Effect of adding different level of Bay laurel (Laurus nobilis L.) powder to diet on productive performance and some physiological traits for female Quail

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Abstract. This study was conducted at the Poultry Research Station, Animal Resources Research Department at the Agricultural Research Department / Ministry of Agriculture - Baghdad Abu Ghraib. To find the effect of adding different proportions of Bay Laurus powder on productive performance and some physiological characteristics of birds during the production stage as Eight Hundreds Female birds of quail were used at the age of 45 days, randomly deployed to 4 treatments with two replicates (100 birds / replicate ) each, and the bay laurel powder was added in the proportions 0.0, 0.5, 1.0, and 1.5% to the diets and for a period of 60 days divided into 4 periods of 15-day .The results indicated significant improvement in the productive performance of birds during different feeding periods. An improvement in egg production was evident on the base of H.D% for T 2 and T 4 treatments during the second, third and fourth periods of breeding. Also, the improvement was evident in the egg mass for T 1 (control treatment) in the second and third periods and T 3 during the fourth period. The T 4 treatment continued its significant improvement during the second, third and fourth periods, the feed consumption decreased for all addition treatments in the fourth period and the food conversion ratio and the cumulative eggs number (egg, bird, period) where improved for the T 4 treatment throughout the four trial periods. The level of total protein and globulin increased significantly in the fourth treatment, and the level of globulin for the second and fourth treatments increased compared to the rest of the treatments. We conclude from this study the possibility of adding 0.5-1.5 % feed of Bay laurel powder to the diet to obtain a positive improvement on the productive and physiological performance for female Quail bird.

1. Introduction

The purpose of new global trend were to the reducing the use of antibiotics and chemicals compounds in the poultry industry so the researchers work to find modern sources of growth stimulators and anti-inflammatory, including medicinal herbs that were distinguished by containing active substances that have the ability to influence immunity and performance in birds [1] such as Laurus nobilis L. which Its classification is due to the following: Family (Lanraceae), Genus (Laurus), Species (L. nobilis).

These leaves can be used in poultry feeding to increase the secretion of gastric juice and thus to stop negative digestion [2]. This is due to its anti-fungal and bacterial role [3and 4] because it contains the active substances Kaempferol, Myricetin, Cisole, Eugenol, Terpenol, Luteolin Apigenin, [5 and 6]. The bay leaf is a green tree found in the Mediterranean [7]. The methanolic extracts of this plant contain phenols and flavonoids and have an antioxidant activity against lipid peroxide[8]. The essential oils in the leaves range from 0.8-3% and most of them contain 1–8 cineol (more than...
50%) and also contain (eugenol, acetyl, methyl, engenol, pinene, phellandrene, linalool, jeraniol, terpineol [9 and 10] indicated that the use of bay laurel at levels 2 and 4 g / kg feed did not affect the productive performance and measurements of egg quality for quail birds and the same researcher[10] concluded that adding levels 2 and 4 g / kg feed of bay laurel reduces the content of value of Malondialdehyde (MDA) in chest meat stored in the refrigerator at 4 Celsius for a period of 8 days. The use of levels 2, 4 and 6 g of bay laurel / kg of feed in meat broiler diets for a period of 35 days showed a decrease in the number of coliform bacteria by increasing the levels of bay laurel in the diet [11]. As for the use of 3 and 6 g / kg of bay laurel / kg of feed in meat broiler diets showed an increase in body weights, rate of weight gain and an improvement in the feed conversion ratio compared to the control treatment of bay laurel [12]. Therefore, this study aimed to use different proportions of bay laurel powder in the diet of quail birds to find out their effect on productive performance and some physiological characteristics of quail during the egg production stage.

2. Materials and Methods
This study was conducted in the poultry field of the Agricultural Research Station / Ministry of Agriculture for the period from 19/3/2019 to 19/5/2019 using 800 birds of quail birds at the age of 45 days and randomly distributed to four treatments with two replicates (100 birds / per replicate) these treatments included the addition of the proportions 0.0, 0.5, 1.0, 1.5% of bay laurel powder to the diets for a period of 60 days distributed to four periods each period of 15 days. These birds were fed on one diet, to which the above-mentioned levels were added to it, and according to the experiment treatments during the study period (Table No. 1).

| Types of diets             | Percentage % |
|----------------------------|--------------|
| Soybean cake used an Argentine source of crude protein content by 48% and 2440 Kcal/ Kg M.E. |              |
| Protein Meal 1             | 26           |
| Hydrogenated Vegetable Fat | 1.2          |
| Dicalcium Phosphate        | 5.5          |
| NaCl                       | 0.3          |
| Total                      | 100          |

Table 1. Feed components included in the composition of the diet and the calculated chemical analysis of the diet of quail birds during the period of egg production.

| Chemical Calculated Values2 | M.E. Kcal/ Kg Diet | 2905  |
|----------------------------|--------------------|-------|
| Crude Protein %            | 20.2               |
| Fat %                      | 3.9                |
| Crude Fiber %              | 2.6                |
| Lysine, %                  | 1.13               |
| Methionine Plus Cysteine % | 0.76               |
| Ca %                       | 2.5                |
| Available P %              | 0.72               |

1Soybean cake used an Argentine source of crude protein content by 48% and 2440 Kcal/ Kg M.E.
2Protein Meal User Product From Netherlands Origin (Brocon) Contain 40% Crude Protein 0.2107 Kcal / Kg Protein M.E., 0.5% Crude Fat 2.20% Crude Fiber 5%, Calcium 4.68%, Phosphorus 3.85%, Lysine 4.12%, Methionine 4.12%, Methionine Plus Cysteine 0.42%, Tryptophan 0.38%, Threonine 1.70.
3[13]
The productive characteristics of egg production, egg mass, quantity of consumed feed, feed conversion ratio, cumulative number of eggs were studied. At the end of the experiment, 9 birds for each treatment (3 birds / replicate) were chosen, blood drew from the pterygoid vein, placing it in tubes without anticoagulant, separating the serum using a 3000X speed centrifuge for 10 minutes under room temperature and stored at a temperature of -20 °C until the proceeding the following analyzes: Total protein, albumin, globulin, cholesterol, triglycerides, VLDL, HDL and LDL. Statistical analysis was conducted according to the complete random design (CRD) to study the effect of different treatments according to the statistical program [14]. The significant differences were compared using Duncan test [15].

3. Results and Discussion

The results of Table (2) showed a significant increase in egg production on the base of HD% for the adding treatment 0.5 and 1.5% of the bay laurel powder for the second, third and fourth periods (ages 75, 90 and 105 days) followed by the third treatment, which recorded a significant increase in egg production in All trial periods, compared to the comparison treatment, free from any addition. As for the egg mass, the second treatment (0.5% bay laurel powder) recorded a significant increase during the second and third periods compared to the first and fourth treatments. As for the third treatment, adding 1% of the bay laurel powder significantly increased the Eggs Mass for the fourth period Compared with other periods.

Whereas, the addition treatment of 1.5% of the Bay laurel powder showed a significant increase in the egg mass for the second, third and fourth periods compared to the first period. As for the status of the consumed feed, the addition of 1.5% of the bay laurel powder in the fourth treatment, in which in it the feed consumption decreased in the first period. As for the second period, the decrease in feed consumption was in the second treatment, and in the third period, feed consumption decreased significantly for control treatment. In the fourth period of the experiment, the significant decrease in feed consumption occurred in all treatments of addition of bay laurel powder, In the feed conversion ratio, the control treatment significantly decreased in comparison with other trial treatments and for all periods, but the fourth treatment improved significantly in the feed conversion ratio and in the four trial periods. Regarding the cumulative number of eggs (egg / bird / period), the fourth treatment (1.5% bay laurel powder) showed a significant increase over the rest of the treatments and for the four periods of the experiment (Tabel 3).

Table (2). The effect of adding different levels of Bay laurel powder to the diet on egg production ratio (H.D%) and the egg mass (gm) during the egg production period for quail birds.

| Period 14 d | Treatment | T₁ | T₂ | T₃ | T₄ |
|-------------|-----------|----|----|----|----|
| Hen Day (H.D) % | | | | | |
| 1 | 71.29±2.66<sup>c</sup> | 74.57±3.17<sup>b</sup> | 75.14±1.86<sup>b</sup> | 78.95±1.44<sup>a</sup> |
| 2 | 70.81±1.59<sup>c</sup> | 79.67±2.92<sup>a</sup> | 75.43±3.33<sup>b</sup> | 81.48±2.03<sup>a</sup> |
| 3 | 71.38±2.96<sup>c</sup> | 81.76±3.30<sup>a</sup> | 76.14±3.52<sup>b</sup> | 85.76±3.74<sup>a</sup> |
| 4 | 70.94±1.85<sup>c</sup> | 84.43±2.39<sup>a</sup> | 78.90±2.03<sup>b</sup> | 87.19±1.54<sup>a</sup> |
| EGG Mass g | | | | |
| 1 | 135.34±3.52<sup>c</sup> | 154.28±2.64<sup>a</sup> | 149.14±5.47<sup>b</sup> | 149.7±3.44<sup>b</sup> |
| 2 | 143.7±4.68<sup>c</sup> | 179.34±4.23<sup>a</sup> | 173.52±3.15<sup>b</sup> | 5.25±181.32<sup>a</sup> |
| 3 | 142.12±4.19<sup>c</sup> | 189.04±2.42<sup>a</sup> | 163±3.56<sup>b</sup> | 186.32±5.13<sup>a</sup> |
| 4 | 138.64±3.98<sup>b</sup> | 141.34±3.15<sup>b</sup> | 170.1±3.51<sup>a</sup> | 184.66±3.47<sup>a</sup> |

<sup>abc</sup>Means in the same row with different superscripts were significantly different (P<0.05).

* treatment mean T₁:control without adding, T₂,T₃ and T₄: (0.5 ,1, 1.5 % Bay laurel powder).
Table (3). The effect of adding different levels of Bay laurel powder to the diet on feed intake, feed conversion ratio and Cumulative egg count during the egg production period for quail birds.

| Period | Treatment | Feed intake g | FCR | Cumulative egg count |
|--------|-----------|---------------|-----|---------------------|
| 14 d   | T1        | 362.66±3.29   | 2.68±1.52  | 9.98±0.10         |
|        | T2        | 344.12±4.58   | 2.23±0.03  | 10.44±0.36        |
|        | T3        | 336.32±3.15   | 2.14±0.02  | 10.52±0.23        |
|        | T4        | 317.04±4.96   | 2.21±0.13  | 11.05±0.08        |
| 2      | T1        | 397.34±4.68   | 2.77±0.33  | 9.91±0.30         |
|        | T2        | 367.14±4.18   | 2.05±0.09  | 11.15±0.20        |
|        | T3        | 370.92±2.99   | 2.26±0.02  | 10.56±0.38        |
|        | T4        | 375.86±4.23   | 2.21±0.01  | 10.56±0.26        |
| 3      | T1        | 359.12±5.67   | 2.33±0.03  | 9.99±0.26         |
|        | T2        | 390.34±5.13   | 2.06±0.02  | 11.45±0.28        |
|        | T3        | 360.02±4.92   | 2.21±0.01  | 10.66±0.24        |
|        | T4        | 376.66±5.26   | 2.21±0.13  | 12.01±0.20        |
| 4      | T1        | 402.64±3.51   | 2.90±0.29  | 9.93±0.13         |
|        | T2        | 377.32±3.36   | 2.67±0.03  | 11.82±0.23        |
|        | T3        | 376.56±3.44   | 2.21±0.13  | 11.05±0.36        |
|        | T4        | 378.42±3.11   | 2.05±0.05  | 12.21±0.21        |

abcMeans in the same row with different superscripts were significantly different (P<0.05).
* treatment mean T1: control without adding, T2, T3 and T4:(0.5, 1, 1.5 % Bay laurel powder).

and table (4) shows a significant decrease in the third treatment (1.0% bay laurel powder) in comparison with the second and fourth treatment, which did not differ significantly from the third treatment on one hand, and the first treatment on the other. As for the level of total protein and globulin, it increased significantly in the fourth treatment in the level of total protein and the second and fourth treatments for the level of globulin level compared to the rest of the treatments. The improvement in the productive characteristics and in the protein level of the treatment that 1.5% of the Bay laurel powder has been added to its diets, may be medical phenolic substances such as Eugenol, terpenol, and cineole, which have an effective anti-bacterial and anti-fungal role [4].

Table (4) the effect of adding different levels of Bay laurel powder to the diet on Lipid profile, Total protein, Albumin and Globulin for blood serum quail birds.

| Traits     | Treatment | Sg |
|------------|-----------|----|
| Cholesterol| T1: 164.16±3.16 | 154.63±3.13 |
|            | T2: 148.83±4.16  | 139.63±5.14 |
|            | T3: 141.96±2.90  | 154.63±3.13 |
| Triglyceride| T1: 151±3.55 | 5.40±0.16 |
|            | T2: 152.83±2.67 | 6.11±0.16 |
|            | T3: 141.96±2.90 | 7.65±0.14 |
| HDL        | T1: 37.45±1.90 | 3.38±0.17 |
|            | T2: 33.0±0.75  | 3.27±0.14 |
|            | T3: 32.20±2.35 | 3.01±0.14 |
| LDL        | T1: 4.63±96.51 | 2.02±0.29 |
|            | T2: 6.67±85.26 | 2.84±0.21 |
|            | T3: 4.67±79.03 | 4.64±0.15 |
| VLDL       | T1: 30.20±71  | * |
|            | T2: 30.56±1.13 | * |
|            | T3: 28.39±0.58 | * |
|            | T4: 28.53±0.51 | * |
| Total Protein| T1: 5.40±0.16 | 5.40±0.16 |
|            | T2: 6.11±0.16  | 6.11±0.16 |
|            | T3: 7.65±0.14  | 7.65±0.14 |
| Albumin    | T1: 3.38±0.17  | 3.38±0.17 |
|            | T2: 3.27±0.14  | 3.27±0.14 |
|            | T3: 3.01±0.14  | 3.01±0.14 |
| Globulin   | T1: 2.02±0.29  | * |
|            | T2: 2.84±0.21  | * |
|            | T3: 4.64±0.15  | * |
|            | T4: 4.77±0.13  | * |

abcMeans in the same row with different superscripts were significantly different (P<0.05).
* treatment mean T1: control without adding, T2, T3 and T4:(0.5, 1, 1.5 % Bay laurel powder).
It may also reinforce the growth of Lactobacilli and reduce E. coli in the intestine and this may improve overall health and nutritional elements readiness and performance in poultry when using bay laurel that contain a high amount of minerals and that are related to the effectiveness of enzymatic systems in the liver [16]. In addition to Phenols As a source of antioxidants, and it increases the effectiveness of antioxidant enzymes such as catalyzes (CAT), peroxidase (PX), superoxidase (SOD) and ascorbate peroxidase (APX) and so this is reflected in the improvement of the bird’s internal environment. Villi may improve productive performance. The significant improvement in productive and physiologic performance in the bay laurel treatment may be due to the high phenolic compounds [16].

Improved general health of the birds and increased hen day (HD), Egg mass, feed intake may be attributed to the contribution of active compounds (Kaempferol, Myricetin, Cinole, Eugenol, Terpenol, Luteolin Apigenin) in Bay Laurel to increasing numbers of beneficial bacteria in the intestine (Lactobacillus) [5-6]. bay laurel rich in phenolic compounds which acts as vital precursor, increases the numbers of beneficial bacteria Lactobacillus and taking advantage of the products of these beneficial bacteria, such as organic acids, the most important of which are lactic acid, which is the source of energy for intestinal cells and increases their activity and divisions, thereby increasing the length of villi and increasing the surface area to absorption the digested nutrients [16].

Conclusion
We conclude from this study the possibility of adding 0.5-1.5 % feed of Bay laurel powder to the diet to obtain a positive improvement on the productive and physiological performance for female Quail bird.

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