

Comparison Of The Effect Of Using Different Levels Of Local Garlic And Black Seed Powder With The Probiotic In The Diets On The Productive And Quality Traits Of Quail Eggs

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Abstract

This study was conducted to show the effect of comparing the use of different levels of local garlic and black seed powder with the probiotic in the ration on the productive and quality traits of quail. The study was conducted on 160 quail females at the age of 38 days. The birds were housed with batteries. They were randomly distributed to 8 feeding treatments, with 5 replicates for each treatment (4 quail females/repeated). The nutritional treatments were as follows: The first treatment: the basic diet without addition (the ration is control), the second treatment: the basic ration with an addition of 1% of the probiotic, the third treatment: the basic ration with an addition of 1% of garlic powder, and the fourth treatment: the basic ration with an addition of 1.5 % of garlic powder and the fifth treatment: the basic diet with an addition of 1% of the black seed and the sixth treatment: the basic diet with the addition of 1.5% of the black seed and the seventh treatment: the basic diet with the addition of 1% of garlic powder and 1.5% of the black seed and the eighth treatment: the bush Basic with the addition of 1.5% of garlic and 1% of black seed powder. The productive of external and internal qualitative traits of eggs were studied during the experimental period. The results of the statistical analysis indicated a significant improvement ($P<0.05$) in the percentage of egg production, food conversion factor, whiteness index, and the only difference in favor of the T8 treatment. And there was a significant improvement ($P<0.05$) in the characteristics of egg weight and egg mass in treatments T7 and T8. There was a significant different in the egg shape index for treatment T3, T7 compared to treatment T2, T4, T8. And we notice a significant improvement in the specific weight of egg, thickness of shell, relative weight of egg shell, yolk diameter, the diameter of the white in favor of the T5 treatment. We notice a significant increase of T1, T2 treatment in the height of yolk and height of whiteness. It was found that there was a significant improvement in the yolk index compared with T2 treatment. There was a significant superiority in the weight of the yolk compared with treatment T1, T3, T5. And there was a significant improvement in the relative weight of yolk compared with T1 treatment. It was found that there was a significant superiority compared with treatment T2, T4, T6 in the relative weight of white. And there were no significant differences in feed consumption, surface area, yolk color, and white weight between the treatments. The T8 treatment recorded better results than the other treatments with the traits included in the current experiment. It is concluded from this experiment that it is possible to

improve the productive and physiological traits by (adding 1% of black seed powder + 1.5% of garlic powder) to the diets.

Keywords: Garlic, black seed, probiotic

Introduction

Recently, scientific research focused on medicinal plants and herbs and their extracts in the poultry industry, which work to improve nutritional efficiency and improve the performance of birds, whether for meat or egg production, as well as improving the quality of carcass and the quality of eggs produced in general (Al-Zuhairi, 2010). And the continuous use of synthetic antibiotics has caused the emergence of resistant microbes (Grashorn, 2010) and the probiotic is beneficial microorganisms (bacteria - fungi - yeasts) that work on the balance of microorganisms in the intestinal tract leading to the production of B group vitamins and digestive enzymes and improve growth and factors Nutritional conversion and increased protection against pathogenic bacterial toxins (Fuller, 1989_ Sellars, 1991_ Dhingra, 1993_ Sherif, 2000_ Soliman et al., 2003_ Kumar et al., 2003_ Abaza et al. 2008). Therefore, a large number of medicinal plants were introduced into the feeding of laying hens and broilers, including black seed (Al-Nadawi, 2003) and garlic powder (Ahmed, 2002 and Al-Hamdani, 2005), as many diverse medical preparations were produced to control some diseases that afflict humans, such as ulcers (Ahmed, 2002), hypertension and diabetes mellitus (Abdul Wahid, 2000) and for the treatment of allergic diseases and skin problems (Schleicher and his colleague, 2002). One of these plants is garlic (*Allium sativum*.L), where garlic is a growth stimulator and has a role in raising the total protein of the serum and as an alternative to fungal antibiotics and toxins and in reducing cholesterol and triglycerides in blood serum and egg cholesterol (Hussain, 2004). Able to be deposited in the liver, muscle and body tissues. As for the black bean (*Nigella sativa*), it is considered one of the important sources of protein as well as containing many nutrients and minerals such as crude fat, phosphorous, calcium, manganese and sodium (Abu El-soud, 2002). The quail is considered one of the birds that is characterized by rapid growth, high representation of food, small weight, size and early sexual maturity, and this is what distinguishes it from chickens from an economic point of view because its feed needs are few and can be bred in a small area unit and in addition to the short generation period as it can be marketed at the age of 6-5 weeks of age (Jassim 2011_Hrncar et al., 2014). Quail meat is also distinguished by its good taste and nutritional properties that increase consumers' interest in this product, as well as low moisture loss, which helps in its easy marketing (Genchev et al., 2005, 2008, 2010), and at this point, black bean and garlic were introduced to quail's ration to study its effect on productive traits. The physiology and quality of eggs and carcass.

Materials and working methods

This research was conducted in the poultry field of the Department of Animal Production / College of Agriculture / Kirkuk University for the period from 15/11/2020 until 15/1/2021. In this study, 160 quail females that were prepared from one of the private fields in Kirkuk governorate at the age of 38 days were used and they were fed on the standardized diet shown in Table (1) for 10 days until the beginning of the experiment and after 10 days they were randomly distributed to 8 experimental treatments with 5 replicates for each treatment (4 females/duplicate) The

birds were housed in a semi-enclosed hall containing batteries of four floors, each floor containing 3 cages with dimensions (20 * 30 * 40) cm length, width and height, respectively for one cage. The hall was equipped with drawers to renew the air and get rid of excess moisture. Batteries were equipped with water and feeding was free to the birds throughout the 60-day experiment period, which was divided into 4 periods each period is 15 days. The feeding treatments were as follows: the first treatment: basic diet control (free of additives) and the second treatment: basic diet + 1% probiotic and treatment The third: basic diet + 1% garlic powder, the fourth treatment: basic diet +1.5% garlic powder, the fifth treatment: basic diet + 1% black seed powder, the sixth treatment: basic diet +1.5% black seed powder, and the seventh treatment: basic diet + 1% powder Garlic +1.5% black seed powder and the eighth treatment: basic diet +1.5% garlic powder + 1% black seed powder .

Table (1) shows the Composition and chemical analysis of the diets.

Feed material	Percent %
Crushed wheat	19.70
Crushed corn	38.85
Soybean	30
Sunflower oil	3
Limestone	5.50
Di Calcium Phosphite	2.00
Choline chloride	0.25
Salt	0.20
Mixed vitamins and minerals	0.10
Del – methionine	0.25
L-Lysine	0.15
Calculated chemical composition	
Represented energy	2857
Raw protein	19.96
Lysine	1.197
Methionine	0.55
Calcium	3.075
Phosphor	0.632

Some productive characteristics represented by feed consumption and food conversion factor were studied according to the equation mentioned by Ibrahim (2000) and the percentage of eggs produced, egg mass, egg shape index, egg specific weight, egg surface area, yolk diameter, and egg diameter were calculated according to the equation mentioned (Al-Fayyad et al., 2011). The weight of eggs, shell weight, yolk weight, relative weight of yolk, weight of white and the relative weight of the white were measured using a sensitive balance. The yolk index and the white index were calculated according to the treatment mentioned by Al-Naji et al., (2008) and the yolk height and white height were calculated by electronic micrometer measuring machine. The color of yolk was measured by means of a hand-held plastic fan. The unit of hue was calculated

according to equation mentioned by Nesheim et al. (1979). Statistical analysis of data for the experiment was carried out using the Complete Randomized Design (CRD) and the differences between the means were compared using Duncan's multiple range tests (Duncan ' s1955).

Results and discussion

The results presented in Table (2) showed that there are no significant differences in the amount of feed consumed between addition treatments compared to the control diet. It was noticed that there was a significant superiority (p<0.05) for T8 treatment in the percentage of egg production compared with either treatments. The improvement in the percentage of egg produced may be due to the synergistic effect of garlic powder and black seed powder, and to the black d seeds containing the active compounds found in volatile oils such as (thymoquinoline, volatile oils, Di thymoquinoline) and it is considered the best alternative to the antibiotic (Guler et al., 2006). Perhaps the moral improvement that occurs when garlic powder is added to the vitamin A present in garlic is due to Al-Khazraji (2002) that vitamin A works to maintain egg production and increase the number of egg produced. It is noted that there are significant differences (p<0.05) between the treatments in egg weight and egg mass, as there is a significant improvement for T7, T8 treatment compared with either treatments. It was concluded that the T8 treatment was significantly increase (p<0.05) with either treatments in food conversion factor, and this was attributed to the active compounds in black seed (Thymoquinon, Nigellone) stimulate the thyroid gland to secrete the hormone thyroxine, which is important in the metabolism process in general and especially Protein metabolism , and the fact that garlic contains many important nutrients and vitamins may be attributed to the presence of B vitamins, vitamins A, E, and others, where Bollengier-Lee et al (1998) reported that vitamin E improves the feed conversion factor.

Table (2) Effect of adding probiotic, black seed powder and garlic and their mixture to the diet on average body weight (g/bird), feed consumption rate (g/bird/day), egg production rate (HD) %, egg weight rate (g) , egg mass (grams/bird/day) and feed conversion factor (g/g eggs) for quail. (mean ± standard error).

feed conversion factor (g/g eggs)	Egg Mass (grams/bird/day)	Egg weight rate(g)	Egg production H.D%	Feed consumption rate (g/bird/day)	Transactions
0.079±2.79 ab	0.102±8.42 b	0.247±11.42 b	1.157±73.89 b	0.404±23.52	T1
0.154±2.72 ab	0.121±8.10 bc	0.147±11.46 b	0.492±70.71 d	1.418±22.14	T2
0.072±2.91 a	0.209±7.85 c	0.200±11.18 b	0.961±70.18 d	0.194±22.83	T3
0.093±2.88 a	0.142±7.98 bc	0.164±11.13 b	0.546±71.74 cd	0.612±22.99	T4
0.069±2.86	0.187±8.05	0.255±11.30	0.418±71.25	0.380±23.02	T5

a	bc	b	cd		
0.048±2.78 ab	0.132±8.10 bc	0.193±11.24 b	0.668±72.11 cbd	0.397±22.59	T6
0.083±2.54 b	0.166±9.12 a	0.176±12.46 a	0.348±73.20 bc	0.704±23.23	T7
0.058±2.27 c	0.157±9.47 a	0.174±12.31 a	0.352±77.0 a	0.214±21.56	T8

The different letters within the same column indicate the presence of significant differences at the probability level ($P < 0.05$). T1: control treatment without additives, T2: control treatment + 1% of the probiotic, T3: control treatment +1% of garlic powder, T4: control treatment +1.5% garlic powder, T5: control treatment +1% of black seed powder Of garlic powder, T6: control treatment + 1.5% of black seed powder, T7: control treatment + 1.5% of black seed powder + 1% of garlic powder, T8: control treatment + 1% of black seed powder + 1.5% of garlic powder.

In Table (3) we notice a significant difference ($P < 0.05$) in the egg shape index between treatments, as T3 (adding 1% of garlic powder) and T7 (adding 1.5% of black seed powder + 1% of garlic powder) outperformed compared with T2, T4, T8 and did not differ significantly with treatments T1, T5, T6. It was noted that there were no significant differences between the treatments in surface area of egg, and there were significant differences between treatments ($P < 0.05$) in the specific weight of the egg, where the T5 treatment (containing 1% of black seed powder) significantly outperformed the treatments T1, T2, T7, T8 and did not significantly differ with the treatments T3, T4, T6. We notice a significant superiority ($P < 0.05$) for treatment T5 in the thickness of the egg shell significantly compared with treatments T1, T2, T3, T4, T6, T8 and it did not differ significantly with treatment T7. As well as a significant superiority ($P < 0.05$) for treatment T5 in the relative weight of egg shell compared with treatments T1, T2, T6, T8 and it did not differ significantly with treatments T3, T4 and T7.

Table (3) effect of using the probiotic, garlic powder and black seed and their mixture in the diet on the egg shape index, surface area, specific weight of the egg, thickness of the shell and the relative weight of the shell in a diet of quail. (mean ± standard error).

Shell weight ratio	Eggshell thickness	Specific Weight of the egg	Surface area (cm ³)	Egg shape guide	Transactions
0.234±10.10 d	0.003±0.22 b	0.002±1.087 b	0.406±24.86	0.293±77.51 ab	T1
0.108±10.24 cd	0.008±0.21 b	0.001±1.089 b	0.236±24.34	0.173±76.47 c	T2
0.180±10.64 abcd	0.007±0.21 b	0.002±1.091 ab	0.326±24.46	0.215±78.13 a	T3
0.103±11.11	0.006±0.22	0.001±1.092	0.554±24.71	0.324±77.02	T4

ab	b	ab		bc	
0.251±11.20 a	0.004±0.24 a	0.002±1.097 a	0.420±24.67	70.247±77.61 ab	T5
0.189±10.61 bcd	0.003±0.21 b	0.0017±1.091 ab	0.318±24.56	0.229±77.39 ab	T6
0.166±10.78 abc	0.007±0.22 ab	0.000±1.089 b	0.267±25.20	0.261±77.68 a	T7
0.157±10.37 cd	0.005±0.21 b	0.002±1.090 b	0.294±24.58	0.160±76.98 bc	T8

The different letters within the same column indicate the presence of significant differences at the probability level ($P < 0.05$). T1: control treatment without additives, T2: control treatment + 1% of the probiotic, T3: control treatment +1% of garlic powder, T4: control treatment +1.5% garlic powder, T5: control treatment +1% of black seed powder Of garlic powder, T6: control treatment + 1.5% of black seed powder, T7: control treatment + 1.5% of black seed powder + 1% of garlic powder, T8: control treatment + 1% of black seed powder + 1.5% of garlic powder

The results in Table (4) indicate that there was a significant difference ($P < 0.05$) between the treatments in yolk diameter, where treatments T4 recorded the lowest average yolk diameter, followed by treatments T2 and T7 compared with either treatments. We note that there is a significant superiority ($P < 0.05$) in the Yolk height in favor of two treatments T1, T2 compared to treatment T6 and it did not differ significantly with either treatments. As for the yolk index, treatment T2 recorded the highest yolk index rate, which outperformed treatments T3, T5, T6, T7, T8 and did not differ significantly with the two treatments T1, T4 . We note that there were significant differences ($P < 0.05$) in the weight of yolk between the treatments, where the treatment T1, T3, T5 was significantly superior compared with treatment T4 and did not differ significantly in treatments T2, T6, T7, T8. As for the relative weight of the yolk, there were differences ($P < 0.05$), in T1 significantly outperformed the treatments T2,T4,T6,T7,T8 and did not differ significantly with the two treatments T3,T5. We note that there are no significant differences between the treatments in the color of the yolk .

Table (4) The effect of using the probiotic, black seed powder, garlic powder and their mixture in a ration on (yolk diameter, yolk height, yolk index, yolk weight, yolk relative weight, yolk color) of quail. (average ± standard error).

Yolk color	Yolk weight ratio%	Yolk weight(g)	Yolk guide	Yolk height (mm)	Yolk diameter(mm)	Transactions
0.289±3.55 a	0.168±34.36 a	0.179±3.93 a	0.366±52.63 ab	0.247±13.29 a	0.098±25.48 ab	T1
0.244±3.65 cd	0.322±32.87 cd	0.113±3.73 ab	0.253±52.84 a	0.106±13.22 a	0.098±25.01 bc	T2
0.169±4.1 ab	0.210±33.98 ab	0.126±3.93 a	0.400±51.53 cd	0.237±13.06 ab	0.280±25.35 ab	T3

0.111±3.75	0.391±31.39 e	0.076±3.53 b	0.342±52.22 abc	0.182±12.77 ab	0.212±24.43 d	T4
0.150±3.9	0.213±33.93 ab	0.069±4.07 a	0.348±50.96 de	0.169±13.01 ab	0.170±25.61 a	T5
0.209±4	0.085±32.30 d	0.099±3.75 ab	0.338±49.13 f	0.141±12.44 b	0.247±25.32 ab	T6
0.169±3.65	0.094±32.73 cd	0.079±3.70 ab	0.221±51.84 bcd	0.281±12.82 ab	0.096±24.72 cd	T7
0.061±3.9	0.341±33.24 bc	0.124±3.84 ab	0.173±50.32 e	0.155±12.78 ab	0.162±25.45 Ab	T8

The different letters within the same column indicate the presence of significant differences at the probability level ($P < 0.05$). T1: control treatment without additives, T2: control treatment + 1% of the probiotic, T3: control treatment +1% of garlic powder, T4: control treatment +1.5% garlic powder, T5: control treatment +1% of black seed powder Of garlic powder, T6: control treatment + 1.5% of black seed powder, T7: control treatment + 1.5% of black seed powder + 1% of garlic powder, T8: control treatment + 1% of black seed powder + 1.5% of garlic powder

The results of the statistical analysis in Table (5) indicate that there is a significant difference ($P < 0.05$) between the treatments in the height of whiteness, where the treatments T1, T2 significantly outperformed the treatments T4, T6, T7 and did not differ significantly with the treatments T3, T5, T8. It was found that there were significant differences between the treatments in diameter of white, where the treatment T7 recorded lowest diameter of whiteness compared to the treatments T1, T2, T3, T4, T6 and it did not differ significantly with treatment T8. As for the whiteness index, T8 treatment was significantly superior to treatment T3, T4, T5, T6, T7 and did not differ significantly with treatment T1, T2 . We note that there are no significant differences between the treatments in the weight of whites. We note that there are significant differences ($P < 0.05$) in relative weight of white, as treatment T2,T4,T6 was significantly superior compared to treatment T1,T3,T5 and did not differ significantly with treatments T7,T8. We note that there was a significant difference ($P < 0.05$) in the hue unit significantly on the treatments T2, T3, T4, T5 and it did not differ significantly with the treatments T1, T6, T7.

Table (5) Effect of using the probiotic, black bean powder and garlic powder in a ration on (whiteness height, egg diameter, whiteness index, egg weight, relative weight of white, and hue unit) of quail. (mean ± standard error).

Hue unit	White weight ratio	White weight (g)	Whiteness guide	White diameter(m m)	High whiteness(m m)	Transactions
1.161±91.83 ab	0.409±55.52 bc	0.114±6.34	0.107±16.53 ab	0.334±40.68 c	0.077±6.60 a	T1
0.517±90.10 b	0.425±56.80 a	0.083±6.47	0.192±16.48 ab	0.154±41.36 b	0.099 ±6.67 a	T2

1.463±88.90 b	50.407±55.37 bc	0.107±6.42	0.182±16.05 bc	0.191±41.61 b	0.029±6.45 ab	T3
1.034±90.35 b	0.299±57.49 a	0.107±6.48	0.182±15.74 cd	0.289±40.58 cd	0.055±6.25 b	T4
1.531±89.04 b	0.394±54.86 c	0.109±6.57	0.171±15.34 d	0.074±42.68 a	0.072±6.35 ab	T5
1.132±90.85 ab	0.194±57.07 a	0.131±6.64	0.181±13.78 e	0.178±41.74 b	0.167±5.67 c	T6
0.475±91.96 ab	0.340±56.39 ab	0.061±6.41	0.156±16.16 bc	0.113±39.68 e	0.147±6.27 B	T7
0.194±93.70 a	0.469±56.37 ab	0.043±6.55	0.124±16.70 a	0.095±40.04 ed	0.086±6.47 ab	T8

The different letters within the same column indicate the presence of significant differences at the probability level ($P < 0.05$). T1: control treatment without additives, T2: control treatment + 1% of the probiotic, T3: control treatment +1% of garlic powder, T4: control treatment +1.5% garlic powder, T5: control treatment +1% of black seed powder Of garlic powder, T6: control treatment + 1.5% of black seed powder, T7: control treatment + 1.5% of black seed powder + 1% of garlic powder, T8: control treatment + 1% of black seed powder + 1.5% of garlic powder

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