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## The Effect of Using Fennel Seeds (*Foeniculum vulgare* L.) on Productive Performance of Broiler Chickens

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**Abstract:** An experiment was conducted at the College of Agriculture Poultry Farm, University of Basra from 20/11/2007 to 2/1/2008 to study the effect of adding fennel seeds to the diet on productive performance of broiler chickens. A total of 120 day - old chicks were randomly distributed into four dietary treatments of fennel 0, 1, 2 and 3 g/kg diet contained 36% and 32% chick peas in the starter and finisher diets respectively. Results indicated that there was a significant improvement ( $p < 0.05$ ) in final body weight and feed efficiency. Carcass characteristics had no significant differences except true stomach and pancreas weight percentage. Flier reptition was highly significant when fennel was added. However chicks fed 1, 2 and 3 g/kg fennel had significantly ( $p < 0.05$ ) higher red blood cells, hemoglobin and packed cell volume. Hetrophil to lymphocyte ratio was significantly ( $p < 0.05$ ) declined for the chicks received 2 and 3g/kg fennel.

**Key words:** Fennel seed, broiler chicks, Aromatic plants

### INTRODUCTION

Aromatic plants are becoming more important due to their antimicrobial activity (Valero and Salmeron, 2003). They posses biological activities such as that of antioxidants (Miura *et al.*, 2002), as hypocholesterolemics (Craig, 1999), stimulant effect on animals digestive systems (Ramakrishna *et al.*, 2003), to increase production of digestive enzymes and improve utilization of digestive products through enhanced liver functions (Hernandes *et al.*, 2004). In limited research the addition of aromatic plants to the feeds and water improved feed intakes, feed conversion ratio and carcass yield (Hertramp, 2001 and Alcicek *et al.*, 2003). Romila (2001) stated that fennel (*Foeniculum vulgare* L.) is one of these aromatic plants which is containing high percentage of the fatty acids linolenic and stearic. In addition fennel has 16.81% trans- anethol pulse 47.20% estragole with total sweetening components of 64.01% in essential oil. El-Deek *et al.* (2003) indicated that body weight was increased and improvement feed conversion by using fennel in the diets. Our aim to use the fennel seeds in poultry nutrition as natural growth promoting substance. For this purpose, different levels of fennel seeds were added to the traditional ration which had chick peas to determine their effect on broiler performance.

### MATERIALS AND METHODS

An experiment was conducted at the Poultry Research Farm, Animal Resources Department, College of Agriculture, University of Basra from 20/11/2007 to 2/1/2008. A total of 120 day-old chicks were randomly distributed to four dietary treatments of fennel 0, 1, 2 and 3 g/kg diet. Each treatment contain three replicate battery cages (10 birds/cages). Birds were fed the experimental

diets from 1- 42 days of age (Table 1). Feed and water were provided *ad lib.*. Birds received all vaccination required. Chicks were weighted at 22 and 42 days of age and feed consumption was recorded during the experimental period.

Table 1: Composition of the starter and finisher diet

Ingredient %	Starter diet (1- 22) days	Finisher diet (23 - 42) days
Yellow Corn	36	40
Soybean meal (44%)	9	6
Wheat	6	7
Chick peas	36	32
Protein Concentration (50%)	10	10
Sunflower oils	2	3
Salt	1	1
Limestone	1	1
Total	100	100
Calculated composition		
Kcal ME/Kg diet	2998	3086
Crude protein %	22.12	19.52
Calorie: protein ratio	135	158
Calcium %	1.07	0.92
Phosphorus available %	0.62	0.56
Methionine + cystine	0.82	0.73
Lysine	1.29	0.92

At 42 day of age blood sample were taken from Brachial vein from 3 birds from each replicate randomly. Blood sample were used for fresh blood count. Red Blood Cell (RBC) and White Blood Cell (WBC) were measured according to the method of Natt and Herrick (1952). Packed Cell Volumes (PCV) were measured according to Archer (1965). Hemoglobin and H/L ratio were measured according to Varley *et al.* (1980), Shen and Patterson (1983) respectively. All data were subjected to an ANOVA procedure of SPSS (1999). Significant

Table 2: Fed diets containing different levels of fennel on the performance of broilers at 22 and 42 days of age (Mean±SE)

Dietary fennel g/kg	Body Weight (g)		Weight Gain (g)		Feed Consumed (g)		Feed Conversion g feed/ g body wt.	
	22 days	42 days	22 days	42 days	22 days	42 days	22 days	42 days
0	619±17	1589 <sup>b</sup> ±42	576±16	1555 <sup>b</sup> ±41	1083±45	3414±77	1.84±0.018	2.19±0.03
1	689±27	1695 <sup>a</sup> ±16	644±26	1652 <sup>a</sup> ±15	1125±31	3393±97	1.71±0.037	2.04 <sup>a</sup> ±0.06
2	675±13	1728 <sup>a</sup> ±21	641±8	1698 <sup>a</sup> ±14	1114±22	3130±54	1.73±0.013	1.84 <sup>a</sup> ±0.02
3	688±12	1761 <sup>a</sup> ±22	648±9	1719 <sup>a</sup> ±22	1100±34	3235±39	1.69±0.026	1.88 <sup>a</sup> ±0.04
Significance	N.S	0.05	N.S	0.05	N.S	N.S	N.S	0.01

Table 3: Carcass characteristic at 42 days of age of chicks received different levels of fennel (Mean±SE)

Characteristic*	Treatment of fennel g/kg				Significance
	0	1	2	3	
Dressing percentage with out giblets	71.79±0.09	71.25±0.79	71.84±0.82	72.54±0.73	N.S
Thigh weight %	21.06±0.63	22.43±0.08	20.83±0.79	20.89±0.78	N.S
Breast weight %	20.83±0.18	21.75±0.41	23.87±1.10	21.64±0.56	N.S
Heart weight %	0.81±0.07	0.82±0.02	0.82±0.03	0.87±0.05	N.S
Spleen weight %	0.11±0.02	0.12±0.06	0.13±0.005	0.13±0.02	N.S
True stomach weight %	0.41 <sup>c</sup> ±0.008	0.50 <sup>b</sup> ±0.02	0.44 <sup>c</sup> ±0.02	0.57 <sup>a</sup> ±0.006	0.01
Gall bladder weight %	0.14±0.01	0.13±0.01	0.11±0.02	0.12±0.008	N.S
Pancreas weight %	0.26 <sup>b</sup> ±0.01	0.28 <sup>b</sup> ±0.005	0.36 <sup>a</sup> ±0.006	0.34 <sup>a</sup> ±0.005	0.01
Bursa of fabricius weight %	0.10±0.01	0.09±0.006	0.11±0.02	0.07±0.02	N.S
Gizzard weight %	2.05±0.13	2.07±0.07	2.14±0.08	2.29±0.04	N.S
Liver weight %	2.39±0.10	2.24±0.11	2.23±0.16	2.48±0.08	N.S
Flier repletion of body	50.59 <sup>b</sup> ±2.8	60.94 <sup>a</sup> ±1.6	57.71 <sup>a</sup> ±2.48	59.18 <sup>a</sup> ±1.71	0.01

\*Value in the same raw with different superscripts are significantly different

Table 4: Some blood characteristic at 42 days of age of chick fed different level of fennel (Mean±SE)

Blood characteristic*	Treatments of fennel (g/kg)				Significance
	0	1	2	3	
RBC	2.79 <sup>b</sup> ±0.093	3.14 <sup>a</sup> ±0.095	3.14 <sup>a</sup> ±0.13	3.15 <sup>a</sup> ±0.05	0.05
WBC	29.12±0.71	27.59±0.53	27.89±0.45	28.63±1.40	N.S
Hb	8.81 <sup>b</sup> ±0.66	9.14 <sup>a</sup> ±0.50	10.27 <sup>a</sup> ±0.48	10.22 <sup>a</sup> ±0.69	0.05
PCV	37.01 <sup>b</sup> ±0.94	41.00 <sup>a</sup> ±1.01	41.03 <sup>a</sup> ±0.69	41.31 <sup>a</sup> ±0.52	0.05
H/L	0.69 <sup>a</sup> ±0.03	0.71 <sup>a</sup> ±0.05	0.45 <sup>b</sup> ±0.03	0.47 <sup>b</sup> ±0.04	0.01

\*Value in the same raw with different superscripts are significantly different

treatment means were separated by using the multiple range test of Duncan (SPSS, 1999).

## RESULTS AND DISCUSSION

Addition of fennel at both 1, 2 and 3 g/kg to the diets resulted in a significant (p<0.05) improvement in the chicks body weight and feed efficiency while no significant differences were observed in feed consumption (Table 2). These finding were in agreement with those of Tollba (2003) who noted that adding fennel to the diet resulted in increased body weight.

Results of this experiment also denoted that addition of 1, 2 and 3 g/kg fennel seeds to the broiler diets resulted in no significant differences in all carcass characteristic except the true stomach weight percentage and pancreas weight percentage. Flier repletion of body also improved significantly (0.01) when fennel was added to the diets (Table 3). That improvement is due to the increase in body weight.

Results on some blood characteristics have been shown in (Table 4). Chicks received 1, 2 and 3 g/kg fennel seeds in their diets had significantly (p<0.05) higher red blood cell Count, hemoglobin and PCV compared with the control group. There was a numerical decline in H/L ratio for chicks that received 2 and 3 g/kg fennel seeds. The improvement in red blood cell, hemoglobin and PCV may caused by the improvement of metabolism and increase the absorption of nutrient (National Academy of Sciences, 2003).

In general these differences among treatment groups may be due to active ingredients in fennel such as administration of trans-anethole (16.81%) and estragole (47.20%) (Romila, 2001). Anethole and estrgole have digestive stimulating and appetizing effects (Cabuk *et al.*, 2003). Bown (2001) reported that fennel has been used in connection with the following conditions, appetite increase, upsed stomach and gastric juice production which relieves nausea and is helpful for Colic

Pain. Fennel is helpful for belching gas bloating, gastrointestinal cramps and sluggish digestion, because it has antispasmodic, antifungal properties and helps prevent fermentation and gas in the stomach and bowels (Abdul-Azez, 2000). EL-Shobaki *et al.* (1990) found that fennel has promoted iron absorption in rats, suggesting positive use as a preventative agent in iron digestive system as it reveals flatulence and helps to improve the appetite. El-Deek *et al.* (2003) indicated that fennel stimulates the flow of digestive juice in the stomach and intestine and increase the efficiency of broken fats to fatty acids. He also noted that the anethole (active component in fennel seeds) affected pathogen microorganisms in digestive system and increased live body weight and improved feed conversion ratio. In conclusion it is summarized that supplementation of broiler diets with different levels of fennel was improved weight gain, feed efficiency and some carcass and blood characteristic.

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