks (Ross 308).

Materials and Methods

This experiment was conducted in the poultry farm of Animal Production Department, College of Agriculture, University of AL-Qasim Green for the period from 27/2/ 2014 to 9/4/2014. The 180 of broiler chicks Ross 308 (Unknown Gender) were used with an average weight 41 g / chick. The chicks have been breeded in cages, the chicks were randomly distributed on 4 treatments, each treatment consisting of 3 replicates, each replicate containing 15 chicks. Feed was provided in free form for birds. Two rations were provided. The initiator ration was 1-21 days age and the final ration 22 to 42 days age as shown in table 1. The rosemary leaves were added to the ration (manual mixing) from one day age, as following: First treatment (control) without adding the leaves of the rosemary leaves to the ration, the second treatment: Add the rosemary leaves by 1 g/kg feed, the third treatment: add the rosemary leaves by 2 g / kg feed and the fourth treatment : Add the rosemary leaves by 3 g/kg feed. The study included the following traits: The average of live body weight, weight gain, feed consumption, feed conversion efficiency and mortality. The averages of these traits were estimated for each week of the five-week experiments. The complete randomized design was used to study the effect of different treatments in the studied traits, The differences between the averages were compared with the use of the Dunkin Multidimensional Test (Duncan, 1955) and using SAS Statistical Analysis Program (SAS, 2010).

Results and Discussion

Table 2 shows the effect of adding rosemary powder in the average of live body weight of broiler chicks for 1-6 weeks. The results of the statistical analysis showed no significant differences in the average of live body weight between the treatments of the addition of the

Table 1 : The percentage of feed materials in the composition of the initiator ration and the growth ration used in the experiment with the calculated chemical composition of both rations.

Feed materials	The initiator ration (1-21 day) %	The growth ration (22-42 day) %
Yellow corn	30	30
Local wheat	27.7	35.5
Soybeans (44% protein)	28	20
Animal Proteins Center*	10	10
Vegetable oil	3	3
Limestone	1	1.2
Food salt	0.3	0.3
Total summation	100%	100%
The calculated chemical analysis**		
Representative energy (kCal / kg)	3078	3125.2
Crude protein (%)	22.74	20.16
The percentage of energy to protein	135.35	155.07
Lysine (%)	1.02	0.95
Methionine + Cicin (%)	0.83	0.75
Calcium (%)	0.97	1.0
Phosphorus Ready (%)	0.41	0.48

* Al-Hayat / Jordanian origin contains 44% protein, 2800 kcal, 12% fat, 25% ash, 5% calcium, 2.9% phosphorus, 2.55% Methionine + Cicin, 2.8% lysine.

**According to the chemical composition according to the analysis of feed materials in [NRC, 1994].

Table 2 : Effect of adding different levels of rosemary leaves powder to the ration in the weekly average of live body weight (g / bird), age (day).

Treatments	14	28	42
First treatment (control)	248.96 a±2.62	1052.08 ab±9.08	1923.95 b±24.55
Second treatment	255.21 a±7.48	1091.67 a±18.08	2066.50 a±26.40
Third treatment	262.50 a±12.84	1056.79 b±2.62	2033.89 a±25.42
Fourth treatment	266.66 a±12,26	1066.28 ab±18.85	2042.91 a±32.47
Significant level	**N.S**	*	*

NS: No significant difference between treatments

* The different letters in each column indicate significant differences between the average of the treatments at ($p < 0.05$)(1) Treatments: First treatment (control) without adding rosemary leaves powder, second, third and fourth treatments: Add the rosemary powder at levels 1, 2 and 3 g, respectively.

powder was significantly ($P < 0.05$) excelled compared to the treatment of 2 g and this treatment did not differ significantly from the birds control treatment and 3 g of rosemary leaves powder. At the age of 6 weeks of the experiment, the treatment of addition of rosemary leaves powder (1, 2 and 3) was significantly ($P < 0.05$) excelled in the average of weight gain compared to the control treatment. The cumulative weight gain was significantly ($P < 0.05$) excelled than all treatments of rosemary leaves powder compared to the control treatment, The cumulative average weight gain for the treatments was 0.0, 1, 2 and 3 g of rosemary leaves powder (1782.95, 2025.50, 1992.83 and 2001.91 g), respectively.

Table 4 indicates the effect of adding the rosemary leaves powder in the ratio of 0.0, 1, 2

Table 3 : Effect of adding different levels of rosemary leaves powder to the ration in the weekly average weight gain (g / bird), age (day).

Treatments	14	28	42	Total weight gain
First treatment (control)	207.96 a±2.62	803.12 ab±6.67	771.87 b±29.18	1782.95 b±38.36
Second treatment	214.21 a±8.21	836.46 a±12.19	974.83 a±8.7	2025.50 a±24.58
Third treatment	221.44 a±12.10	794.29 b±4.92	977.10 a±24.79	1992.83ab±35.29
Fourth treatment	226.50 a±11.45	799.32 ab±19.68	976.09 a±29.21	2001.91 a±38.98
Significant level	**N.S**	*	*	*

NS: No significant difference between treatments

* The different letters in each column indicate significant differences between the average of the treatments at ($p < 0.05$)(1) Treatments: First treatment (control) without adding rosemary leaves powder, second, third and fourth treatments: Add the rosemary powder at levels 1, 2 and 3 g, respectively.

rosemary leaves 1, 2 and 3 g/kg feed and control treatment at the age of two weeks. At the age of four weeks, the second treatment was significantly excelled than 1 g of rosemary leaves powder ($P < 0.05$) compared to 2 g of rosemary powder which did not differ significantly from the control treatment and treatment of 3 g of rosemary leaves powder. At the sixth week of age, the addition of rosemary leaves powder in their three levels was significantly ($P < 0.05$) excelled compared to control treatment. The average weight of the live body at 6 weeks of treatment was 0.0, 1, 2 and 3 g / Kg feed of rosemary leaves powder 1923.95, 2066.50, 2033.89 and 2042.91 g, respectively.

Table 3 shows the average of weight gain for birds of the experiment treatments. The results of the statistical analysis show that there are no significant differences between the control treatment and the treatments of addition of rosemary powder in the average of weight gain at the age of two weeks of the experiment. At the age of 4 weeks, the 1 g treatment of rosemary leaves and 3 g / kg feed in the average of feed consumption for broiler chicks for 1-6 weeks. The results of the statistical analysis did not indicate that there was a significant effect of adding the rosemary leaves powder in the average of feed consumption at ages 2, 4 and 6 weeks of the experiment. The overall average of feed consumption for period 1-6 weeks was 3562.50, 3488.10, 3543.74 and 3436.46 g for the four treatments 0.0, 1, 2 and 3 g/kg feed, respectively, the average of feed consumption for the 3 g treatment was less than the other treatments.

Table 5 shows the effect of adding rosemary leaves powder to the ration in feed conversion efficiency for 1-6 weeks. The results of the statistical analysis showed no significant differences between the treatments in feed conversion efficiency at age 2 and 4 weeks. At the sixth week of the age of birds, the treatments of adding rosemary leaves powder (1, 2 and 3 g) were significantly excelled ($P < 0.05$) in feed conversion efficiency compared to the control treatment (first treatment). The cumulative feed conversion efficiency for 1-6 weeks was significantly

Table 4 : Effect of adding different levels of rosemary leaves powder to the ration in the weekly average of feed consumption (g / bird), age (day).

Treatments	14	28	42	Total feed consumption
First treatment (control)	439.58 a±32.16	1192.19 a±19.51	1930.73 a±15.00	3562.50 a±12.02
Second treatment	382.29 a±11.58	1233.33 a±35.63	1872.48 a±68.73	3488.10 a±10.21
Third treatment	422.91 a±45.53	1139.58 a±32.11	1981.25 a±18.74	3543.74 a±22.70
Fourth treatment	361.46 a±24.96	1153.12 a±31.93	1921.88 a±29.96	3436.46 b±38.98
Significant level	**N.S**	**N.S**	**N.S**	*

NS: No significant difference between treatments

* The different letters in each column indicate significant differences between the average of the treatments at ($p < 0.05$)(1) Treatments: First treatment (control) without adding rosemary leaves powder, second, third and fourth treatments: Add the rosemary powder at levels 1, 2 and 3 g, respectively.

Table 5 : Effect of adding different levels of rosemary leaves powder to the ration in the feed conversion efficiency (g feed/ g weight gain), age (day).

Treatments	14	28	42	Cumulative feed conversion efficiency
First treatment (control)	2.12 a±0.16	1.48 a±0.03	2.51 a±0.11	2.03 a±0.041
Second treatment	1.76 a±0.58	1.47 a±0.06	1.92 b±0.06	1.71 c±0.018
Third treatment	1.93 a±0.27	1.43 a±0.04	2.03 b±0.03	1.79 b±0.030
Fourth treatment	1.55 a±0.18	1.44 a±0.03	1.97 b±0.06	1.65 c±0.017
Significant level	**N.S**	**N.S**	**N.S**	*

NS: No significant difference between treatments.

* The different letters in each column indicate significant differences between the average of the treatments at ($p < 0.05$)(1) Treatments: First treatment (control) without adding rosemary leaves powder, second, third and fourth treatments: Add the rosemary powder at levels 1, 2 and 3 g, respectively.

excelled than that of rosemary leaves powder ($P < 0.05$) compared to control. The cumulative feed conversion efficiency of 0.0, 1, 2 and 3 g/kg feed treatments were 2.03, 1.71, 1.79 and 1.65, respectively. The results showed that the best cumulative feed conversion efficiency was for the 3 g / kg feed treatment of adding rosemary leaves powder. The increasing of average live body weight and weight gain ($P < 0.05$) for the treatments of adding rosemary leaves powder 1, 2 and 3 g / kg feed as shown in tables 2, 3 and no significant differences in average feed consumption as shown in table 4, resulted in the superiority of the treatments of adding rosemary leaves powder at levels 1, 2 and 3 g / kg feed in cumulative feed conversion efficiency compared to control treatment as shown in table 5.

As for the mortality, none of the additive ratios had any significant effect on the percentage of mortality among birds, knowing that the mortality that occurred during the experiment period did not reach 2%. Perhaps due to the significant improvement in the weights of the rosemary birds treatments and the weight gain in levels (1, 2 and 3 g / kg feed) may be due to the role of the rosemary in the regulation of digestion and metabolism to contain its leaves on effective substances Caffeic acid, carnosic acid, borneol and carnosol, which stimulates the secretion of digestive juices in the digestive tract of birds, thus maximizing the utilization of nutrients necessary for the achievement of vital events and chemical reactions to the maintenance and production (Anghout, 2000). The improvement in the cumulative feed conversion efficiency for the birds of the rosemary leaves powder treatment is due to the fact that these additives are catalysts for the growth of the bird through its work as antioxidants on the one hand, as well as the work of the components of rosemary leaves as essential oils and phenolic compounds as antibacterial and fungicidal, which enhance the health of the birds, which reflected on the performance of production.

References

Bassett, R. (2000). Oregano's positive impact on poultry production. *World Poultry*, **16** : 31-34.

Begum, A, S. Sandhya, S. Ali, K. Vinod, S. Reddy and D. Banji (2013). An In-Depth Review on the Medicinal Flora *Rosmarinus officinalis* (LAMIACEAE). *Acta Sci. Pol., Technol. Aliment*, **12(1)** : 61-73.

Duncan , B. D. (1955). Multiplerange and multiple f-test. *Biometrics*, **11** : 1-42.

Hernández, F., J. Madrid, V. Garcý´a, J. Orengo and M. D. Megý´as (2004). Influence of two plant extracts on broilers performance, digestibility, and digestive organ size. Department of Animal Production, University of Murcia, Campus de Espinardo 30071, Murcia, Spain.

Jamroz, D. and C. Kamel (2002). Plant extracts enhance broiler performance. *J. Anim. Sci*., **80** : 41.

Labban, L., U. Mustafa and Y. Ibrahim (2014). The Effects of Rosemary (*Rosmarinus officinalis*) Leaves Powder on Glucose Level, Lipid Profile and Lipid Perodoxation. *International Journal of Clinical Medicine*, **5** : 297-304.

Langhout, P. (2000). New additives for broiler chickens. *World Poult. Elservier*, **16** : 22-25.

Marcus, Donald M. (2002). Education about complementary and alternative medicine focus on Alternative and Complementary Therapies, Vol. **7(1)**, Pharmaceutical press: 1-2.

Mellor, S. (2000). Antibiotics are not the only growth promoters. *World Poultry*, **16 (1)** : 14-15.

National Research Council (NRC) (1994). Nutrient requirement of poultry then. National Academy press. Washington. D. C. USA.

Sarinivasan, K. (1991). Spice as influences of body metabolism an overview of three decades or research. *Food Research International*, **38** : 77-86.

SAS (2010). SAS/ STAT Users Guide for Personal Computers Release 9.1 SAS .Institute Inc. Cary and N.C USA.

Williams, P. and R. Losa (2001). The use of essential oils and their compounds in poultry nutrition. *World Poultry*, **17** : 14-15.