

Effect of adding different levels of dried dill (*Anethum graveolens*) to the diet on the productive performance of broilers

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Abstract: *This study was conducted at the poultry research station to the office of Agricultural Research / Ministry of Agriculture / during the period 4/1/2016 to 5/5/2016 and 336 one-day-old Ross308 chicks were used, and fed on diets provided with dried dill (*Anethum graveolens*) at levels 0.4, 0.6 and 0.8% for treatments D₂, D₃ and D₄, respectively, and they were compared with the control treatment D₁. Each treatment included three replicates in each replicate contain 28 birds, in order to study the effect of adding different levels of dried dill plant on the productive performance and some characteristics of the carcass for broilers. The results showed a significant increase ($p < 0.05$) in the average body weight at 5 weeks of age for the treatments (D₂ and D₃) compared to the control treatment D₁. The study showed a significant increase ($p < 0.05$) in the rate of weight gain for birds of the treatment in which different percentages of dried dill powder were used compared to the control treatment for the periods (3-5), (0-5) weeks and also feed consumption ratio increased significantly ($p < 0.05$) for treatments D₁, D₂ and D₃ for periods (3-5) and (0-5) compared to treatment D₄. These results were reflected on feed conversion ratio, which showed an obvious improvement in the treatments in which dried dill powder was used for all percentages, but the improvement was obvious in the D₄ treatment that did not significantly differ for each of the treatments D₂ and D₃ compared to the control treatment (D₁) during the breeding period. The results had indicated a significant increase ($P < 0.05$) in the percentage of the Brest cut of the birds of treatments D₁, D₂ and D₄ compared to treatment D₃, also the study showed a significant increase in liver's weight percentage for birds of D₂ treatment compared to other treatments. We conclude from this study the possibility of adding dried dill plant powder to the diet at levels of 0.4 and 0.6% to obtain a positive improvement in the productive performance of meat broilers.*

Keyword: *dried dill , productive performance , characteristics of the carcass, broilers*

1. INTRODUCTION:

Medicinal plants and herbs have gained an increasing interest in recent years despite the tremendous development in science when they are used as feed additives to poultry birds diets for their role as growth stimulants (Sarinivasan, 2005) and antifungals (Tagoe et al., 2011) and their improvement of the immune status (Durranim et al., 2007), and antioxidants (Taha, 2008). Dill is one of these plants that has been used since ancient times for medicinal

purposes and is widely used to flavor food (Ramadan et al., 2013). The scientific name of the dill plant is *Anethum graveolens* and its worldwide common name is Dill. It is an herbaceous plant whose dark green leaves are smooth to the touch with an aromatic smell and sweet taste. Dill contains many active substances such as Limonene and Carvone, which have proven effective against fungi (Delaquis et al., 2002) as well it contains phenolic acids, volatile oils and many vitamins such as niacin and pyridoxine and minerals necessary for the body such as copper, potassium, calcium, manganese and iron (Al-Ismael and Aburjai, 2004), and it also has an antioxidant role (Ramadan et al., 2013), and an obvious effect in lowering the level of lipids and cholesterol in the blood (Bahramikia and Rayieh, 2008). Due to the lack of existing studies on the use of dried dill powder in the diets of poultry birds, the current study aimed to introduce different levels of dried dill powder in the diets of broilers and study its effect on productive performance and some characteristics of the carcass.

2. MATERIALS AND WORKING METHODS:

In this experiment, 336 one-day-old Ross 308 chicks with an average weight of 46 g were used. The chicks were raised in a closed hall consisting of 12 chambers. The chicks were randomly distributed on the chambers, with 28 birds per chamber, and the birds were fed on two diets, a starter diet (1-21 days) containing 22% protein and a Metabolizable energy by 2981 kilocalories/kg feed and a final diet from 22-35 days with a 19% protein and a Metabolizable energy by 3145 kilocalories/kg feed, the dried dill powder was added in percentages 0.4, 0.6, 0.8% and compared with the control treatment free of dried dill powder. Each treatment included 3 replicates in each replicate there are 28 birds. Feed and water were provided freely (*ad libitum*) for the duration of the experiment. The temperature was controlled by using gas incubators. The dwelling was equipped with continuous lighting with the lights off for one hour to make the birds be accustomed to the power failure. Dried dill was purchased from local markets and an approximate analysis was conducted to find out the percentage of crude protein, ether extract, moisture and Ash. Productive features that included average body weight, weight gain, feed consumption and feed conversion efficiency were measured during the experimental periods (0-3) and (4-5) weeks of age and the total period was 0-5 weeks. The data of the experiment were analyzed using the complete random design (CRD) using the pre-made statistical program (2001, SAS) and the significant differences between the averages were compared using Duncan's polynomial test (Duncan, 1955).

Table 1. percent composition of starter(1-21d.) and finisher(22-35) diets

Ingredients %	Types of diets	
	Starter(1-21d.)	Finisher(22-35d.)
Yellow corn	30	39.93
Wheat	27	24
Soybean Meal ¹	32	25
Meat Meal ²	5	5
Hydrogenated Vegetable Fat	3.5	4.4
Dicalcium Phosphate	0.7	0.9
Lime stone	1.2	0.6

NaCl	0.1	0.1
Methionine	0.25	0.07
Lysine	0.25	-
Total	100	100
Calculated Values³		
Crude Protein %	22	19.4
M.E. Kcal/ Kg Diet	2981	3145
Methionine + Cysteine %	1.1	0.85
Lysine %	1.4	1.04
Ca	1.03	0.83
P	0.47	0.49

¹ Soybean cake used an Argentine source of crude protein content by 48% and 2440 Kcal/ Kg M.E.

² Protein 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 Cystine 0.42%, Tryptophan 0.38%, Threonine 1.70%. It Contains A Mixture Of Vitamins And Minerals Needed Believes Rare Birds Of These Elements.

³Based on National Research Council recommendations (1994).

Table (2) Chemical analysis of dried dill powder

Ingredients	%
moisture	5.08
Ash	17.90
Crud Protein	22.52
Ether Extract	6.50

3. RESULTS AND DISCUSSION

Table (3) shows the effect of adding different levels of dill powder to the diet on the average body weight and the rate of weight gain. As there were no significant differences between the treatments at the age of 3 weeks, while the body weight increased significantly ($P < 0.05$) at the age of 5 weeks for the two treatments D₂ and D₃ and recorded 1970.80 and 1980.33 respectively compared to the control treatment, which recorded 1922.8 g and did not differ significantly from treatment D₄. The rate of weight gain did not differ among birds of all treatments during the first period of bird life (0-3 weeks). Where there was a significant ($P < 0.05$) increase in the average weight gain of birds for each of the treatments D₂, D₃, and D₄ compared to the control treatment D₁, which recorded the lowest rate of weight gain during the period between (3-5) and (0-5). Treatment D₄ did not differ significantly from the control treatment in the rate of weight gain during the period (0-5) week.

Age week	Treatment ¹				Sg.
	D ₁	D ₂	D ₃	D ₄	
Body Weight (g.)					
3	933.47±7.53	941.20±10.21	934.40±38.05	930.6±12.25	NS
5	1922.80 ±34.9 ^b	1970.80±14.46 ^a	1980.33±34.9 ^a	1953.0±43.37 ^{ab}	*
Body Weight Gain (g.)					
0-3	886.13±39.16	895.87±9.24	887.40±33.20	884.93±27.70	NS
3-5	989.33 ±26.75 ^b	1029.60±41.36 ^a	1045.93±18,89 ^a	1022.40±19.09 ^a	*
0-5	1876.47 ±62.71 ^b	1924.47±48.10 ^a	1934.33±51.73 ^a	1907.33±30.85 ^{ab}	*
*Means in the same row with different superscripts were significantly different (P<0.05).NS: non-significant ¹ treatment mean D ₁ :control without adding, D ₂ ,D ₃ and D ₄ :(0.4 ,0.6 and 0.8% of dill powder).					

Table 3 . effect of dill powder on body weight and body weight gain of broiler

These results complied with the findings of Bahadori et al. (2013) when they used different percentages of dill powder (1, 3, 6%) in meat broiler diets, as there was no significant increase in the average body weight and weight gain during the first period of the birds' life (0-3) week, and the increase appeared clearly and significantly during the second period (3-5) week and during the total breeding period (0-5) week, especially for birds of diets supplied with 3% of dried dill powder. As for the feed consumption ratio, it was noted from Table (4) that there were no significant differences (P<0.05) in feed consumption ratio during the first period of the birds' life (0-3 weeks) and for all experiment treatments. Obvious significant differences appeared and a significant increase (P<0.05) in feed consumption ratio for treatments D₁, D₂ and D₃ during the second period of bird life (3-5) week and the total rearing period (0-5) week compared to treatment D₄, to which dried dill was added by 0.8%, but treatment D₂ did not differ significantly in feed consumption ratio from treatment D₄ and during the two periods, and these results were reflected on feed conversion efficiency (Table 4), which showed an obvious improvement in all treatments in which dried dill powder was used, but the improvement was obvious in the treatment in which the highest percentage of dill powder was used at a rate of 0.8% (D₄) and did not differ significantly from D₂, D₃ (0.4% and 0.6% dill powder) compared to the control treatment, which recorded the highest feed conversion efficiency during the total breeding period (0-5). There were no significant differences in feed conversion efficiency during the first period of the life of the birds and the second period, except for the significant improvement (P<0.05) in the feed conversion efficiency of birds of treatment D₄ during the period (3-5).

Age week	Treatment ¹				Sg.
	D ₁	D ₂	D ₃	D ₄	
Feed Consumption (g)					
0-3	1457.2±70.74	1386.9±35.24	1484.5±47.01	1371.8±52.34	ns
3-5	2317.5±121.08 ^a	2177.5±127.27 ^{ab}	2222.7±77.91 ^a	1986.1±44.99 ^b	*
0-5	3774.6±190.67 ^a	3564.4±157.32 ^{ab}	3707.2±96.68 ^a	3357.9±77.2 ^b	*
Conversion Ratio Of Broiler (g feed/ g gain)					
0-3	1.64±0.146	1.55±0.045	1.67±0.088	1.54±0.106	ns
3-5	2.35±0.154 ^a	2.11±0.055 ^a	2.12±0.049 ^a	1.94±0.082 ^b	*
0-5	2.01±0.153 ^a	1.85±0.053 ^{ab}	1.91±0.049 ^{ab}	1.76±0.069 ^b	*
*Means in the same row with different superscripts were significantly different (P<0.05).NS: non-significant					
¹ treatment mean D ₁ :control without adding, D ₂ ,D ₃ and D ₄ :(0.4 ,0.6 and 0.8% of dill powder).					

Table 4 . effect of dill powder on Feed Consumption and feed conversion ratio of broiler

As for the effect of adding different levels of dried dill in the diets of meat broilers on the percentage of dressing and carcass cuts in Table (5), it was noted that there were no significant differences in the dressing ratio and in the percentage of the Thigh cut and drummer stick, while a significant increase (P<0.05) was noted in the percentage of the chest cut for each of the treatments D₄.D₂.D₄ (36.88, 37.83 and 37.09%), respectively, compared to treatment D₃ (34.72%).

Table 5. effect of dill powder on dressing percentage, breast , thigh and drumstick

Carcass Quality %	Treatment ¹				Sg.
	D ₁	D ₂	D ₃	D ₄	
Dressing	72.54±0.77	72.35±0.58	71.88±0.42	72.65±0.62	NS
Breast	36.88±0.35 ^a	37.83±0.65 ^a	34.72±0.85 ^b	37.09±0.72 ^a	*
Thigh	14.96±0.72	14.24±0.93	13.52±1.29	13.44±0.44	NS
Drumstick	36.88±0.35 ^a	37.83±0.65 ^a	34.72±0.85 ^b	37.09±0.72 ^a	*
*Means in the same row with different superscripts were significantly different (P<0.05).NS: non-significant					
¹ treatment mean D ₁ :control without adding, D ₂ ,D ₃ and D ₄ :(0.4 ,0.6 and 0.8% of dill powder)					

Table (6) shows that there was a significant increase (p<0.05) in the percentage of liver weight of treatment D₂ birds (3.33%) compared to the rest of the treatments, and there were no significant differences (p<0.05) in the percentage of gizzard and belly fat among the different treatment birds at the end of the treatment period. Experience. The reason of the improvement in the productive performance of birds whose diets were added dried dill powder because it contains many active substances and contains Limonene and Carron, which have high effectiveness against fungi and thus improve the health status of the bird, which is positively reflected on its productive performance (Bahadori et al., 2013). Also, because it contains phenolic acids, volatile oils, and some necessary vitamins and minerals for the growth of the bird (Al-Ismail et al., 2004), as dill has a direct effect on improving the digestion process inside the bird's body and providing many elements necessary for its growth in addition to its properties similar to antibiotics when added to meat broiler diets due to its capability of high resistance to harmful bacteria inside the alimentary canal and improve

the bird's health and productivity status (Al-Kassie, 2009). This improvement in the productive performance of treated birds to which dried dill was added, especially during the last period of the birds' life, complied with what was reached (Bahadori and others, 2013).

Table 6. effect of dill powder on Liver, Gizzard and Abdominal fat

Carcass Quality %	Treatment ¹				Sg.
	D ₁	D ₂	D ₃	D ₄	
Liver	2.29±0.02^b	3.33±0.39^a	2.14±0.21^b	2.64±0.05^b	*
Gizzard	1.44±0.03	1.53±0.07	1.47±0.11	1.60±0.12	NS
Abdominal fat	1.10±0.23	1.09±0.15	1.44±0.10	1.47±0.16	NS
*Means in the same row with different superscripts were significantly different (P<0.05).NS: non-significant					
¹ treatment mean D ₁ :control without adding, D ₂ ,D ₃ and D ₄ :(0.4 ,0.6 and 0.8% of dill powder)					

We conclude from this study the possibility of adding dried dill powder to the diet at levels of 0.4 and 0.6% to obtain a positive improvement in the productive performance of meat broilers.

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