

Effect of adding dill seeds (*Anethum graveolens* L.) to the feed on some immune and microbial traits of broilers.Walaa Zayer Shanin¹ Ali Radi Abdel Zahra ²¹Researcher² Chief Agricultural Engineer, Al-Sadr First Municipality, Mayoralty of Baghdad

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Abstract

This study was conducted in the poultry field of the Department of Animal Production , College of Agricultural Engineering Sciences , University of Baghdad Abu Ghraib for the period from 10/15/2021 to 11/25/2021 with the aim of demonstrating the effect of adding different levels of dill seeds to the feed on some immune and microbial traits for meat chickens. In this study, 200 unsexed broiler chicks (Ross 308) were used, one day age and with a starting weight of (42) g. The chicks were randomly distributed into 5 treatments, and each treatment included 4 replicates with 10 birds for each replicate. The birds were fed three starter diets. Growth and final diet. The experimental treatments for T1, T2, T3, T4, and T5 were the addition of dill seeds (0, 0.3, 0.6, 0.9, 1.2) %, respectively. The results of the experiment indicated that the addition of dill seeds to diet of broilers did not show significant differences between the treatments in the relative weight of bursa of fabricius and spleen. There are no significant differences between the treatments in the volumetric standard for Newcastle and Camboro disease. The results showed a significant decrease ($P>0.05$) in the numbers of *E.Coli* bacteria for treatment T3 compared to T1, T2, and T4. As for the numbers of *Lactobacillus* bacteria, a significant increase was observed in treatment T1 compared to T4. We conclude from this study that there was a significant decrease in T3 coli bacteria by 0.6%.

Keywords: dill seeds, broiler, immune traits, microbiology.**introduction**

The poultry industry is one of the most developed or growing food industries in the world, where poultry is one of the most important sources of animal protein, due to its reasonable price compared to types of red meat, in addition to the diversity of its meat content of amino acids and vitamins that the human body needs for development and growth[2,10] . The use of some types of medicinal plants or oil seeds and types of essential oils has a physiological effect on the body. It is used in treatment and affects the performance of organs in the human and animal body, whether its effect is inhibitory or stimulant or it has an effect on living organisms that parasitize the body internally or externally. Which led most researchers to use it in poultry bird feeds, because it contains

effective natural substances and thus has proven its ability to improve the immune traits of birds [14] .One of the most important additions whose effectiveness has been highlighted recently are dill seeds. Dill is an annual or biennial plant that has a taproot like the root of a carrot plant. The plant is standing and its height ranges between 70-120 cm. The leaves are compound, feathery, divided into stringy, ribbony parts. The stems are smooth, juicy, and the flowers are hollow. Complete, yellow, inside compound tent inflorescences with a diameter of 15 cm. The calyx leaves have five green leaves, and the petals also have five yellow leaves. The ripe ones are characterized by a pleasant smell and grow annually from seeds that include more than 250 species[3,6]. Dill seeds have been used medicinally by herbalists. Boiled seeds are

used to get rid of gases and treat inflamed stomachs, as a drink for newborn babies (gripe water), to relieve the pain of inflamed colon, and dill seed powder is added to food in order to reduce fatigue and treat high blood pressure, calm the nerves, and remove chronic headaches. It also reduces blood sugar, treats asthma, strengthens the heart and spleen, and is also useful in increasing blood sugar, as well as treating hemorrhoids and breaking up kidney stones. [1,15] Dill seeds contain active compounds, namely carvone, which is responsible for the smell of dill seeds, limonene, beta-cyamine, and alpha-phlandrene. Other active compounds present are flavonoids, coumarins, phenolic acids, and steroids[7] . As a result of the lack of research, this study aimed to add different levels of dill seeds to the diet of broiler chickens, their effect on the preparation of harmful and beneficial microorganisms and on the body's immunity.

Materials and methods

This study was conducted in the poultry field of the Department of Animal Production/College of Agricultural Engineering Sciences/University of Baghdad for the period from 10/15/2021 to 11/25/2021 for a period of six weeks and 42 days. In this study, 200 unsexed Ross 308 broiler chicks were used, prepared from the hatchery of the Al-Shukr National Broiler Production Company in Abu Ghraib district, at one day old. The chicks were randomly distributed into 5 treatments, and each treatment included 4 replicates, 10 birds per replicate, with an average starting weight of 41.64. In general, all chicks were fed an ad-libitum diet, with a starter ration from 1-10 days of age, which was then gradually replaced with a growth ration from 11-24 days of age, and then replaced with a finishing ration from 25-42

days of age. Table (1) The experimental treatments were divided as follows: The first treatment (T1): - control treatment without addition, the second treatment (T2): - adding dill seeds to the feed at an average of 0.3%, and the third treatment ((T3): - adding dill seeds to the feed at an average of 0.6% and The fourth treatment (T4): - Adding dill seeds to the feed at an average of 0.9%. The fifth treatment (T5): - Adding dill seeds to the feed at an average of 1.2%. Dill seeds were purchased from local markets, and chemical analysis of the dill seeds was conducted to estimate the percentages of protein, ash, fat, and moisture and crude fiber, carbohydrates, limonene, carvone, and beta-cyamine in the laboratory of the Environment and Water Department / Ministry of Science and Technology, as shown in Table 2). at the end of the experiment, at 42 days of age, 1 bird from each replicate (two males and two females) was slaughtered for each treatment. Fabricia's bursa was randomly extracted by cutting the connective tissue around the bursa and then weighing it with a scale sensitive to four decimal places and extracting the relative weight of the bursa according to the method mentioned by[9] . The blood samples were collected in tubes that did not contain an anticoagulant and were placed in a centrifuge at a speed of 3500 rpm for 15 minutes to separate the serum from the cellular part. They were preserved and frozen at a temperature of (-20°C) until the following test was performed for the purpose of measuring the volumetric standard for antibodies. In the blood serum of Newcastle and Camboro disease, using an enzyme-linked immunosorbent assay (ELISA) test in the group's laboratory specialized in veterinary immunological tests in the Al-Sinak / Baghdad area. The ELISA test is an immunological test used to calibrate any

antigen with high accuracy to 0.0005 microns[13] . An examination of the intestinal microbiome was conducted in the Biotechnology Laboratory / Ministry of Science and Technology. An amount of 1 gram of intestinal contents from three birds slaughtered for each treatment at the end of the experiment was taken from the jejunum, ileum and duodenum, and added to 9 ml of the previously prepared peptone water solution to

be an initial dilution of 10. 1-Keep the solution in the refrigerator at a temperature of 4°C until tests are performed on it. The experiment data were analyzed according to a completely randomized design (CRD) to analyze the effect of different parameters on the studied traits. The significant differences between the means were compared with [5] program was used for statistical analysis.

Table 1. Percentages of feed components used in the experiment and their chemical composition

Final diet (42-25)days	Growth diet (24-11)days	Starter diet (1-10) days	Feed material
46.5	44.6	43.8	Yellow corn
16	15.4	14	wheat
26	29.1	32.7	Soybean meal 48%
5	5	5	Protein concentrate (1)
4.4	3.5	2.2	Sunflower oil
1.3	1.5	1.1	limestone
0.3	0.4	0.7	Dicalcium phosphate DCP
0.3	0.3	0.3	salt
0.2	0.2	0.2	Vitamins and minerals mixture (2)
100	100	100	Total
Chemical analysis calculated based on [11]			
20.27	21.53	23.03	Crude protein (%)
3193.20	3105.47	3005.83	Representative energy (kilocalorie/kg feed)
1.13	1.22	1.3	Lysine (%)
0.80	0.84	0.88	Methionine + Cysteine(%)
0.82	0.93	0.86	Calcium(%)
0.44	0.46	0.52	Available phosphorus (%)

Brocon - 5 Special W protein concentrate. Each kg contains: 40% crude protein, 5% fat, 2.2% fiber, 24.52% ash, 3.53% calcium, 5.35% phosphorus, 3.85% lysine, 3.7% methionine, 4.12% methionine + cysteine, 0.43% tryptophan, 2.57% . % arginine, 2.4% sodium, 2107 kcal/kg represented energy, 200,000 IU Vitamin A, 60,000 IU Vitamin D3, 600 mg Vitamin E, 50% mg Vitamin K3, 60 mg Vitamin B1, 140 mg Vitamin B2, 80 mg Vitamin B6, 700 microg, Vitamin B12, 800 mg niacin, 20 mg folic acid, 1 mg iron, 200 mg copper, 1.6 mg manganese, 1.2 mg zinc, 20 mg iodine, 5 mg selenium. (2) A mixture of vitamins and minerals, each kg of which contains: 500 IU Vitamin A, 600 IU D3, 10 mg E, 2 mg K3, 2 mg B1, 2 mg B2, 2 mg B6, 5 microg B12, 10 mg C 15 mg niacin, 500 microg folic acid.

(3) According to the chemical analysis of the feed according to [11].

Table 2. Chemical analysis of dill seeds used in the experiment

<i>%percentage</i>	Chemical analysis
14.2	Protein
7.1	Ashes
13.9	Fats
5.9	Humidity
20.9	Crude fibre
38.0	Carbohydrates
18.22	Limonene
40.05	Carvone
12.0	Beta-cyamine

Results and discussion

It is noted from Table (3) that adding dill seeds to the diet of broilers did not show

significant differences between the treatments in the relative weight of Fabricia bursa and spleen.

Table 3. Effect of adding different levels of dill seeds to broiler diets 308 Ross on the relative weight (%) of Fabricia bursa and spleen (mean \pm standard error)

Relative weight		treatments
Spleen %	% bursa of fabricius	
1.99 \pm 1.87	0.98 \pm 0.94	T1
0.09 \pm 0.01	0.02 \pm 0.00	T2
0.12 \pm 0.03	0.04 \pm 0.02	T3
0.10 \pm 0.03	0.12 \pm 0.01	T4
0.13 \pm 0.01	0.08 \pm 0.03	T5
N.S	N.S	significance level

T1: control treatment without addition, T2, T3, T4, T5 addition of dill seeds at an average of 0.3, 0.6, 0.9, 1.2%, respectively.

N.S: There are no significant differences between the average treatments.

Table (4) shows that there are no significant differences between treatments in the size standard for Newcastle and Camboro disease

when different levels of dill seeds are added to the diet of broiler chickens.

Table 4. The effect of adding different levels of dill seeds to the diets of broiler chickens Ross 308 on the size of serum antibodies directed against Newcastle and Camboro disease (mean \pm standard error)

Cumboro	Newcastle	treatments
13303.75 \pm 1840.25	4222.50 \pm 2418.37	T1
14012.75 \pm 1295.63	5569.75 \pm 2221.96	T2
14819.25 \pm 1704.72	4261.00 \pm 2273.22	T3
12602.25 \pm 1503.96	6019.25 \pm 3240.75	T4
14583.25 \pm 1461.54	6267.25 \pm 2816.31	T5
N.S	N.S	significance level

T1: control treatment without addition, T2, T3, T4, T5 addition of dill seeds at an average of 0.3, 0.6, 0.9, 1.2%, respectively.

N.S: There are no significant differences between the average treatments.

The results of the statistical analysis of Table (5) indicate that there are significant differences between the treatments ($P>0.05$) in the numbers of lactobacilli and coli bacteria, as a significant superiority is observed in the treatments T1, T2, and T4 over the third treatment, T3, as it recorded 6.37, 6.34, and 6.54 CFU/ml. While it did not differ

significantly with the fifth treatment, T5, when calculating the numbers of coliform bacteria. When calculating the lactobacilli bacteria, it is noted from the table that the first treatment, T1, had a significant superiority over the fourth treatment, T4, as it recorded 9.86 CFU/ml, while it did not differ significantly with the treatments T2, T3, and T5.

Table 5. The effect of adding different levels of dill seeds to the diet of broiler chickens Ross 308 on the number of Lactobacillus bacteria and the number of E.coli bacteria. (CFU /ml) Log)(Mean \pm standard error)

<i>coli bacteria</i>	<i>Lactobacilli bacteria</i>	treatments
6.37 \pm 0.24 a	9.86 \pm 0.25 a	T1
6.34 \pm 0.22 a	9.22 \pm 0.60 ab	T2
5.21 \pm 0.38 b	8.45 \pm 0.54 ab	T3
6.54 \pm 0.25 a	8.22 \pm 0.46 b	T4
5.81 \pm 0.31 ab	8.66 \pm 0.47 ab	T5
*	*	significance level

T1: control treatment without addition, T2, T3, T4, T5 addition of dill seeds at an average of 0.3, 0.6, 0.9, 1.2%, respectively.

*Averages with different letters for one column indicate that there are significant differences between the average treatments at the level ($P > 0.05$)

Our results are consistent with [12] who observed a significant decrease in the numbers of coliform bacteria when adding dill seeds in proportions (200, 400, and 600) g per ton. The results of the study agree with [16] who indicated a decrease in the numbers of coliform bacteria and lactobacilli bacteria in the jejunum and cecum when adding dill seeds to the diets of broiler chickens by (0, 0.3%).

The reason for the decrease in the numbers of E.Coli bacteria in the T3 treatment by (0.6%) compared to the control treatment may be attributed to the dill seeds containing compounds or active substances, and that each compound has its own property of working against microorganisms. Phenols and fatty acids such as linolenic acid can kill microorganisms. By affecting the structural

and functional traits of the cell membrane and penetrating the cell wall without visible changes, leading to its disassembly or interference with harmful microbial cell metabolic pathways[4]. The action of these active compounds (carvone, limonene, and phenol) is by increasing the activity of digestive enzymes and improving the environment. The microbiome within the digestive tract has been reflected in the bird's health and the extent to which it benefits from nutrients[8].

Conclusion

We conclude from this study that there was a significant decrease in T3 coli bacteria by 0.6%.

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