Comparison the Effect of Adding Waterly Extract of Black Seeds (Nigella Sativa), Chamomile and Fenugreek with Drinking Water on Productive Performance for Broiler

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Abstract
The present study was conducted to compare the effect of adding waterly extract of black seeds (Nigella Sativa), chamomile and fenugreek seeds individually with drinking water on the productive performance of broilers, the addition started from the age of 8 days. It used 180 unsexed chicks from the Ross 308 strain and randomly distributed the chicks to 4 treatments. The Control treatment where drinking water was provided to the birds free of any addition. T1- Treatment of addition of watery extract of Nigella Sativa with bird drinking water. T2- Treatment of adding watery extract of chamomile with bird drinking water. T3- Treatment of adding watery extract of fenugreek with bird drinking water. The results of the statistical analysis indicated that there was a significant improvement in the rate of final live body weight, the rate of weight gain and feed consumed for T1 and T2 treatments. There were no significant differences among treatments in the feed conversion ratio, there was no mortality of chicks during duration of the experiment.

Key words : waterly, extract black seeds, chamomile, fenugreek and broiler.

1. Introduction
The orientation of researchers in the scope of poultry feeding towards studying some non-food additives has had a great impact in supporting the physiological and productive status of birds, these additions are types of plants that have a medicinal characteristic for some diseases that have been called medicinal herbs because the industrial medicines have side effects on the physiological and health status. To avoid these effects, the trend began to use these medicinal herbs that contain many effective compounds with few side effects on health, especially with diseases that accompanied the progress made on the poultry industry in comparison with chemically manufactured drugs [1]. Where plant watery extracts are distinguished by having a stimulating effect on the digestive system of animals and poultry, as they improve the function of organs, especially the liver, this leads to an increase in digestive enzymes that increase the utilization of food intake and meet the body's need for nutritional components [2]. It is also characterized by being antimicrobials, natural antioxidants and also works to raise the body's immunity by stimulating the immune system, therefore, medicinal plants began to occupy a distinguished and large place in the global agricultural production because of the natural chemicals they contain, which are of great interest and importance in their physiological effect, their therapeutic activities for humans and animals. Scientific studies have proven that the products derived from these plants have the ability to cure many diseases and eliminate their symptoms [3].

One of these plants is the black seed (Nigella Sativa), which is characterized by being rich in nutrients, vitamins, multiple sugars and volatile and fixed oils. Black seeds also contain lactins that are able to resist bacteria, yeasts and viruses. It also reduces blood sugar in human and animals and a substance that helps in digestion and Anti-inflammatory as well as it has an anti-fungal and anti-gas activity [4]. Among the medicinal plants that have many uses are the chamomile flower, which is used in the treatment of wounds and dermatitis. Chicken Pox and in lowering body temperature. As well as its anti-microbial and pathogenic effects, reduces stomach pain, has positive effects on the digestive and respiratory systems. It has an important role in enhancing immunity and reducing oxidative stress [5-7].

The fenugreek which is one of the herbal plants rich in protein, phosphorous and starchy materials, in addition to using its seeds since ancient times due to its pharmacological effectiveness [8], noted [9] that the use of fenugreek seeds in the of laying hens diet has led to an improvement in productive performance. indicated [8] that the fenugreek increased the
appetite of birds to consumption food and therefore an increase in the average body weight of the body. The aim of this study is to try to improve the productive performance of broiler by using the watery extract of these medicinal plants.

2. Materials and Methods

This study was carried out at the field of poultry breeding in the Faculty of Agriculture, University of Al-Qadisiyah, for the period from 1 March 2019 to 15 April 2019. It was used One hundred and eighty unsexed one day old broiler chicks type Ross 308, average weight of 41.5g. The chicks were randomly distributed to 4 treatments with 3 replicates for each treatment. Each treatment included 45 chicks and each repeater consisted of 15 chicks. Special programs were used for vaccination of birds and health care as recommended in the broiler guide, as the chicks were kept for a period of 35 days.

The chicks were fed from the age of 1 to 18 days on a starter diet and then fed on a growth diet afterwards until the age of 35 days. Table 1 shown the diets which fed to birds in starter and grower. Chicks were kept in floor cages under similar managerial and hygienic conditions in a close house. Water and diets were given ad libitum throughout the whole experimental period. The brooding temperatures were 33°C, 30 °C, 28°C, 24°C and 22°C during the 1st, 2nd, 3rd, 4th and 5th weeks of age respectively. The lighting regimen was 23:1 light-dark cycle. The seeds of these medicinal plants (Nigella Sativa, chamomile and fenugreek) were obtained from local markets. to prepare the watery extract, where the seeds are dried at first by hot air oven and It was ground in a grinder to be in powder type, mixing 10 gram of powder with 200 ml of distilled water by using a blender and left for 24 hours under room temperature. The mixture was filtered by using several layers of medical gauze to eliminate plankton then centrifuged at 3000 r per min for 10 minutes. Another round of filtration was done using filter papers for clarification. The extract was dried by an oven for 40 minute [10].

Then add the result with a liter of bird drinking water. The water which containing the plant watery extract It was given for birds was started from 8 days old until the end study at the age of 35 days for 12 hours / day from 8 am until 20:00 then provides the usual drinking water. Manual waterers were used during the duration of the experiment. Body weights (g) were recorded at 1, 8, 15, 22, 29 and 35 days of age. Body weight gain (g/period), feed intake (g) and feed conversion ratio (g feed /g body weight gain) were calculated for the periods 8-14, 15-21, 22-28, 29-35 and 8-35 days of age. while Mortality was documented daily. Diets expressed permitting to [11].

3. Experimental treatments

T.C- Control treatment where drinking water was provided to the birds free of any addition.
T1- Treatment of addition of extract of Nigella Sativa with bird drinking water.
T2- Treatment of adding extract of chamomile with bird drinking water.
T3- Treatment of adding watery extract of fenugreek with bird drinking water.

Table 1. shown the treatment diets which fed to birds in starter and finisher. Mixture of Methionine, lysine, vitamins and minerals were added to appropriate the dietary requirements of chicks to agreement with the Ross 308 broiler management guide.

| Feedstuff       | Starter 1-18 day | Grower 19-35 day |
|-----------------|-----------------|-----------------|
| Yellow Corn     | 60              | 50              |
| Wheat           | 0               | 14              |
| Soybean meal (48%) | 35.5          | 28.5            |
| Premix M-25 1   | 2.5             | 2.5             |
| Limestone       | 0.7             | 0.8             |
| Salt            | 0.3             | 0.3             |
| Vegetable oil   | 1               | 3.9             |
| Total           | 100             | 100             |

Calculated nutrient levels (N.R.C. 1994).

|                  | Starter  | Grower  |
|------------------|----------|---------|
| ME.kcal/kg       | 3079     | 3197    |
| Crude protein cp (%) | 23.44   | 20      |
1 Composition per kg of product: folic acid – 2200 mg; calcium pantothenate – 17000 mg; vit. E – 80000 mg; biotin – 220 mg; copper – 16000 mg; choline – 500000 mg; iron – 40000 mg; iodine – 1250 mg; manganese – 120000 mg; methionine – 2190000 mg; niacin – 60000 mg; riboflavin – 8600 mg; selenium - 300 mg; vit. A – 12000,000 IU; vit. B12 – 17 mg; vit. D3 – 5000,000 IU; vit. K - 3200 mg; zinc – 110000 mg.

4. Statistical analysis
Data gained from the study were tested for significance by one-way ANOVA using the GLM processes [12]. Differences among treatments means were parted by Duncan’s new multiple range test [13], on the level of probability 0.01 and 0.05.

5. Results and discussion
5.1 Live body weight:
The results in Table (2) indicate that there were no significant differences among experimental treatments during the periods 8-14 and 22-38 days of the study. While it was noticed that there were significant differences(P <0.05) during the period 15-21 days, where treatment T1 (895.15g / bird) was significantly superior to TC treatment (860.25 g / bird) and there was no significant difference among TC treatment, T2 treatments( 870.18) G / bird) and T3 (868.11 g / bird). During the period 29-35 days of the chicks age, significant superiority was observed for the treatments T1 (2100.28 g / bird) and T2 (2015.00 g / bird) compared to the treatment of T.C. (1983.45 g / bird) and T3 treatment (1994.09 g / bird). These results were consistent with [14-16].

Those who noticed that adding black seed to feed resulted in a significant increase in the weights of broilers compared to the control treatment. The reason for the superiority of the black seed treatment in this study may be due to the fact that the black seed stimulates the increase in the excretion of thyroid hormone which enhances the excretion of growth hormone from the pituitary gland [17], which affects protein metabolism and increases the process of protein synthesis, which has a role in body building.

In addition to the fact that the black seed contains many compounds and nutrients necessary for building the body, such as vitamins, minerals, and fatty and amino acids [18]. These results also agreed with [9], who observed a significant improvement in the weights of broiler fed to a container diet on chamomile. The final weight gain of the chamomile treatment may be due to the chamomile flower oils containing compounds that stimulate thyroid hormones such as flavonoids and camazolin these hormones accelerate the process of cells metabolism, thereby improving the productive efficiency of broilers in addition to the action of these active compounds as antimicrobial and antifungal agents in the digestive system and thus support the action of natural microflora in the intestine [19]. It may also be attributed to the active compounds contained in the chamomile plant (Tanins and Bitter) responsible for increasing the durability of the lining of the gut, which leads to an optimal absorption of nutrients and an increased utilization of food, thus improving productive traits [20]. The reason for the significant decrease in body weight may be due to the third treatment (Fenugreek treatment) The use of fenugreek seeds at a high rate causes a decrease in the level of glucose sugar in the blood, which leads to a decrease in the energy allocated to growth and the building of fat tissue in the bird’s body. This leads to the use of fat sources as an energy source instead of glucose sugar and prevents the accumulation of fats in the bird’s body which caused a decrease in live body weight [21].
Table 2. Effect of adding watery extract of Nigella Sativa, chamomile and fenugreek with drinking water on live body weight (g/bird) for broiler of Ross 308.

| Treatment | 8 – 14 | -2115 | -2822 | 29 – 35 |
|-----------|--------|-------|-------|---------|
| Tc        | 450.30 ±3.91 | 860.25±4.16 b | 1405.33±73.70 | 1983.45±65.44 b |
| T1        | 3.22±9.77 | 895.15±8.80 A | 1431.12±12.14 | 2100.28±38.37 a |
| T2        | .11±18.66 | 870.18±32.32 Ab | 1411.21±33.36 | 2015.00±53.00 a |
| T3        | .09±12.88 | 868.11±17.83 Ab | 1398.13±48.67 | 1994.09±23.77 b |

evel of significance | N.S | * | N.S | **

** means significant differences at probability level 0.01, * mean significant differences at probability level 0.05 and N.S mean no significant differences among treatments within the same column.

5.2 Weight gain: Table (3) shows the results of the statistical analysis of the weight gain of the broiler Ross 308 during the trial period, where it is observed that there were no significant differences among the treatments for the period 8-28 days of study. Whereas, the difference was significant during the period 29 - 35 days, where a significant superiority of the treatment T1 (P <0.01) was observed to the treatments T.C and T3 during this period where the weight gain value for each treatment was (669.16, 578.12 and 595.96 g / bird), respectively. As for the rate of weight gain during a period of 8 to 35 days, it is noted that the treatments T1 and T2 have significantly superior (P<0.01) to the treatments TC and T3 (2005.18, 1924.22, 1882.62 and 1878.10 g / bird). The significant superiority of the treatment of T1 (Nigella Sativa) was consistent with [22] and [4]. The significant superiority of T2 treatment (chamomile) was similar to the results obtained by [20] and [23]. The weight gain is a more accurate indication of the increase in weight than live weight, this is related to the health and physiological state of the body of the organism. Because black seed oil is rich in poly unsaturated fatty acids, which are important for growth and building muscle cells, its presence helps increase growth and improve weight gain [24]. The reasons for the improvement of the productive performance of broilers for the treatments that dealt with black seed (Nigella Sativa) may be due to increased immunity in the bird’s body and a decrease in the intestinal content of harmful microorganisms and thus raising the level of health and vitality of birds, which is reflected in their productive performance [25]. The use of chamomile flower improves the amount of food utilization by inhibiting pathogenic organisms in the intestine [26].
Table 3. Effect of adding watery extract of Nigella Sativa, chamomile and fenugreek with drinking water on the weight gain (g/bird) for broiler of Ross 308.

| Treatment | 8-14 | 15-21 | 22-28 | 29-35 | 8-35 |
|-----------|------|-------|-------|-------|------|
| TC        | 243.95±1.08 | 409.95±4.61 | 545.08± 5.11 | 578.12± 71.7% | 1882.62±89.37 |
| T1        | 265.93±3.22 | 434.93±6.57 | 535.97±9.56 | 669.16±8.98 | 2005.18±68.49 |
| T2        | 248.07±2.18 | 416.07±10.47 | 541.03±5.97 | 603.79±12.3% | 1924.22±58.82 |
| T3        | 232.02±3.84 | 407.02±8.89 | 530.02± 7.88 | 595.96±39.8% | 1878.10±94.53 |
| **Level of significance** | N.S | N.S | N.S | ** | ** |

** means significant differences at probability level 0.01, * mean significant differences at probability level 0.05 and N.S mean no significant differences among treatments within the same column.

5.3 feed consumption

Table (4) indicates that there were no statistically significant differences in feed consumption among the four treatments during the 8-14 days period of the experiment. Although there are no significant differences in the amount of feed consumption during this period, but they tend to treatments T1 and T2 superior to the T.C and T3 treatments (247.31, 243.10, 209.80 g / bird), respectively. The same situation was repeated during the period 15-21 days, when the superiority of the addition Treatment T1 ,T2 and T3, ( 513, 474.31, and 484.35 g / bird) respectively were not significantly superior to treatment T.C (459.14) g / bird). As for the period 28-28 days, we notice that there were no significant differences in feed consumption among T.C , T1 and T2 treatments (752.12 , 780.30 and 796.62 g/bird) respectively, with significant superiority (P <0.05) for treatment T2 (796.62g/bird) to treatment T3 (733.72 g / bird) . There were no significant differences among experimental treatments during the period 29-35 days . Whereas, there were significant differences among experimental treatments where T1 and T2 treatments were significantly superior (P <0.01) to TC and T3 treatments( 2616.38 , 2507.63 , 2427.98 and 2445.34 g/bird) respectively,

These results were consistent with [27,28]. Low feed consumption for T3 (fenugreek treatment) may be attributed to the fact that the use of high levels of fenugreek seeds (1% or more) leads to an increase in the proportion of Steroid Saponins compounds with a bitter taste that leads to poor appetite and a reduced feed consumption rate for birds [17]. may be because the Black seed contains the substance naglion and allicin, and these compounds have an important role anti- Microbes, which raised the body's immunity, which reflected positively on the general health of the bird and access to productive performance best [18].
Table 4. Effect of adding watery extract of Nigella Sativa, chamomile and fenugreek with drinking water on the food consumption (g/bird) for broiler of Ross 308.

| Treatments | Age by day | food consumption g/ bird |
|------------|------------|--------------------------|
|            | 8 – 14     | 15 – 21                  | 22 – 28                  | 29 – 35                  | 8 – 35                    |
| Tc         | 209.80±4.09| 459.14± 3.74             | 780.30±13.77 Ab          | 978.74±12.38             | 2427.98±16.25 b           |
| 1T         | 247.31±7.86| 513.21± 13.18            | 752.12±15.08 Ab          | 1103.74±33.72            | 2616.38±83.98 a           |
| 2T         | 243.10±5.41| 474.31±3.15              | 796.62±25.81 A           | 993.60±26.57             | 2507.63± 30.32 a          |
| 3T         | 206.50±9.66| 484.35±10.45             | 733.72±12.09 B           | 1017.77±45.17            | 2445.34±37.20 b           |

1 of significance: N.S N.S * N.S **

** means significant differences at probability level 0.01, * mean significant differences at probability level 0.05 and N.S mean no significant differences among treatments within the same column.

5.4. feed conversion ratio: Table (5) shows the presence of significant differences in the value of the feed conversion ratio (P<0.01) among the treatments during the period 8-14 days, where the treatment T2(0.98) was superior to the T.C (0.86) and T1 (0.93) treatments. During the 15-21 days period, there were no significant differences among experimental treatments. We noticed, during the 22-28 days, treatment T2 was significantly superior (P <0.01) compared to T.C, T1 and T3 treatments (1.47, 1.43, 1.40 and 1.38) respectively. During the period of 29-35 days, significant superiority (P<0.01) was observed for T.C and T.3 treatments compared to treatments T1 and T2 (1.70, 1.70, 1.64 and 1.64) respectively. As for the value of the feed conversion ratio during the period from 8 to 35 days of the experiment, there were no significant differences between the treatments during this period.

The feed conversion ratio is an indicator of how much feed is used and converted into live weight. No mortality were recorded in this study, and this may be due to several factors, the most important of which is the type of additives used in this experiment. Nigella Sativa which contain the substances of nageila and allicin, in addition compounds play a microbial antimicrobial role, which raised the body's immunity, which reflected positively on the general health of the bird and obtained a better productive performance [18]. The chamomile flowers that stimulate thyroid hormones such as flavonoids and camazolin that act as antimicrobial and fungal agents in the digestive system [19]. And Fenugreek seeds that contain many active compounds such as essential oils, aldehydes, alkaloids and others that work together to increase disease resistance [1].

Table 5. Effect of adding watery extract of Nigella Sativa, chamomile and fenugreek with drinking water on the feed conversion ratio (g/g) for broiler of Ross 308.

| Treatments | feed conversion ratio g/g (age by days) |
|------------|----------------------------------------|
|            | 8 – 14 | 15 – 21 | 22 – 28 | 29 – 35 | 8 – 35 |
| Tc         | 0.86 ± 0.01 b | 1.12 ± 0.023 | 1.43 ± 0.051 B | 1.70 ± 0.043 A | 1.28±0.018 b |
| T1         | 0.93± 0.021 b | 1.18 ± 0.024 | 1.40 ± 0.065 B | 1.64 ± 0.062 A | 1.30 ±0.032 b |
| T2         | 0.98± 0.06 a  | 1.14 ± 0.058 | 1.47 ± 0.042 A | 1.64 ± 0.039 B | 1.30±0. 024 a |
| T3         | 0.89± 0.14 ab | 1.19 ± 0.39  | 1.38 ± 0.049 C | 1.70 ± 0.019 A | 1.30±0. 023 ab |
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