Effect of Dietary Fenugreek Seeds (*Trigonella foenum*) as Natural Feed Addition on Broiler Chicks Performance

Magda Elmahdi Elbushra

Department of Animal Production, Faculty of Agriculture, University of Sinnar, Abunaama, Sudan.
*Corresponding author migos71@gmail.com

Abstract: The objective of this study is to evaluate the effect of fenugreek seeds as natural feed additive in broiler diets. A total of 160 unsexed one-day Ross chicks were used in this study, the broiler chicks were divided randomly into four experimental groups, each experimental group included 40 chicks in four replicates (10chicks/replicate). The first experimental group represent the control and fed basal diet, while the other groups (from 2 to 4 received the basal diets) supplemented with fenugreek at 0.5% ,1.0% and 1.5% of diet respectively. The experimental groups were nearly equal in the live body weight at the start of the experiment. The experiment was extended up to 6 weeks of age. The results showed that the:-Live body weight at 6 weeks old, body weight gain, feed conversion ratio and protein efficiency ratio were significantly improved for chicks fed diets supplemented at o.5% or 1.5% as compared to control diet. -Higher values were obtained in average feed consumption for the groups fed with 1.5% while the lower values were recorded in groups fed diets with 0.5% and 1.0% during whole experimental period. Significant improvements in efficiency of energy utilization values in average feed consumption were recorded for the groups fed diets with o.5 and 1.5% during the experiment period.

Key words: *Fenugreek* **,** *Broiler and Performance* **.**

Introduction

Large number of feed additives available for inclusion in animal and poultry diets to improve animal performance. However, the use of chemical products especially hormones and antibiotics, may cause unfavourable side effects. Moreover, there is evidence indicating that this products could be considered as pollutants for human and threaten their health on the long-run. Attempts to use the natural materials such as medical plants could be widely accepted as feed additives to improve the efficiency of feed utilization and animal productive performance (Aboul-Fotouh *et al* .,1999).It was found that Fenugreek seeds is rich in protein, fat, total carbohydrates and minerals such as calcium, phosphorus, iron, zinc and magnesium (Gupta *et al*, 1996). Moreover Fenugreek benefits the digestive system (Sahalian, 2004).The objectives of this study is to investigate the effect of fenugreek addition at different levels (o.5%, 0.1% and 1.5%) into broiler diets on growth performance.

Materials and Methods:

Experimental chicks and diets:

The present study was carried out at department of animal production, Faculty of Agriculure, Sinnar University, Abu Naama. Total of 160 unsexed one-day-old Ross chicks
were used . The broiler chicks were divided randomly into four experimental groups. Each experimental group included 40 chicks in four replicates (10 chicks/replicate).The first experimental group represents the control and fed basal diets (table 1), the groups from 2 to 4 received the basal diets supplemented with fenugreek at different levels of 0.5, 1.0 and 1.50% of diet, respectively. The experimental birds were nearly equal in the live body weight at the start of the experiment. The experiment was extended up to 6weeks of age. The experimental period included two feeding phases (starter and finisher periods). The basal diets were 23% and 18% CP and 3100 and 3200kcal ME/kg diet of the starter and finisher respectively (table 1). Experimental diets were formulated to meet the nutrient

requirements of the broiler chicks (NRC,1984). Feed and water were supplied adlibitum during the experimental periods. Chicks were grown in brooders with raised wire floors and exposed to 24 hours of constant light (12 hrs on day light and the rest on artificial lighting, using 40 watt bulbs.). All chicks were kept under the same environmental and hygienic conditions. Individual body weight was recorded at one day, th, five and six weeks of age. Live weight, body weight gain, feed consumption, feed conversion ratio, protein efficiency ratio were recorded during the experiment period.

Statistical analysis:

The data obtained from the growth study was subjected to analysis of variance according to Steel and Torrie (1980), using a completel randomized design. The significance between treatments means determined using Duncan's (1955) multiple range test (DMRT).

Table (1): Percent Ingredients of experimental diets .

Ingredients	Starter diet(%)				Finisher diet (%)			
	0	0.5	1.0	1.5	0	0.5	1.0	1.5
Sorghum	66.5	66.5	66.5	66.5	67.00	67.00	67.00	67.00
Wheat bran	15.8	15.3	14.8	14.3	15.00	14.50	14.00	13.50
Sesame cake	05.0	05.0	05.0	05.0	07.00	07.00	07.00	07.00
Fish meal	09.0	09.0	09.0	09 .0	06.50	06.50	06.50	06.50
Lysine	00.6	00.6	00.6	00.6	00.05	00.05	00.05	00.05
Methionine	00.1	00.1	00.1	00.1	00.02	00.02	00.02	00.02
Sesame oil	02.2	02.2	02.2	02.2	03.13	03.13	03.13	03.13
Lime stone	00.4	00.4	00.4	00.4	00.90	00.90	00.90	00.90
Fenugreek	00.	00.5	01.0	01.5	00.00	00.50	01.00	01.50
Salt	00.4	00.4	00.4	00.4	00.40	00.40	00.40	00.40

Results and Discussion:

Chemical composition of fenugreek:

The chemical composition of fenugreek was showed in table (2) according to A.O.A.C (1990).

Table (2): Chemical Composition of fenugreek (FK) seed.

Item (%)	Fenugreek
Moisture	7.15
Dry matter	92.85
Organic matter	33.03
Crude protein	16.51
Ether extract	9.49
Total ash	7.15
NFE	33.82
ME(kcal/kg)	38.52

Live body weight and body weight gain:

Values of live body weight (LBW) and body weight gain (BWG) of the chicks fed on the experimental diets are shown in table (3) and table (4) respectively .There were significant differences in initial live body weight among different experimental groups. Significant increases in live body weight and

body weight gain at 0-2, 2-4 and 4-6 weeks parison to control diet.

The obtained results are in agreement with that of El-Gharmy *et al*., (2004) who found that, addition of fenugreek chickens at 1.5% level had significantly ($p \leq 0.05$) heavier live body weight and body weight gain than those fed on control diet ,similarly, Morsy (1995) reported that there was a significant improvement in live body weight and body weight gain of Hubbard broiler chicks fed 500g fk/ton diet while no significant differences in live body weight and body of the treated groups with fenugreek incom-

weight gain were found for birds fed 1000g Fk/ton diet compared to the control diet at 6 weeks of age. Azooz (2001) reported that addition of FK at levels 1 and 1.5% diets (23% CP) containing two levels of metabolizable energy (3000 and 3200 kcal/kg) respectively, had no significant effect on body weight gain, while supplementation of FK to low energy diets (2800kcal/kg) up till 2% increased significantly ($p \leq 0.05$) body weight gain as compared with control diet.

Table (3): Effect of dietary Fenugreek on broiler live body weight and body weight gain/bird

	live body weight (gm) Fenugreek level			
Age	0%	0.5%	1%	1.5%
1day	43.20±o.66	43.67±o.70	43.21±o.76	43.52±o.68
2weeks	724.5±15.8 [b]	748.5±10.4[ab]	762.6±11.6 [a]	748.1 ±8.5[ab]
4weeks	1546.5±44.3 [b]	1628.2±32.6 [a]	1546.4±25 [b]	1616.7 ±19.1 [a]
6weeks	2191.7±72.5 [c]	2364.3b±50.7 [b]	2293.8[c]±41[b]	2461.3 ±33.5 [a]
	body weight gain (gm/day) Fenugreek level			
Age	0%	0.5%	1%	1.5%
2weeks	48.64±15.7 [b]	50.34 ±10.3 [a b]	51.38±11.6[a]	50.32±8.4 [a b]
4weeks	58.70 ±34.8 [b]	62.83 ±27.0 [a]	55.98 ±18 [a]	62.00 ±15.4 [c]
6weeks	46.10±38.3 [c]	51.15±40.3 [b]	52.42 ±25.4 [b]	57.90 ±27.7 [a]

Means with similar letters with in the same row are not significantly different.
± SE

Feed consumption and feed conversion ratio:

Values of feed consumption (FC) and feed conversion ratio (FCR) of day old broiler chicks fed on experimental diets are shown in table (4). Birds fed 1.5%fenugreek recorded the highest values but birds given 0.5and 1% recorded the lowest values as compared to control group, this may be due to the change in the taste of feed, as reported by Stukie (1986) who indicated that, birds have a sense of taste. The best feed conversion ratio was obtained by birds given 0.5 FK diets while the lowest was obtained by the control group, similar trend was observed by Abdel – Latif ., *et al* (2002) in Japanese quail when reported that adding FK to the control diet at a level of 1000g Fk/ton diet improved feed conversion ratio while feed consumption values were declined. Morsy

(1995) showed that no significant ($p \geq 0.05$) conversion ratio when broiler chicks fed diets containing 500 or 1000g FK/ton as compared with control diets. Azooz (2001) found that no significant ($p \geq 0.05$) differences in feed consumption and feed differences in FC and FCR between birds fed 1, 1.5, or 2% and control diet.

Table (4): Feed consumption and feed conversion ratio/bird

	Feed consumption (gm/day)			
	Fenugreek level			
Age	0%	0.5%	1%	1.5%
1day	59.60 ±79.8^{ab}	52.88 ±79.8 ^{a}	54.63 ±98^{ab}	58.00±54.0^{ab}
2weeks	99.60±158$^{a\ b}$	93.95 ±71 ^{b}	94.55 ±157$^{a\ b}$	101.04 ±177 ^{a}
4weeks	99.63 ±57^{b}	95.37 ±3.2^{b}	99.37 ±302 ^{b}	99.97 ±5.5 ^{b}
6weeks	118.10 ±111.3 ^{b}	107.97 ±35.5 ^{c}	110.8 ±114.9 ^{b}	115.78±121.7 ^{a}
	Feed conversion ratio			
	Fenugreek level			
Age	0%	0.5%	1%	1.5%
2weeks	1.96 ±0.08 ^{a}	1.72 ±0.04^{bc}	1.81 ±0.06^{abc}	1.76 ^{bc}±0.03^{bc}
4weeks	1.47 ^{a} ±0.05	1.30 ±0.03^{ab}	1.38±0.04^{ab}	1.42 ±0.02^{ab}
6weeks	1.87 ±0.10 a	1.73 b±0.11 b	1.98 a ±0.12a	1.86 a ±0.11 a

Means with similar letters are not significantly different.
± SE

Protein efficiency ratio and efficiency of energy utilization:

Results presented in table (5), showed that supplementation of fenugreek to broiler chicks significantly ($p \leq 0.05$) improve protein efficiency ratio values compared with the un-supplemented diets, there was no significant differences ($p \geq 0.05$) in efficiency of energy utilization values between chicks fed the different levels of FK compared with the control diet. Moreover significant ($p \leq 0.05$) improvements in efficiency of energy utilization for chicks fed diets containing 0.5 and 1.5% of fenugreek.

Table (5): Protein efficiency ratio and efficiency of energy utilization/bird

30

Age	Efficiency 0f energy utilization (EEU)			
	Fenugreek Level			
	0%	0.5%	1%	1.5%
2weeks	5.99±0.31	5.53±0.36	6.33±0.39	5.96±0.34
4weeks	7.96±0.88	7.00±0.47	6.28±0.25	7.16±0.52
6weeks	6.24 ±0.26[a]	5.53 ±0.12[bc]	5.84 ±0.20[abc]	5.49 ±0.09[bc]

Age	Protein efficiency ratio (PER)			
	Fenugreek level			
	0%	0.5%	1%	1.5%
2weeks	2.69 ±0.13 [b]	2.92 ±0.20 [a]	2.54 ±0.15 [b]	2.70 ±0.16 [b]
4weeks	2.16 ±0.14 [b]	2.68 ±0.04 [a]	2.67 ±0.10 [a]	2.77 ±0.07 [a]
6weeks	2.23 ±0.08 [d]	2.55 ±0.06[bcd]	2.40 ±0.08 [a]	2.47 ±0.04[abc]

Means with similar letters are not significantly different.
± **SE**

Conclusion and Recommendation:

Supplementation of fenugreek had significant effect for broiler chicks in live body weight, body weight gain, feed conversion ratio, protein efficiency ratio, feed consumption and efficiency of energy utilization.

Further Study is recommended for using fenugreek in layers rations.

References:

Abdel –latif,S.A;Faten.A.A.Ibrahim A. A and EL-kaiaty A. M. (2002). Effect of feeding dietary thyme, black cumin. Dianthus and fennel on productive and some metabolic responses of growing Japanese quail. Egypt poult.sci, 22(1): 106-125.

Aboul-Fotouh,GE; Shehat S.M.and Abdel-Azeem S. N. (1999). Effect of some medicinal plants as feed additives on performance of growing sheep.Egyptian j.Nutrition and feeds, 2(2):79-87.

Association of official Analytical chemists (A.O.A.C) 1990.Official methods of analy-sis, 15th edition, Washington, USA.

Azooz, H.M.M. (2001). Effect of hot pepper and fenugreek seeds supplementation on broiler diets Ph.D.Thesis.Faculty of Agric., Cairo university,Egypt.

Duncan,D.B(1955).Multiple range and multiple F test Biometrics,11:1-42

El-Gharmy,A.A;H.M.Azooz and A. T. El-Yamny (2004).Effect of hot pepper and fenugreek seeds supplementation to low energy diets Muscovy ducklings perfor-

mance. Egypt. poult. Sci; 23(111):613-627.

Gupta,K;k.k.Thakral;S.k.Arora and M. l. Chowdhary (1996).Structural carbohydrate and mineral seeds. Indian Coca Arecenut and species J, 20:120.

Morsy, M.M.A.(1995). The use of fenugreek (Trigonella foenum graecum), clove (Syzgium Aromaticum) in broiler nutrition as feed additives.M.Sc. Thesis, Fac. Of Agric, Alexandria Univ, Egypt.

NRC: 1984. National Research Council. Quail. In; Micro-livestock –Little known small animals with a promising future. Nation Academy Press. Washington D.C. PP. 147-155.

Sshalian,M. D.(2004).Diosgenin,a steroid sapo-nins of Trigonella foenum graecum (feungreek),inhibits azoxymethane-induced aberrantcrypt foci formation in HT-29 human colon cancer cells.prev.2004 Aug;13(8):8

Steel,G. D. R. and H. J. Torrie (1980).Principles and procedures of statistical Biometrical approach.p.633. 2nd.University of Wisconsin.

Stukie,P. D.(1986).Avian physiology.4th Ed. Published by Springe Verlag, NewYork, USA.

أثر إضافة الحلبة علي أداء الدجاج اللاحم

ماجدة المهدي البشرى
جامعة سنار – ابو نعامة كلية الزراعة والانتاج الحيواني – migos71@gmail.com

المستخلص

الهدف من هذه الدراسة هو تقييم الحلبة كمضاف غذائي طبيعي في علائق كتاكيت التسمين. استخدم في هذه الدراسة عدد 160 كتكوت روس عمر يوم غير مجنس. وزعت الكتاكيت عشوائيا الي لأربع معاملات الأولى هي المجموعة المقارنة (الكنترول) بينما المعاملات الأخرى تحتوي على بذورالحلبة بمستويات مختلفة(5،% , 1،5%)على التوالي.متوسط اوزان الجسم للمعاملات التجريبية كان متساوي تقريبا في بداية التجربة . استمرت التجربة لمدة 6 اسابيع وأوضحت النتائج أن زيادة معنوية في متوسط وزن الجسم الحي و الزيادة الوزنية المكتسبة و تحسن ملحوظ في معدل التحويل الغذائي والكفاءة النسبية للبروتين للمعاملات المضاف اليها النسب 5،% أو 1،5 % مقارنة بالقياسية. سجلت الكتاكيت المغذاة على علائق بها 1،5% أعلى متوسط استهلاك للغذاء و كان اقل متوسط للغذاء للعلائق 5، %, 1% أثناء فترة التجربة. على علائق بها 5، %, 1% وجد تحسن ملحوظ في قيم كفاءة الاستفادة من الطاقة للكتاكيت المغذاة .