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INFLUENCE OF USING VARIOUS LEVELS OF FENUGREEK ESSENTIAL OIL IN DIET ON SOME PRODUCTIVE TRAITS AND CARCASS PROPERTIES IN BROILER CHICKEN

Mohammed Jard Kadhim and Elaf Mishaal Mohammed
Al-Furat Al-Awsat Technical University, Al-Musaib Technical College, Animal Production Techniques Dept. Babel, Iraq
Corresponding author: com.moh33@atu.edu.iq

Abstract

A gross of 240 one day-old unsexed broiler chicken Ross 308 was used to explore the influence of fenugreek essential oil (FEO) on some growing performance and carcass characteristics of broiler chicken. Chicken were haphazardly divided in a complete randomized design into 4 collections (0, 1, 2 and 3% FEO) apiece group having 3 duplicates through 20 chicken per apiece. Chickens in (group 0) fed standard feed, (group 1) comprising 1% fenugreek essential oil (FEO) in feed, (group 2) complemented by 2% FEO in feed and (group 3) complemented by 3% FEO in feed. Individually broilers live body weight, body weight gain, feed consumption, feed conversion ratio, dressing ratio and carcass parts (breast, thigh and femoral part and abdominal fat) were calculates. Results indicate there were chicken nourished on 1% FEO documented significantly ($P< 0.05$) higher live body weight and body weight gain when compared to experimental groups, chicken nourished on feed complemented by using FEO spent significantly less provender and calculate the paramount feed conversion ratio compared to standard group. Supplement of FEO meaningfully affects on dressing ratio of chicken and abdominal fat, there were insignificant effects on breast and thigh and femoral part. It can be determined that addition of FEO to chickens feed recorded a best part in enhances productive performance and carcass features. Economically FEO it could be using a good alternative natural growing supporter in broiler chicken feed.

Keywords : Fenugreek, broiler, productive performance

Introduction

Antibiotic have a confident dated as withdrawal time. If an antibiotics are not confined from the poultry feed prior of slaughtering, it will be lead to a precipitation of antibiotic residues in broiler meats, this will be harmful effect on human life through consumption this meats. (Halfhide, 2003). This problem can be solved by enhancement of phyto additives, which include antibiotic and antimicrobial characteristics. Most of medicinal plants and their extract haven't negative side effects (Tipu *et al.*, 2006). Feed additives are indispensable element of poultry feed formulation that accelerate growth, feed efficiency and metabolism or health (Patel *et al.*, 2017). Fenugreek is the best origin of fatty acids starting 5-9% which are contented linoleic, oleic, linolenic and nutritional protein 21-29%. The seeds have several phytochemical mixtures for example choline diosgenin, neotigogens trigonelline and tigogenim. Fenugreek seed is the superb basis of natural resources similar calcium, selenium, copper, zinc, potassium, iron, magnesium and manganese. It must 45-65% overall carbohydrates with 15% galactomannan. Moreover it is wealthy in several all-important soluble vitamins which are essential for optimal health like a vitamin of the B complex (B1, B2, B3, B6 and B9), vitamin C and vitamin A (Michael and kumawat, 2003). It's benefits the digestive system as a laxative, intestinal lubricant, carminative, antiemetic, digestive and tonic, exhibited growth promoting action (Awadein *et al.*, 2010).

Fenugreek essential oil gained from the seed has some health benefits, it has antiviral, antioxidant, anti-inflammatory and anticancer properties (Al-Habori and Raman, 2002). Influence of added fenugreek seeds at (3g/ kg diet) as normal growing supporter for broiler chicken significantly improve live body weight, feed consumption and feed conversion ratio (Alloui *et al.*, 2012).

The goal of the research was to find out the influence of various levels of the fenugreek essential oil as feed additive on the growth production and carcass properties of broiler chicken.

Material and Methods

The experiment was conducted in the farm belong to Al-Furat Al-Awsat Technical University, Al-Musaib Technical College, Animal Production Department, to know effect of using various levels of fenugreek essential oil on some productive performance and carcass characteristics of broiler chicken, during the period from 24/2 to 6/4/2019. A overall of 240 one day-old unsexed broiler chicken Ross-308 was purchased from a commercial hatchery. Randomly chickens were placed in 4 experimental group for each group 3 replicates with 20 chicken for each replicate. The 1st group was feed on essential diet (Standard), the 2nd group was feed on essential diet and addition 1% of fenugreek essential oil (1% FEO). The 3rd group was feed on essential diet and addition 2% fenugreek essential oil (2% FEO). The 4th group was feed on essential diet and addition 3% fenugreek essential oil (3% FEO). Chicks were feed on starter and finisher diets (Table 1). Water and feed were given *ad libitum* for 42 days. In the first week the temperature was 34°C regularly decreased 2°C in each week. Afterward, it was maintained 24°C in sixth week of age, light was provided 24 hours per day. Fenugreek essential oil were bought from supermarket. Separately the chickens of each cage were weighed weekly and feed consumption was determined then evaluating. Every week, average of body weight gain and feed conversion ratio were calculated. Mortality were detailed every day during experimental age. Randomly 5 chicken to each cage were chosen, separately balanced and slay and put in warm water, plume removed by hands after that washed, after pick off and disembowel, carcasse were divided and weighed (breast muscle, leg and

femoral part, and intestinal fat) and their proportion were considered depend on body weight. Moreover, dressing ratio devoid of giblet was calculated.

The results gathered were put in to examination of differences (one-way ANOVA), and anywhere significant variances were detected, average was undergo to Duncan's variety test (Duncan, 1955).

Table 1 : The components of essential diets.

Ingredients and composition	Starting diet 1-3 week	Ending diet 4-6 week
yellow maize (%)	63.7	71
soya (44% C.P.)	27	22
Fish meal (72% C.P.)	6	3.5
Di calcium Phosphate (%)	1.2	1.4
Limestone (%)	1.5	1.5
Methionine (%)	0.2	0.2
Vitamin and Minerals (%)	0.1	0.1
Salt (%)	0.3	0.3
Overall	100	100
Detail of synthesis		
Metabolizing Energy (Kcal/kg)	2931	3004
Crude Protein (%)	21.6	19.8
Calorie / protein ratio	128.69	151.71
Calcium (%)	1.08	1.07
Overall phosphate (%)	0.98	0.68
Methionine (%)	0.57	0.35
Lysine (%)	1.21	0.95
Methionine and Cysteine (%)	0.90	0.64

Results and Discussion

Results of influence of addition various levels of fenugreek essential oil on live body weight are presented in Table 2. Treatments have significant effects on body weight of broiler chicks at 3 week of age. Higher live body weight of chicken was in 1% FEO group comparted with all experimental groups and there were no significant difference between 2% FEO and 3% FEO groups, lower live body weight was in standard group compared with rest groups and there were no significant difference (P · 0.05) between 2% FEO and 3% FEO groups. At 6 week of broiler chicken age there were significant difference between groups, higher live body weight of broiler chicks was in 1% FEO group and there were no significant difference with 2% FEO group. Lower live body weight was in standard group and not significantly different with 3% FEO group. It was noticed that all treatment which contented fenugreek essential oil have positive effect on live body weight in this experiment. Therefore, 1% fenugreek essential oil it is hypothesized the optimum level of dietary that induces positive effects on live body weight. Comparable of chicks fed 2% or 3% fenugreek essential oil. The development in live body weight may be by reason of beneficial influence on digestion and ability to modify feed texture (Murlidar and Goswami, 2012), or attributable to existence of the fatty acids (Murray, *et al.*, 1991). The results were in contract with Nadir Alloui *et al.*, (2012) and Elkhider, (2013) whose found that adding of fenugreek seeds in poultry feed improved live body weight. The results were in line which that obtained by Guo *et al.*, (2004) and Abaza (2007) who found that fenugreek seed inclusion in poultry diets significantly improved the body weight.

Results in Table 2 refer to there were notable difference (P < 0.05) in body weight gain in the groups when supplement different levels of FEO in diet, higher weight gain at 3 weeks of broilers age was in 1% FEO group while lower weight gain was in standard group and there were no significantly differences with 2% FEO and 3% FEO groups. Weight gain at six week of chicks age were show in Table 2. Significant difference noticed in groups, the highest weight gain of broiler chicks was in 1% FEO and there weren't significant difference with 2% FEO. Lower weight gain was in standard group and there were no significant difference with 3% FEO group. The improvement in weight gain may be due to the fenugreek substances of affect composites for example antifungal, anti- bacterial, anti-inflammatory and antioxidant actions. Result were agree with finding Hamden *et al.* (2010). Results are in agreement with that obtained by Guo *et al.* (2004) who found that fenugreek seeds inclusion in broiler chicken feed significantly improved body weight gain.

Using different levels of fenugreek essential oil in diet on feed consumption are shown in table 3. Broiler chicken fed on diets containing FEO at 3 week of age significantly (P< 0.05) appeared less feed consumption compared to standard group. Higher feed consumption was in standard group whilst less was in 1% FEO group. At 6 weeks of broiler age there were significant deference between groups, higher feed consumption was in 2% FEO group and there were no significant deference with standard group while lower was in 3% FEO group. significantly decreased feed consumption due to the existence of high quality proteins and essential fatty acids in the fenugreek which is adequate for growth additionally to feed elements. However, addition of fenugreek seeds to hen diet at equal of 0.05% shown haven't inconsequential effect on feed consumption compared to the standard group (Moustafa 2006). There were no effect of supplemented fenugreek seeds on feed consumption for laying hens and broilers chicken (El-Kaiaty *et al.* 2002 and Radwan 2003). Table 3. was shown there were noted differences in feed conversion ratio through groups, at 3 and 6 week of broiler chicken age higher value of feed

conversion ratio was in standard group while lower value was in 1% FEO group, the improvement in feed conversion ratio in FEO groups may due to broiler chicks have feed consumption less than standard group additionally to the components of fenugreek essential oil which adding in diet. Results are in agree with the findings of Alloui *et al*. (2012) who informed that added fenugreek seeds in broiler feed significantly affected ($p<0.05$) on feed conversion ratio during the 42 days of age.

Results of influence of adding numerous levels of fenugreek essential oil on dressing ratio of broiler chicks at 6 weeks are shown in table 4. The highest dressing ratio was in 1% FEO group however less was in 3% FEO group and there were no significant deference between standard and 2% FEO group. Table 4 shown that there were insignificant deference ($P < 0.05$) between groups in breast, thigh and femoral part weight at 6 weeks of age of broiler chicken. Results found refer that there were remarkable difference ($P < 0.05$) between groups in weight of intestinal fat of broiler chicken. The highest intestinal fat weight were in 2% FEO group whilst the lowest were in 1% FEO group and there were no significant deference between 2% FEO group and 3% FEO group. The improvement in carcass characteristics of broiler chicken in fenugreek essential oil groups may due to content of fenugreek which enhance growth of the chicks. Results are in agree with the finding (Weerasingha and Atapattu 2013) whose found the weight of empty carcass in broilers given 1% fenugreek seeds in feed was significantly higher than those fed on 3, 4 or 5%. Results are disagree with Awadein *et al*. (2010) who stated that no significant affect of fenugreek supplementation on dressing ratio in broilers, layers and Japanese quails respectively. Alloui *et al.* (2012) Mentioned that addition of 3g/kg of fenugreek seeds in broiler feed haven't significantly affected ($P>0.05$) on slaughtering traits, carcass length and dressing ratio.

Table 2 : Effect of addition various levels of fenugreek essential oil on live body weight and weight gain of the chicken Rose 308 at 3 and 6 week of age (Average ± standard error).

Treatments	**Live body weight, g / 3 weeks**	**Live body weight, g / 6 weeks**
Standard	767.08 ±37.50 b	1964 ±37.82 b
1% FEO	999.37 ±7.71 a	2457 ±35.97 a
2% FEO	841.62 ±10.04 ab	2243 ±46.86 a
3% FEO	869.16 ±51.66 ab	1930 ±36.97 b
Treatments	**Weight gain, g / 3 weeks**	**Weight gain, g /** 6 **weeks**
Standard	438.95 ±39.79 b	1721 ±116.9 b
1% FEO	704.37 ±1.45 a	2004 ± 156.9 a
2% FEO	538.5 ±1.83 ab	1964 ±140.0 a
3% FEO	540.62 ±32.29 ab	1857 ±126.8 b

Average with different superscripts in a column significantly difference at ($P<0.05$).

Table 3 : Effect of addition various levels of fenugreek essential oil on feed consumption and feed conversion ratio of the broiler chicks Rose 308 at 3 and 6 weeks of age (Average ± standard error).

Treatments	**Feed consumption, g / 3 weeks**	**Feed consumption, g / 6 weeks**
Standard	779 ±106.4 a	3540 ±123.87 a
1% FEO	742.2 ±111.2 d	3241 ±176.96 b
2% FEO	775.3 ±98.50 a	3656 ±193.97 a
3% FEO	750 ±120.7 c	3228 ±186.97 b
Treatments	**Feed conversion ratio 3 weeks**	**Feed conversion ratio** 6 **weeks**
Standard	1.76 ±0. 15 a	2.05 ±0.24 a
1% FEO	1.09 ±0. 10 c	1.61 ±0.21 c
2% FEO	1.44 ±0. 10 b	1.86 ±0.33 b
3% FEO	1.38 ±0.05 b	1.73 ±0.47 b

Average with different superscripts in a column significantly difference at ($P<0.05$).

Table 4 : Effect of addition various levels of fenugreek essential oil on dressing ratio, breast muscles, leg and femoral part and intestinal fat of Ross 308 chicks at 6 week of age (Average ± standard error)

Treatments	Dressing ratio, (%) 6 weeks	Breast muscle, g / 6 weeks
Standard	74.1 ±11.98 b	22.5 ±2.98 a
1% FEO	75.8 ±12.09 a	24.3 ±2.65 a
2% FEO	74.3 ±16.09 b	23.4 ±2.54 a
3% FEO	72.9 ±21.98 c	23.7 ±3.98 a
Treatments	**Leg and femoral part, g / 6 weeks**	**Intestinal fat, g /** 6 **weeks**
Standard	32.1 ±6. 89 a	0.87 ±0.04 b
1% FEO	32.3 ±7.19 a	0..85 ±0.05 b
2% FEO	32.8 ±8.11 a	**1.95** ±0.04 a
3% FEO	31.7 ±7.94 a	1.93 ±0.06 a

Average with different superscripts in a column significantly difference at ($P<0.05$).

Conclusion

The fore mentioned results confirm the beneficial use of Fenugreek essential oil (1% FEO) within broiler chicken feed, such it improve productive traits. Fenugreek essential oil could a substitute to antibiotic growing developers and it is the better suggested as feed additive.

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