The effect of adding Dill (Anethum graveolens) leaves powder in the diets of broiler on some physiological properties

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Abstract. The current study was conducted in poultry farm which belong to department of animal production, college of Agriculture, University of Kufa during the period from 11/3/2018 to 15/4/2018. The study included 3 standard treatment groups respectively containing 1, 2, 3 gm of Dill / kg of feed in addition to control group (0 gm/kg). 120 unsexed chicks (Ross 308) with one day of age were used with initial weight averaged 40.5 gm. Closed hall was used and divided into pens each pen about 3m² of area and the chicks were distributed randomly in the four treatments with 30 chick for each treatment. Each treatment composed of three replicates (10 chicks each) distributed randomly in pens and the period continue till the 5th week of age. The aim of this study is to determine the effect of adding Dill (Anethum graveolens) leaves powder in the diets of broiler on some physiological properties. Results showed a significant effect of dill addition on PCV while no significant effects on hemoglobin, globulin, red blood cells, total protein, glucose and cholesterol.

1. Introduction.
Poultry industry was highly interested by many researchers and breeders nowadays and they make a great work to develop high poultry production and good efficiency by producing many hybrids. the increasing of poultry production was combined with many problems and difficulties because of using many of drugs, antibiotics and chemicals additives which necessary for improving the performance [1]. Modern science discovers that the plant kingdom are enriched with secondary products which characterized by biological activity and high physiological effects against many diseases and pathogens that infects human and animals such as birds. Medical plants and perfume herbals are one of very important sources to enhance the physiological poultry performance and health. Such plants have a verity of natural and useful substances can be used for treatment and improve immunity system in animal species [2].

Because of health limitations of antibiotics and drugs, the interest is increased of the medical plants to be used instead of these drugs or antibiotics [3]. Many studies referred to the possibility of using these plants to increase production and enhance the poultry performance. [4] insisted on the importance of using the medical food as an effective tool to avoid the side effects of industrial compounds. The results were encouraging many researchers and breeders to use the wide group of
herbal and medical plants in poultry nutrition as feed additives [2]. In the 2nd part of last century, medical plants were used widely in many fields of industries such as cosmetics and alternative medicine because of it contains many important compounds which can be extracted from these plants. Many studies reported that the medical plants can used in poultry diets and it contains medical compounds contribute of improving the health and production [5].

Dill is one of these plants, annual plant and a member of Umbelliferae family [6]. The origin of this plant is Mediterranean Sea area, it is common plant in ancient Greece. Dill seeds are brown color, divided into five lobes and used commercially as a seasonings, while leaves are eaten freshly or cocked with soup [7]. Dill seeds contain many volatile oils and the active compounds such as Carvone, Limonen, α-pinene, α-phellandrene, Camphe and β-cymene [8]. It also contains many of antioxidants [9]. Dill leaves contains a big amount of Vitamin A as carotene and Vitamin C in addition to fibers which play a crucial role as regulators of lipids an saccharides absorption, as activators of intestine, decrease the cholesterol absorption gallbladder salts. The acceptable flavor of seeds make it a good appetizer to increase feed intake and its enrich with ferrate, calcium, potassium, vitamins B complex and Vitamin K [10]. The plant parts (leafs and seeds) used to indigestion and bulges [11].

The aim of this study is to determine the effect of Dill addition to the broiler diets and investigate the significant changes in physiological indicators and it effects on physiological performance to exploit the results to improve the production.

2. Materials and methods

2.1 Chicks feeding and management.

The current study was conducted in poultry farm which belong to department of Animal Production, College of Agriculture, University of Kufa during the period from 11/3/2018 to 15/4/2018. Chicks are fed starter diet during three weeks and finished diet in 4th and 5th week. 120 unsexed one day age chicks (Ross 308) were used with initial weight averaged 40.5 gm. Chicks were held in closed house and divided into pens each pen about 3m² of area and the chicks were distributed randomly in the four treatments with 30 chicks for each treatment. Treatments groups were termed as T1 (control), T2, T3, and T4 were given 0, 1, 2, and 3gm dill/kg of feed respectively. Each treatment group composed of three replicas (10 chicks each ) distributed randomly in pens and the period continue till the 5th week of age. The feed and water were produced ad–libitum and the diets were mash type.

2.2 Traits that studded.

Blood samples were collected from four chick of every replicate (2 males and 2 females) randomly at the end of experiment using sterilized medical syringe. Blood samples were then transferred to test tubes containing anticoagulant (K-EDTA) to make cellular tests (hemoglobin rate and red blood cells) while the other part of blood was collect in test tubes without K-EDTA to obtain serum to measure the biochemical tests (total protein, albumin, glucose and cholesterol). PCV was calculated directly by microhematocrit, while [12] method was used to calculate the globulin. Serum was separated by centrifuge technique and collected in micropipette then kept in freeze at (-20°C) till use.

2.3 Statistical analyses.

Statistical analyses system SAS [13] computer program was used and data were analyzed by using completely randomized design (CRD) and the significance differences were tested by Duncan multiple range [14].

3. Results and Discussion:

Results represented in Table-1 shows no significant differences in hemoglobin concentrations and red blood cells count for all experimental treatments compared to the control. The highest and
significant values of PCV were noticed in T2 compared to control while no significant differences among the other treatments.

Biochemical tests represented in Table-2 showed no significant difference in total protein concentrations, albumin, globulin and glucose in blood serum at 35th day of age. Cholesterol concentration did not differ among experimental treatments compared to control except T3 which was significantly increase.

Depending on the current results, we can conclude that the T2 which contain 1 gm of Dill per kg of feed recorded the best theoretical or significant differences in hemoglobin. PCV and globulin rates compared to other treatments and this resulted from the violate oils which found in Dill plant [15]. In addition, Dill plant contain active compounds such as Carvone, Limonen, α-pinene, α-phellandrene, Camph and β-cymene [8] and antioxidants [9]. The content of these useful compounds reflected positively on physiological performance of birds while the 2 and 3 gm of Dill per kg of feed make a negative results because of the negative effect of these compounds with increasing the concentrates more than 1gm/ kg, the results accordance with those of [10].

**Table1.** Effect of diets containing different levels of dill leaves powder on the hematological indices of broiler during a 35-day experiment.

| Treatments                                | Hb (g/dL)   | RBC (10⁶/µL) | PCV (%)   | RBC (10⁶/µL) |
|--------------------------------------------|-------------|--------------|-----------|--------------|
| T1: Control (0% dill leaves powder/ kg feed) | 10.70 ± 0.52 | 2.45 ± 0.17  | 28.3 ± 0.33 b | 2.45 ± 0.17  |
| T2: (1gm dill leaves powder/ kg feed)      | 11.66 ± 0.49 | 2.56 ± 0.14  | 30.0 ± 0.57 a | 2.56 ± 0.14  |
| T3: (2gm dill leaves powder/ kg feed)      | 11.00 ± 0.17 | 2.34 ± 0.04  | 29.3 ± 0.33 ab | 2.34 ± 0.04  |
| T4: (3gm dill leaves powder/ kg feed)      | 11.06 ± 0.46 | 2.29 ± 0.07  | 29.0 ± 0.57 ab | 2.29 ± 0.07  |

different letters vertically indicate significant difference (P<0.05).

**Table 2.** Effect of diets containing different levels of dill leaves powder on the blood biochemical indices of broiler during a 35-day experiment.

| Treatments                                | Total Protein (g.dL⁻¹) | Albumin (g.dL⁻¹) | Globulin (g.dL⁻¹) | Glucose (mg.dL⁻¹) | Cholesterol (mg.dL⁻¹) |
|--------------------------------------------|------------------------|------------------|------------------|------------------|----------------------|
| T1: Control (0% dill leaves powder/ kg feed) | 2.79 ± 0.13            | 1.20 ± 0.02      | 1.56 ± 0.12      | 260.3 ± 12.91    | 103.0 ± 1.00 b       |
| T2: (1gm dill leaves powder/ kg feed)      | 2.79 ± 0.05            | 1.07 ± 0.03      | 1.71 ± 0.01      | 236.0 ± 9.86     | 97.0 ± 6.80 b        |
| T3: (2gm dill leaves powder/ kg feed)      | 3.02 ± 0.07            | 1.17 ± 0.05      | 1.87 ± 0.08      | 256.0 ± 2.08     | 147.0 ± 13.79 a     |
| T4: (3gm dill leaves powder/ kg feed)      | 2.70 ± 0.10            | 1.08 ± 0.02      | 1.58 ± 0.09      | 255.0 ± 1.52     | 107.0 ± 7.37 b       |

different letters vertically indicate significant difference (P<0.05).

4. Conclusions

Results showed a significant effect of dill addition on PCV while no significant effects on hemoglobin, globulin, red blood cells, total protein, glucose and cholesterol.

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