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Effect of Dietary Inclusion of Sunflower Meal on Performance, Carcass Traits, Litter Moisture and Economic Efficiency of Broiler Chickens

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Abstract

An experiment was designed to investigate the influence of different levels of dietary inclusion of sunflower meal on broiler's productive performance, serum lipid profile, carcass traits, litter moisture and economic efficiency. One hundred and twenty, day-old Cobb broiler chicks were assigned randomly into 5 equal groups, each contained 24 chicks in three replicate pens (8 chicks/pen). Group 1 was fed on basal diet without sunflower meal and kept as a control group, while groups from 2 to 5 were fed on diets contained 2.5, 5, 7.5 and 10% sunflower meal, respectively. Birds individual weights and pen feed consumed were determined for each feeding period for determining the average body weight (BW), average daily gain (ADG), average daily feed intake (ADFI) and feed conversion ratio (FCR). At the trial end, a total of six birds from each group were picked randomly, slaughtered and the visceral organs (liver, gizzard, heart and spleen) plus fat pad were separately weighed for calculating the dressing percentage and the percentage of internal organs relative to carcass weight. Furthermore, litter moisture percentage and economic efficiency were calculated at the trial end. The averages of BW, ADG, ADFI and FCR were not significantly differed among groups. No differences ($P>0.05$) were observed in the serum lipid parameters and carcass traits among experimental groups. However, the spleen percentage was significantly higher in broilers group that fed on 10% sunflower meal in comparison to those fed on 2.5, 5 and 7.5 sunflower meal, while the litter moisture percentage was not significantly affected. The best economic efficiency was reported in broilers group fed on 10% sunflower meal but the difference did not reach the significance level. It is concluded that levels up to 10% of sunflower meal can be successfully incorporated in broiler chicken diets.

Key words: Sunflower meal, Performance, Lipid, Carcass, Litter, Broilers.

Introduction

Utilizing alternative protein rich feed ingredients in poultry nutrition is of an ongoing interest for both nutritionists and poultry producers. Although, soybean meal is the standard source of protein in poultry diets, but alternative sources such as corn gluten meal, canola meal, distillers grains (DDGS), guar meal, and sunflower meal become currently available in the Egyptian market at reasonable prices. Sunflower meal is ''the by-product of the oil extraction process of sunflower seed'' which belongs to the genus Helianthus annuus that is a mixture of protein containing kernel and hulls [1]. Its content of protein varies from 28 to 36%, and fiber from 18 to 30%. Although dietary inclusion of sunflower meal could lower the diet cost, the main nutritional limitations of its inclusion were lower energy and lysine, and higher crude fiber content in comparison with soybean meal. These limitations reduce the inclusion level of sunflower meal in chicken diets [2]. Most of the previous studies were conducted to evaluate the inclusion effect of sunflower meal in broiler's diets; some researchers recommended its inclusion at levels up to 10% [2,3], while others at levels up to 30% [4]. From a practical point of view, dietary inclusion of sunflower meal should be less that 10%, because increasing the level of sunflower meal will increase the need for adding more dietary oil to restore the required metabolizable energy with subsequent adverse effect on pellet quality. This experiment was planned to explore the effect of the different levels of sunflower meal (0, 2.5, 5, 7.5 and 10%) on the broiler's performance, serum lipid profile, carcass traits, and litter moisture.

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Material and Methods

Experimental birds and management

A total of 120 day-old broiler chicks (Cobb) were obtained from a commercial hatchery and reared at the Experimental Research Animal Unit in the Faculty of Veterinary Medicine, Zagazig University. The chicks were weighed at arrival and randomly distributed into 5 equal groups according the level of inclusion of sunflower meal as followings: Group I, no inclusion with sunflower meal (Control); Group II, 2.5% sunflower meal; Group III, 5% sunflower meal; Group IV, 7.5% sunflower meal; Group V, 10% sunflower meal. Each group was subdivided into three replicates reared in pens of equal size (8 chicks/pen). The chicks were reared in a naturally ventilated house provided with sawdust bedding materials with stocking density of 10 birds /m^2. The house incubation temperature was 33°C at the beginning of the experiment then weekly lowered by 2°C. The lighting was continuous throughout the experiment using natural lighting with enrichment of incandescent artificial light.

The chicks were vaccinated against Newcastle disease virus; Hitchner B1 strain at day 7 via eye-drop, Inactivated oil adjuvant clone 30 strain at day 15 via S.C injection of 0.25 mL per chick, and LaSota strain at day 17 via eye-drop); Gumboro disease virus (D78 strain, at days 12 and 22 via drinking water); Infectious Bronchitis virus (H 120 strain at day 7 via eye-drop) which was administered in combination with Hitchner B1 strain; Avian Influenza disease virus (Reassortant inactivated H5N1 Subtype, Re-1 Strain) at day 9 via s/c injection of 0.3 mL per chick). They also were given a mixture of colistin and flumequin antibiotics (1 g / L of drinking water) for 12 h every day during the first 3 days of the trial. All the vaccines were produced by Intervet International B.V., Boxmeer, Netherland, except Avian Influenza H5N1 Subtype, Re-1 Strain was produced by Harbin Weike Biotechnology Development Company, Harbin, China. The diet specifications met the nutrient requirements of broiler chickens as set by the National Research Council [5]. The feeding program was divided into 3 feeding phases: starter (0-21 days of age), grower (22-35 days of age), and finisher (36-42 days of age) (Table 1). The diets were isocaloric, isonitrogenous, and provided in mash. Feed and water were available ad-libitum. No synthetic antimicrobials were included in the experimental diets. The proximate composition of the feed ingredients and diets was conducted according to the procedures described by AOAC [6].

Growth performance parameters

Individual bird weights and feed consumed per pen were determined for each feeding period to detect the average body weight (BW), average daily gain (ADG), average daily feed intake (ADFI) and feed conversion ratio (FCR).

Serum lipid profile

At 42 days of age, blood samples were collected from five random birds per treatment into test tubes without anti-coagulant. The collected samples were kept in the refrigerator for 12 hrs, centrifuged for 15 minutes at 3000 rpm to separate the serum then stored at -20 ºC till analyzed. Colorimetric determination of the serum lipid profile components was conducted using commercial kits (total lipids [7] using Diamond Diagnostic kit (Egypt); triglycerides [8], total cholesterol [9] and high-density lipoprotein cholesterol (HDL-C) [10] using Spinreact kits (Spain)). The very low-density lipoprotein cholesterol (VLDL-C) was estimated via dividing triglycerides levels by 5. The difference between total cholesterol and the combined concentrations of HDL-C and VLDL-C was considered the value of the low-density lipoprotein cholesterol (LDL-C) [11].

Carcass traits

At the trial end, six birds were slaughtered randomly per group (2 birds/pen), and the internal organs (gizzard, liver, heart, spleen) plus fat pad were separately weighed to determine the dressing percentage weight without giblets to live body weight and the percentages of internal organs.

Litter moisture

Samples from litter materials were gathered from four places with equal distance inside each pen. The litter samples were homogenously combined then subsamples (100g) were obtained. Moisture analysis of the

litter was determined via drying 50 g samples in a hot air oven at 60 ºC for 24 h [12] with duplicate samples per pen, then weighed after cooled.

Economic efficiency

The economic efficiency (Y) was calculated according to El-Kerdawy [13] using the following equation: Y= (A-B)/B x 100, where A is the selling price of the obtained gain and B is the feeding cost of this gain.

Statistical analysis

Obtained results were subjected to one-way ANOVA using Statisitx 9© [14]. The statistical model used was $Y_{ijk} = \alpha_i + T_j + R_k + e_{ijk}$, where Y_{ijk} is the measured variable, α_i is the overall mean, T_j is the effect of treatment, R_k is the effect of replicate, which was not found to be significant in the current study, and e_{ijk} is the residual error. Significant means were detected by LSD test. Statements of statistical significance were based on $P<0.05$.

Results

Growth performance

The averages of body weight, daily gain, and daily feed intake of broiler chickens were not significantly differed ($P>0.05$) among the different groups during different feeding periods (Table 2). The FCR was not affected by adding sunflower meal during different feeding periods ($P>0.05$). However, the FCR of broilers fed on diets contained 2.5% sunflower meal was significantly lowered by about 1.9 and 2.3% when compared to those fed on 0 and 7.5% or 10% sunflower meal respectively during the feeding period of 36-42 days of age (Table 2). The mortality rate among groups was very low; only two birds were dead in-group II (2.5% sunflower meal) and one bird was dead in group V (10% sunflower meal). No mortality was observed in other groups.

Serum lipid profile

Dietary intake of different levels of sunflower meal did not reveal any significant difference ($P>0.05$) in the measured serum lipid parameters (total lipid, total cholesterol, high, low and very low density lipoprotein cholesterols, Table 3).

Carcass traits

The obtained results revealed no significant differences in the selected measured carcass traits (dressing, liver and gizzard percentages) among the experimental groups. However, the spleen percentage was the highest in broilers fed on diet contained 10% sunflower meal in comparison to those fed on 2.5, 5 and 7.5% sunflower meal (Table 3).

Litter moisture

The litter moisture percentage of 42-day-old broiler chickens was not significantly influence by inclusion of different levels of sunflower meal (Table 4).

Economic efficiency

Although, the economic efficiency (EE) was not significantly differed among groups, the highest numerical value was found in broilers fed on diet contained 10% sunflower meal followed by those fed on 5 and 2.5% of sunflower meal, respectively. In the meantime, the lowest EE value was found in broilers fed the control diet (Table 4).

Table 1: Physical and chemical composition of the experimental diets in three feeding phases of broiler chickens

Ingredients	Starter period (0-3 wks)					Grower period (3-5 wks)					Finisher period (5-6 wks)				
	G I	G II	G III	G IV	G V	G I	G II	G III	G IV	G V	G I	G II	G III	G IV	G V
Yellow corn	54.02	52.81	51.62	50.41	49.20	58.80	57.59	56.39	55.18	53.98	63.07	61.86	60.65	59.45	58.25
Soybean meal, 46% CP	35.44	33.747	32.05	30.36	28.67	30.38	28.69	27.00	25.31	23.61	25.44	23.75	22.06	20.37	18.67
Corn gluten, 60% CP	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Sunflower meal 36%CP	0	2.5	5	7.5	10	0	2.5	5	7.5	10	0	2.5	5	7.5	10
Soy oil	2.55	2.94	3.33	3.72	4.12	3.27	3.66	4.05	4.44	4.84	4.16	4.55	4.95	5.34	5.736
Calcium carbonate	1.05	1.046	1.038	1.03	1.022	0.958	0.950	0.942	0.935	0.927	0.929	0.922	0.914	0.906	0.898
Dicalcium phosphate	2.05	2.044	2.038	2.031	2.025	1.816	1.810	1.803	1.797	1.790	1.693	1.687	1.681	1.674	1.668
Salt	0.31	0.311	0.310	0.309	0.309	0.262	0.261	0.261	0.260	0.259	0.265	0.264	0.263	0.263	0.262
Sodium bicarbonate	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Premix *	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
DL-methionine, 98%	0.275	0.267	0.260	0.252	0.244	0.235	0.227	0.220	0.212	0.204	0.196	0.188	0.180	0.173	0.165
L-lysine, 78%	0.268	0.292	0.316	0.340	0.364	0.249	0.273	0.297	0.321	0.345	0.226	0.250	0.274	0.298	0.322
L-threonine	0.036	0.039	0.042	0.045	0.048	0.034	0.037	0.040	0.043	0.046	0.021	0.025	0.028	0.031	0.034
Chemical composition % (Calculated)															
Crude protein	23.00	23.00	23.00	23.00	23.00	21.00	21.00	21.00	21.00	21.00	19.00	19.00	19.00	19.00	19.00
ME* (kcal/kg diet)	3000	3000	3000	3000	3000	3100	3100	3100	3100	3100	3200	3200	3200	3200	3200
Crude fiber	3.035	3.374	3.713	4.052	4.391	2.888	3.226	3.565	3.904	4.243	2.734	3.073	3.412	3.751	4.09
Calcium	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.850	0.850	0.850	0.850	0.850
Av. Phosphorus	0.5	0.5	0.5	0.5	0.5	0.450	0.450	0.450	0.450	0.450	0.420	0.420	0.420	0.420	0.420
lysine	1.40	1.40	1.40	1.40	1.40	1.25	1.25	1.25	1.25	1.25	1.10	1.10	1.10	1.10	1.10
Analyzed values															
Dry matter %	88.5	88.7	89.0	88.5	88.5	89.2	89.0	89.3	88.8	89.1	88.9	89.5	88.3	88.7	88.7
Crude protein %	22.85	22.75	22.8	22.75	22.7	20.6	20.8	20.75	20.75	20.75	18.7	18.9	18.7	18.8	18.85
Ether extract %	5.50	5.90	6.20	6.65	7.0	5.50	6.60	6.95	7.32	7.60	7.0	7.45	7.75	8.0	8.40
Ash %	5.75	5.85	5.60	5.75	5.90	5.90	5.65	5.86	5.75	5.66	5.5	5.78	6.1	5.77	5.85

G: Group, G I, 0% sunflower meal (Control); G II, 2.5% sunflower meal; G III, 5% sunflower meal; G IV, 7.5% sunflower meal; G V, 10% sunflower meal . * Alrowaad Premix: each 3.00 kg contained Vit. A (10000000 IU), Vit. D3 (2000000 IU), Vit. E (10000 mg), Vit. K3 (1000 mg), Vit. B1 (1000 mg), Vit. B2 (5000 mg), Vit. B6 (1500 mg), Pantothenic acid (10000 mg), Vit. B12 (10 mg), Niacin (30000 mg), Folic acid (1000 mg), Biotin (50 mg), Choline (500 mg), Fe (30000 mg), Mn (60000 mg), Cu (4000 mg), I (300 mg), Co (100 mg), Se (100 mg), and Zn (50000 mg).**

Table 2: The effect of adding different levels of sunflower meal to the diet on growth performance of broiler chickens

	Group I	Group II	Group III	Group IV	Group V	*P*-value
Average body weight (g)						
1 day of age	42.53± 0.07	42.68± 0.07	42.50± 0.15	42.49±0.19	42.35± 0.15	0.88
21 day of age	868.5± 15.1	901.3± 17.1	890.1± 19.3	860.3±16.3	869.45± 18.1	0.12
35 days of age	1832.7±28.4	1884.8±35.1	1893.7± 36.5	1789.9±22.4	1839.3±30.5	0.16
42 days of age	2367.9±32.9	2437.0±53.9	2456.5± 44.1	2345.7±30.4	2375.4±35.2	0.11
Average daily gain (g)						
0-21 days of age	39.30±0.71	40.90± 0.82	40.35± 0.93	38.92± 0.76	39.40± 0.87	0.23
22-35 days of age	68.87±1.26	70.25± 1.45	71.67± 1.25	66.40± 0.86	69.27± 1.01	0.20
36-42 days of age	76.45±2.28	78.87±2.83	80.40± 1.28	79.40±1.43	76.57±0.92	0.17
0-42 days of age	55.35±0.81	57.00±1.27	57.50± 1.05	54.82±0.74	55.55±0.83	0.12
Average daily feed intake (g)						
0-21 days of age	49.97± 1.03	51.55± 1.24	51.02± 0.78	50.00±0.89	49.75± 0.97	0.16
22-35 days of age	123.8± 1.61	126.32± 2.34	128.95± 1.98	122.17±1.66	125.15± 1.91	0.18
36-42 days of age	163.0±4.27	165.08±6.67	169.53± 2.57	169.6±2.61	164.80±2.23	0.25
0-42 days of age	93.45±1.42	95.40±2.29	96.72± 1.41	94.00±1.21	94.07±1.39	0.14
Feed conversion ratio						
0-21 days of age	1.27± 0.01	1.26± 0.01	1.27± 0.01	1.28±0.01	1.26± 0.01	0.20
22-35 days of age	1.80± 0.02	1.80± 0.02	1.80± 0.02	1.84±0.02	1.81± 0.01	0.14
36-42 days of age	2.14±0.01^{ab}	2.10±0.01^{c}	2.11± 0.01^{bc}	2.14±0.01^{ab}	2.15±0.01^{a}	0.05
0-42 days of age	1.69±0.01	1.67±0.01	1.68± 0.01	1.72±0.01	1.69±0.01	0.12

G: Group, G I, 0% sunflower meal (Control); G II, 2.5% sunflower meal; G III, 5% sunflower meal; G IV, 7.5% sunflower meal; G V, 10% sunflower meal; ± SE (standard error); ^{a,b,c} means within the same row with different superscripts are significantly different at P<0.05.

Discussion

This study hypothesized that sunflower meal can be efficiently used in broiler chicken diets without negative effects on performance once the diets become balanced in energy and lysine contents. The obtained results approved this hypothesis, where broilers fed on diets containing sunflower meal had a good growth performance comparable to those fed on diets without sunflower meal. Moreover, the feed conversion ratio was improved during the finisher period (36-42 days of age) when sunflower meal was incorporated in the diet with the levels of 2.5 and 5%. Most of previous studies indicated that sunflower meal can be utilized in broiler chicken diets at levels up to 20% [15-18] or even up to 40% [19-21] without negative effects on growth performance and feed efficiency. Other researchers reported a positive improvement in the feed efficiency when sunflower meal was included for the entire fattening period of broilers at levels of 10 or 20% [22]. Furlan [23] showed a significant improvement in the weight gain and feed intake by 12 and 13%, respectively when sunflower meal was included in the diet as a partial substitute for 30% of the amount of soybean meal. Nevertheless, other studies had a negative effect of sunflower meal on the growth performance when included at levels higher than 10% [24]. These variations observed among different studies were attributed to the variation in the managemental conditions and the level of lysine and metabolizable energy used when sunflower meal was included in their diets. From a practical prospective, utilizing higher level of sunflower meal (more than 10%) could have adverse effects on the pellet quality and durability. This may be due to increase dietary fat and oil to correct the energy content of the diet when increasing the levels of sunflower meal.

Table 3: The effect of different levels of sunflower meal on the serum lipid profile and carcass traits of 42-day-old broiler chickens

	Group I	Group II	Group III	Group IV	Group V	*P*-value
Lipid profile (mg/dL)						
Total lipid	303.3±24.40	316.1±15.1	320.8±10.1	302.6±16.95	329.1±14.7	0.39
Total cholesterol	161.3±11.3	164.6±8.25	173.0±10.05	158.3±6.08	173.7±9.05	0.26
HDL	61.40±5.77	66.51±3.41	59.62±3.38	61.40±4.43	62.11±3.72	0.15
LDL	83.62±9.95	80.91±6.65	96.37±7.79	80.52±6.97	94.55±10.75	0.10
VLDL	16.12±1.55	17.0±1.18	16.50±1.13	16.10±1.27	16.8±0.76	0.24
Carcass trait (%)						
Carcass dressing	70.40±0.90	70.07±0.81	71.2±0.80	72.02±1.32	70.50±1.10	0.23
Liver	3.10±0.22	3.02±0.21	3.02±0.21	3.17±0.22	2.35±0.23	0.12
Gizzard	2.75±0.19	2.65±0.10	2.93±0.16	3.17±0.13	2.82±0.21	0.30
Heart	0.65 ± 0.05^{b}	0.63 ± 0.03^{b}	0.55 ± 0.03^{b}	0.57 ± 0.02^{b}	0.76 ± 0.03^{a}	0.05
Spleen	0.64 ± 0.02^{ab}	0.56 ± 0.03^{bc}	0.50 ± 0.01^{c}	0.52 ± 0.01^{c}	0.66 ± 0.03^{a}	0.01

G: Group, G I, 0% sunflower meal (Control); G II, 2.5% sunflower meal; G III, 5% sunflower meal; G IV, 7.5% sunflower meal; G V, 10% sunflower meal; HDL = high density lipoprotein; LDL = low density lipoprotein; VLDL = very low density lipoprotein; ± SE (standard error); ^{a,b,c} means within the same row with different superscripts are significantly different at P<0.05.

Table 4: Effect of feeding different levels of sunflower meal on the litter moisture and economic efficiency of 42-day-old broiler chickens

	Group I	Group II	Group III	Group IV	Group V	*P*-value
Litter moisture						
Litter moisture %	32.52±0.86	33.75±1.03	32.70±0.25	34.25±1.25	33.53±0.28	0.33
Economic efficiency						
Feeding cost of the obtained gain (B) (Pound)	15.30±0.23	15.52±0.36	15.60±0.22	15.07±0.18	15.00±0.24	0.18
Selling price of the obtained gain (A) (pound)	27.92±0.40	28.72±0.64	28.97±0.54	27.65±0.38	28.00±0.42	0.21
(A-B)/B	0.82±0.03	0.85±0.03	0.85±0.03	0.83±0.03	0.87±0.03	0.15
Economic efficiency (EE)	82.42±1.13	85.15±1.15	85.27±1.29	83.20±1.26	86.65±1.25	0.22

G: Group, G I, 0% sunflower meal (Control); G II, 2.5% sunflower meal; G III, 5% sunflower meal; G IV, 7.5% sunflower meal; G V, 10% sunflower meal; ± SE (standard error).

The serum lipid profile was not significantly influenced when sunflower meal was included in the diets at levels up to 10%. Similarly, Cheve-Isarakul and Tangtaweewipat [25] revealed that dietary incorporation of sunflower meal in broiler diets had no influence on the serum cholesterol concentration. Likewise, dietary inclusion of 7, 14, and 21% of full fat sunflower seed didn't result in significant difference in the serum triglyceride, and high and low-density lipoproteins of broilers [26]. Additionally, replacing soybean meal by sunflower meal at different levels (0, 25, 50 and 75%) didn't significantly affect the serum lipid profile of broiler chickens [27].

Although dietary intake of sunflower meal did not have a significant impact on most of the measured carcass traits, but a significant increase in the heart and spleen percentages was observed when sunflower meal was fed at a level of 10%. Increased spleen size can be considered an indication for improved immune status [28]. Although we did not measure immunity parameters in this trial, we feel that mentioning this finding could be of an interest for future research studies. Similarly, Ozen and Erdem [28] did not observe significant difference in the dressing percentage of broiler chickens when sunflower meal replaced different levels of soybean meal (0, 25, 50, 75 or 100%). In addition, El-Sherif [29] revealed that partial substitution of soybean meal by 5, 10 or 15% of sunflower meal did not result in significant difference in the abdominal fat or carcass component (liver and gizzard) percentages. Furthermore, Araujo [30] and Horvatovic [31] did not observe significant difference in the carcass yield due to feeding of sunflower meal in broiler chicken diets. On the other hand, Salari [32] reported that dietary inclusion of 0 to 20% of full fat sunflower meal led to a linear significant decrease in the liver percentage.

Based on the positive correlation between crude fiber content of the diet and litter moisture content, we expected to notice an adverse effect on the litter moisture when sunflower meal has been included in the diets particularly at high inclusion levels (7.5 and 10%). Inclusion of different levels of sunflower meal in the current study increased the crude fiber content of the diets by levels up to 45, 47, and 50% in the starter, grower and finisher stages, respectively. A high dietary crude fiber can increase the water binding capacity in the GIT, and subsequently increase the water content of droppings [33].

The litter moisture percentage was not significantly influenced by feeding of different levels of sunflower meal. This trial was conducted in the summer months; therefore, a significant quantity of moisture content of the litter could be evaporated quickly to the environment due to the effect of hot weather. A pronounced adverse effect of dietary sunflower meal on the litter moisture could be observed if the trial was conducted in the winter months (which could be of interest in future studies). Similar finding was observed by Araújo [30] who did not report a significant difference in the litter moisture percentage when sunflower meal was included in the broiler chicken diets at a level of 15%. Although the economic efficiency was not significantly differed among treatments, the numerical improvement observed in broilers fed on 10% sunflower meal is an indicator for more profits could be obtained at this inclusion level. Up to the authors knowledge, there was a lack of references that discuss this point.

Conclusion

Based on the economic efficiency and utilization of byproduct proficiency, sunflower meal could be successfully incorporated in broiler diets at levels up to 10% without being detrimental to the growth performance, lipid profile, carcass yield and litter moisture, once the formulated diet contained sufficient level of lysine and energy.

Conflict of interest

None of the authors have any conflict of interest to declare.

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الملخص العربى

تأثير إضافة كسب عباد الشمس إلى علائق بدارى التسمين على الأداء الإنتاجى, صفات الذبيحة, رطوبة الفرشة و الكفاءة الإقتصادية

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أجريت هذه التجربة لدراسة تأثير إضافة مستويات مختلفة من كسب عباد الشمس إلى علائق بدارى التسمين على الأداء الإنتاجى, صفات الذبيحة, نسبة الرطوبة في الفرشة و الكفاءة الإقتصادية. تم تقسيم الطيور(١٢٠ طائر) إلى خمس مجموعات بحيث إحتوت كل مجموعة على ٢٤ طائر في ثلاث تكرارات (٨ طائر بكل تكرار). غذيت طيور المجموعة الأولى على العليقة الضابطة بينما غذيت طيور باقى المجموعات من الثانية حتى الخامسة على مكونات العليقة الضابطة مضافا إليها ٢.٥, ٥, ٧.٥ و ١٠% كسب عباد الشمس. تم تسجيل أوزان و كمية العلف المستهلكة فى نهاية كل فترة و ذلك لحساب متوسط وزن الجسم، معدل الزيادة اليومية، معدل كمية العليقة المستهلكة يوميا و معدل التحويل الغذائى. فى نهاية التجربة, تم ذبح ٦ من بدارى التسمين بصورة عشوائية من كل مجموعة و ذلك لدراسة صفات الذبيحة. تم تجميع عينات من الفرشة فى عمر ٤٢ يوم لقياس نسبة الرطوبة بها وأيضا تم حساب الكفاءة الإقتصادية. أظهرت النتائج أن إضافة المستويات المختلقة من كسب عباد الشمس لم تؤدى إلى ظهور فروق معنوية في وزن الجسم, معدل الزيادة اليومية, معدل إستهلاك العلف الكلى و معدل التحويل الغذائي خلال فترة التجربة. كما لم تسجل فروق معنوية بين المجموعات المختلفة في مستوى الدهون وصفات الذبيحة ولكن كان هناك زيادة معنوية فى وزن الطحال في بدارى التسمين التي غذيت على عليقة تحتوى على ١٠% كسب عباد شمس بالمقارنة بالمجموعة الضابطة. أظهرت النتائج عدم وجود فروق معنوية بين المجموعات المختلفة فى نسبة الرطوبة في الفرشة. كانت أفضل قيمة عددية الكفاءة الإقتصادية في المجموعة التي إحتوت على ١٠% كسب عباد شمس ولكن الفرق كان غيرمعنويا. يستخلص من هذة الدراسة أنة يمكن إضافة كسب عباد الشمس بنجاح في علائق الدواجن بنسب تصل إلى ١٠% .