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EFFECT OF NIGELLA SATIVA SEEDS ON GROWTH PERFORMANCE, CARCASS TRAITS AND ECONOMIC EFFICIENCY OF BROILER CHICKS UNDER EGYPTIAN CONDITION

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ABSTRACT: This experiment was conducted to study the influence of feeding a natural feed additive, Nigella sativa seeds (NS), at different levels on growth performance, carcass characteristics and economic efficiency of broiler chicks. One hundred and forty unsexed one-day-old Arbor Acres broiler chicks were battery reared in a semi-open house. Chicks were assigned into four treatment groups. Each treatment consisted of seven replicates each replicate contained five birds. The first diet was the control without NS. The second, third and fourth diet were supplied with 0.5, 1.0 and 1.5% Nigella sativa, respectively. Results showed that the addition of NS at 0.5, 1, and 1.5% levels induced higher market body weight and body weight gain compared to the control group. Moreover, NS supplementation significantly ($P<0.05$) increased ether extract and crude fiber digestibility compared to the control group.

Carcass weight percentage increased ($P<0.05$) due to feeding NS at different levels ranged between 74.7 to 76.5% compared to the control group (66.4%). In addition, Bursa of Fabricius and heart weight percentages were higher than those of the control group at 1 and 1.5% NS levels. Broiler chicks fed diets supplemented with 0.5% and 1% NS were more economical than the control group. They showed a high increase in total revenue, net revenue and relative economic efficiency percentages. It could be concluded that the addition of NS up to 1% seems to have a positive effect on growth, carcass characteristics and economic performance, moreover, it can be used as a growth promoter feed additive for broiler chicks.

Key words: Nigella Sativa – Broiler – growth – carcass – economic.

INTRODUCTION

Feed additives as antibiotics, prebiotics and probiotics are widely used in poultry diets as growth promoters to improve nutrient utilization and feed efficiency. Most growth promoters supplemented to broiler feeds were antibiotics. However, because of their drug residues and subsequent antibiotic resistant-bacteria, researchers paid an attention to natural growth promoters (medicinal plants) as Nigella sativa seeds in broiler feeding (Guler et al., 2006). Nigella Sativa (black cumin) is an aromatic plant, it is used traditionally to promote health as diuretic (Zaoui et al., 2000), antidiabetic (Meral et al., 2001), antiparasitic (Mahmoud et al., 2002), digestive and appetite stimulant (Gilani et al., 2004). It has an antibacterial activity (Nair et al., 2005), as well as antioxidant effect (Tawfeek et al., 2006).

Nigella sativa seeds dietary supplementation has revealed some of its positive effect on broiler chicks' performance (Guler et al., 2006; Abu-Dieyeh and Abu-Darwish, 2008), weight gain, feed conversion ratio (AL-Harthi, 2004; Khan et al., 2012), feed intake, dressing and internal organ weight percentages (Durrani et al., 2007). Moreover, the effects of NS feed supplementation on growth performance and carcass measurements of broiler chicks have been explored in some studies. Nigella sativa had a positive effect on body weight gain and feed conversion ratio (Al-Harthi, 2004; Khan et al., 2012), body weight gain, thigh and breast weight percentages (Durrani et al., 2007), as well as dressing weight percentage (Halle et al., 1999; Durrani et al., 2007).

On the contrary, with the increase of NS extract level, the feed consumption was linearly decreased (Mehmet et al., 2008). Attia et al. (2008) found that higher levels of NS meal decreased growth and feed utilization of laying Japanese quail hens. In addition, Nasir and Grashorn (2010) and Yesuf et al. (2017) did not record any significant (P>0.05) changes in broiler body weight and gain due to feeding NS supplements at different levels. The last authors did not find significant changes in liver, heart, and internal organ weight percentages. Subsequently, the present work objective was to investigate the effect of Nigella Sativa seeds supplementation at different levels in broiler diets on growth performance, carcass traits and economic efficiency.

MATERIALS AND METHODS

This work was carried out at El-Bostan Farm, Faculty of Agriculture, Damanhour University during the period from July to August, 2012.

Chicks, diets and experimental design: One hundred and forty unsexed one day old Arbor Acres broiler chicks were fed the experimental diets (Table 1) during the period from 1–45 days of age. The chicks were randomly assigned in a straight run experimental design among four treatments, each replicated 7 times with 5 unsexed chicks per replicate. Corn-soybean meal basal diet was formulated to be isocaloric and isonitrogenous to meet the nutritional requirements according to NRC (1994). The basal diet was administered without supplements (control group) or supplemented with Nigella sativa seeds at 0.5, 1.0 and 1.5% levels (Table 1). Nigella sativa contain 21.16% crude protein, 31.97% ether extract, 10.92%

crude fiber, 5.58% moisture and 1.88% ash according Mohammed (2016).

Husbandry of chickens:

Chicks were kept in battery brooders (40×45×60 cm) under similar managerial and hygienic conditions in a semi-open house. Water and mash diets were given ad libitum throughout the whole experimental period. The brooding temperatures were 33, 31 and 30°C during the 1st, 2nd and 3rd weeks of age, respectively. During 21-45 days of age, the average ambient temperature and relative humidity (RH%) were 30 ± 3°C and 45 ± 4%, respectively. The lighting regimen was 23:1 light-dark cycle.

Data Collection:

Body weights (g) were recorded at 1, 14, 30 and 45 days of age, body weight gain (g/period), feed intake (g) and feed conversion ratio (g feed /g body weight gain) were calculated for the periods 1-14, 15-30, 31-45 and 1-45 days of age.

Nutrients' digestibility:

The effect of dietary treatments on the digestibility of dry matter (DM), crude protein (CP), ether extract (EE), crude fiber (CF) and ash were performed at days 32 to 35 of age using five replicates of five chicks housed individually in metabolic cages /treatment using total collection method as cited by Attia et al. (2001). Nitrogen, EE, CF and CA content of the excrement as well as those of feed were determined according to AOAC (1995).

Carcass traits:

At 28 and 45 days of age, six chicks were taken randomly from each treatment, and slaughtered. The remaining carcass after bleeding, plucked, eviscerated and weighed (dressed carcass weight). Liver, proventriculus, gizzard, heart, pancreas, intestine and abdominal fat were separated and weighed. The carcass and ~~organs~~ parts were expressed as relative to live body weight.

Chemical and physical traits of meat:

Meat samples from breasts and thighs (50:50 basis) from each experimental diet were chemically analyzed for DM, CP, lipid and crude ash according to AOAC (1995). Meat tenderness and water holding capacity (WHC) were measured according to the method of Volvoinskaia and Kelman (1962). Color intensity of meat and drip were determined according to the method of Janisch et al. (2011), whereas pH values were measured by a pH meter as described by Aitken et al. (1962).

Economic efficiency:

An economic evaluation was made for all the experimental diets. Economic efficiency was calculated as described by Zeweil (1996) using the following steps for growing trails:

1.Total revenue /chick (LE)= Average body weight gain (Kg) × Price of Kg body weight at time being of terminating of the experiment.

2.Total feed intake/chick (kg)

3.Price/Kg feed (LE)

4. Total feed cost/chick (LE)= Total feed intake/chick (kg) × Price/Kg feed (LE)

5.Fixed cost/chick (LE)= Total feed cost/chick (LE) per chick

6.Total cost/chick (LE)= Total feed cost/chick (LE) + Fixed cost/chick (LE)

7.Net revenue (LE)= Total revenue /chick (LE) - Total cost/chick (LE)

8.Economic efficiency (EE)= (Net revenue/ total costs)×100

9.Relative economic efficiency (REE) = Economic efficiency/economic efficiency of the positive control

Statistical analyses:

Analyses of data were done by General Linear Model procedure (GLM) (SAS, 2004). Least Squares Means (LSM) ±

standard errors were estimated and tested for significance (P<0.05) using "t" student test (Steel and Torrie, 1960).

RESULLTS AND DISCUSSION

Growth Performance: Body weights, gains (g/period) and growth pattern of broiler chicks supplemented with different levels of NS are shown in Table 2. Although, feeding NS at 1% level significantly (P<0.05) decreased chicks body weights at 14 days of age (273.1 gm) compared to control group (301.3 gm). The market weights were significantly (P<0.05) improved at 45 days of age compared to the control group. Moreover, feeding broiler chicks with diets supplemented with NS at the levels of 0.5, 1 and 1.5% improved average body weight gain (g/period) at 14-30 days, 30-45 days and 1-45 days periods, compared to those of control (Table 3). However, it was noticed during the brooding period (1-14 days), that body weight gain of control group surpassed (P<0.05) the 1% NS level group.

The addition of 0.5, 1, and 1.5% NS supplements induced higher final broiler body weight, weight gain (Table 2) compared to birds of the control group. However, feed intake was affected by the use of different NS levels through the periods of 1-14 days and 1-45 days (Table 3). Feed intake through the period from 1-14 days of age was highly more significant (P<0.05) with the level of 0.5 NS group than other levels of NS and the control groups, while feed intake in the period of 1-45 days was highly significant with 0.5 and 1.5% NS levels compared to control and 1% NS. Even though there was no statistically significant in feed conversion ratio, 1% NS improved FCR compared to other groups.

Data for digestibility of nutrients of broiler chicks during the experimental periods are shown in Table (4). The results indicated that there was no significant effect of different supplementations on the digestibility of DM, CP and ash of broilers. Nevertheless, EE and CF were significantly affected by different feed supplements. The 1.5% NS significantly increased ether extract and crude fiber digestibility (P<0.05) compared to the control.

The linear increase in live body weight and gain of broiler chickens as NS level increased in diet up to 1% was also indicated by the findings of Guler et al., (2006), Abu-Dieyeh and Abu- Darwish (2008) and Al-Hothaify and Al-Sanabani (2016). In contrast, Yesuf et al. (2017) did not show the previous proportional enhancement in broiler body weight, and body weight gain (Nasir and Grashorn 2010). Moreover, the promotion of chicks' body weight growth rate could be attributed to the nutritional value of NS components (Mixture of fatty acids and essential amino acids) (Takruri and Dameh, 1998; Jamroz and Kamel, 2002; El-Deek et al., 2009). NS contain a lot of active ingredients and pharmacologically active substances; they maintain the health and enhance poultry performance. NS stimulates secretion of many digestive enzymes (like lipase and amylase) and intestinal mucosa in broilers, which are so important to increase feed digestion, prevent the adhesion of pathogens and stabilize microbial balance in the gut; consequently improve feed utilization and assimilation (Khan et al., 2012; Azeem et al., 2014). In addition, the antimicrobial effects of NS on the pathogenic bacteria, fungi and parasites in the digestive system could be the main cause for improving the performance of poultry (Gilani et al., 2004).

The significant improvement of CF and EE digestibility and the numerical increase in DM and CP digestibility agree with the findings of Radwan (2002) and Hermes et al. (2009). These results are in agreement with the report of Gilani et al., (2004) who indicated that NS stimulate secretion of digestive enzymes (lipase and amylase) and improve the health of intestinal mucosa in broilers, which enhance feed digestion.

Carcass measurements at 28 days of age:

Feeding NS at different levels significantly (P<0.05) decreased liver and abdominal weight percentages compared to control group (2.25-2.34 vs 3.04%; 1.02-1.27 vs 2.08%, respectively) while no significant (P>0.05) differences were recorded for other carcass and organs weight percentages (Table 5).

Carcass characteristics at 45 days of age:

Carcass weight percentage increased significantly (P<0.05) due to feeding NS at different levels under investigation (74.7-76.5%) compared to control group (66.4%). Moreover, Bursa of Fabricius and heart weight percentages were higher than those of the control group at 1 and 1.5% NS levels (0.2-0.21 vs 0.13%; 0.54-0.58 vs 0.44%, respectively). Whilst, feeding NS at the level of 1.5% improved the proventriculus weight percentage in comparison to 0% NS fed group (0.49±0.049 vs 0.38±0.005 %, respectively). In addition, gizzard, liver, spleen, intestine, thymus, pancreas and abdominal fat weight percentages were not significantly different (P>0.05) among NS fed groups at different levels including 0% level (Table 5).

The broiler chickens fed diets supplemented with different values of NS showed an improvement in dressing weight and a decrease in abdominal fat weight percentages compared to the control group (Guler et al., 2006; Durrani et al., 2007; Ashayerizadeh et al., 2009; Nasir and Grashorn, 2010; Al-Hothaify and Sanabani, 2016). Guler et al., (2006) attributed these findings to the high percentages of fatty acids that increase the metabolism of dietary nutrients. On the other hand, the changes in broiler carcass characteristics after feeding NS supplements disagree with the results recorded by Yesuf et al., (2017) for heart, liver, and gastrointestinal organ weight percentages; AL-Beitawi and El-Ghousein (2008), Al- Hermes et al., (2009) and Al-Hothaify and Sanabani (2016) for abdominal fat weight percentage; Erener et al., (2010), Toghyani (2010) and Shewita and Taha (2011) for dressing weight or edible organ weight percentages, who recorded non-significant effect (P>0.05).

Sensory evaluation:

Data for physical and chemical traits of boilers' meat as well as measured attributes are presented in Table (6). Different concentrations of NS showed no significant (P>0.05) effect on different meat characteristics under investigation. The detected non-significant (P>0.05) differences in chemical and physical characteristics of the meat of broilers disagree with the findings of Hermes et al. (2009) who recorded significant (P<0.05) changes due to feeding diets supplemented with different NS levels. As for broilers meat quality attributes being not affected by NS supplement to boiler diet, Vogt et al. (1989) and Vogt and Rouch (1991) indicated that herb mixture showed no effect on sensory meat quality. These findings were also, dedicated Siddeeg (2000) who confirmed that meat measured attributes (flavor and consistency) were not significantly (P<0.05) changed despite of NS volatile oil or aromatic odour characteristics.

Economic efficiency:

Data for economic efficiency and relative economic efficiency percentages estimated for the experimental diets (NS) are presented in Table 7. The results of economic efficiency, according to the input and output analyses, indicate that chicks supplemented with NS 1% showed significantly (P<0.05) lower feeding cost and total costs when compared with broiler chicks fed other NS levels. Moreover, the results showed that the total revenue, net revenue and economic efficiency percentage were not affected by NS seeds supplementation. In addition, broiler chicks fed on diets supplemented with NS 0.5% and NS 1% were more economic than the control group. They had higher total revenue, net revenue and relative economic efficiency percentage than control group. These findings agree with Abaza (2001) who found that broiler diets supplemented with medicinal plants including NS were more economic than control group diet. Ahmed (2006) concluded that it is cheaper and economic to add NS supplement to broiler diet than feed additive. Moreover, Ragab-Ayat et al. (2013) recorded significant (P<0.05) economic efficiency percentage expressed as total feed cost, price of total rabbit weight gain as well as net revenue due to dietary supplementation of NS.

It could be concluded that the addition of NS up to 1% seems to have a positive effect on growth, carcass characteristics and economic performance, moreover, it can be used as a growth promoter feed additive for broiler chicks.

Table (1): Ingredients and compositions of the experimental diets

Ingredients	Starter				Grower diet			
	0	0.5	1	1.5	0	0.5	1	1.5
Corn	54.02	53.52	53.02	52.52	61.02	60.52	60.02	59.52
Soybean meal (44%)	33	32.5	32.5	32.5	26	26	26	26
Corn gluten meal (60%)	4	4	4	4	4	4	4	4
Mixed oils (%)	4.5	5	5	5	4.5	4.5	4.5	4.5
Nigella seeds (%)	0	0.5	1	1.5	0	0.5	1	1.5
Sodium chloride	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Dl- methionine	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
L-lysine	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Dicalcium phosphate	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Limestone	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Vit. and min. mixture	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Antioxidant	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	100	100	100	100	100	100	100	100
ME kcal/ kg diet[2]	3200	3200	3200	3200	3200	3200	3200	3200
Dry matter[3]	90.15	89.8	89.31	88.87	90.06	89.61	89.17	88.73
Crude protein	23	23	23	23	20	20	20	20
Calcium	1	1	1	1	1	1	1	1
Non-phytate phosphorus[2]	0.48	0.5	0.48	0.47	0.45	0.45	0.45	0.45
Methionine+cystine[2]	0.76	0.7	0.75	0.74	0.68	0.68	0.68	0.68
Lysine[2]	1.36	1.3	1.34	1.34	1.17	1.17	1.17	1.17
Crude fibre[3]	4.25	4.2	4.18	4.1644	3.91	3.90	3.88	3.8674
Crude fat[3]	6.66	7.14	7.12	7.11	6.81	6.80	6.78	6.77

[1]Vit+Min mix. Provides per kilogram of the diet: Vit. A, 12000 IU, vit. E (dl-α-tocopheryl acetate) 20 mg, menadione 2.3 mg, Vit. D3, 2200 ICU, riboflavin 5.5 mg, calcium pantothenate 12 mg, nicotinic acid 50 mg, Choline 250 mg, vit. B_{12} 10 μg, vit. B_6 3 mg, thiamine 3 mg, folic acid 1 mg, d-biotin 0.05 mg. Trace mineral (mg/ kg of diet): Mn 80 Zn 60, Fe 35, Cu 8, and Selenium 0.1 mg. [2]Calculated values, [3]Analyzed values.

Table (2): Effect of different levels of Nigella sativa seeds on body weight and gain of broiler chicks during 1-45 day of age

Days of Age	Control	Nigella sativa seeds, g/kg diet			SEM	P value
		0.5	1	1.5		
Body weight, g/period						
0	51.58	51.52	51.54	51.90	1.056	0.9932
14	301.5^{a}	300.2^{a}	273.1^{bc}	285.5^{ab}	9.40	0.0476
30	862	943	905	902	28.28	0.2804
45	1567^{b}	1753^{a}	1727^{a}	1706^{a}	49.42	0.0421
Body weight gain, g/period						
1–14	250^{a}	248^{a}	221^{bc}	234^{ab}	4.18	0.0210
15–30	560^{b}	640^{a}	630^{a}	614^{a}	11.9	0.0483
31–45	704^{b}	819^{a}	814^{a}	804^{a}	14.7	0.0448
1–45	1515^{b}	1707^{a}	1666^{a}	1554^{b}	21.1	0.0431

$^{a, b}$ Means in the same row followed by different letters are significantly different at ($p \leq 0.05$); SE = standard error.

Table (3): Effect of different levels of Nigella sativa seed on feed intake and feed conversion ratio of broiler chicks during 1-45 day of age

Period	Control	Nigella sativa seeds, g/kg diet			SEM	P value
		0.5	1	1.5		
Feed intake, g/ period						
1-14 days of age	473^{b}	554^{a}	455^{b}	520^{ab}	8.0	0.007
15-30 days of age	891	919	868	979	33.0	0.507
31-45 days of age	1769	1956	1777	1933	27.3	0.106
1-45 days of age	3133^{b}	3430^{a}	3099^{b}	3431^{a}	37.3	0.020
Feed conversion ratio, g feed/g BWG						
1–14 days of age	1.9	2.0	2.2	2.2	0.22	0.41
15–30 days of age	1.6	1.4	1.4	1.6	0.26	0.14
31–45 days of age	2.5	2.5	2.2	2.5	0.38	0.51
1–45 days of age	2.1	2.1	1.9	2.0	0.27	0.41

$^{a, b}$ Means in the same row followed by different letters are significantly different at ($p \leq 0.05$); SEM = standard error of mean.

Table (4): Effect of different levels of Nigella sativa seeds on apparent nutrient digestibility at 45 days of age.

Criteria	Control	Nigella sativa seeds, g/kg diet			SEM	P value
		0.5	1	1.5		
Dry matter digested, %	75.1	74.9	75.0	75.1	0.053	0.7589
Crude protein digested, %	82.1	82.5	82.7	82.6	0.123	0.5297
Ether extract, %	71.5^{bc}	71.2^{c}	72.8^{b}	74.8^{a}	0.193	0.0001
Crude fiber, %	47.5^{b}	47.9^{b}	53.0^{a}	53.4^{a}	0.609	0.0100
Ash, %	25.4	27.5	26.2	27.7	0.421	0.3034

$^{a,\,b}$ Means in the same row followed by different letters are significantly different at ($p \leq 0.05$); SEM = standard error of mean.

Table (5): Effect of different levels of Nigella sativa seeds on dressing and body organ percentages at 28 and 45 days of age

Criteria	Nigella sativa seeds, g/kg diet				SEM	P value
	0	0.5	1	1.5		
Means at 28 days of age						
Carcass, %	65.2	69.0	69.5	64.6	3.708	0.7127
Proventriculus, %	0.57	0.51	0.57	0.54	0.065	0.6280
Gizzard, %	2.06	2.29	1.98	2.58	0.332	0.1904
Liver, %	3.04^{a}	2.31^{b}	2.25^{b}	2.34^{b}	0.303	0.0373
Heart, %	0.47	0.51	0.56	0.62	0.079	0.2130
Spleen, %	0.09	0.09	0.07	0.09	0.018	0.5701
Intestine, %	7.20	6.33	7.03	6.81	0.872	0.5140
Bursa, %	0.26	0.25	0.22	0.18	0.036	0.1368
Thymus, %	0.50	0.38	0.54	0.37	0.115	0.3603
Pancreas, %	0.31	0.29	0.30	0.36	0.035	0.0995
Abdominal fat, %	2.08^{a}	1.27^{b}	1.21^{b}	1.02^{b}	0.370	0.0402
Means at 45 days of age						
Carcass, %	66.4^{b}	76.5^{a}	74.9^{a}	74.7^{a}	1.925	0.0059
Proventriculus, %	0.38^{c}	0.44^{ab}	0.45^{ab}	0.49^{a}	0.046	0.0412
Gizzard, %	1.67	1.83	1.63	1.91	0.175	0.4139
Liver, %	1.60	1.43	1.48	1.56	0.153	0.0576
Heart, %	0.44^{b}	0.44^{b}	0.54^{a}	0.58^{a}	0.064	0.0439
Spleen, %	0.07	0.08	0.10	0.08	0.015	0.3970
Intestine, %	2.89	2.52	3.01	2.59	0.297	0.0650
Bursa, %	0.13^{b}	0.13^{b}	0.21^{a}	0.20^{a}	0.033	0.0300
Thymus, %	0.29	0.26	0.24	0.24	0.065	0.5310
Pancreas, %	0.19	0.17	0.16	0.15	0.031	0.1664
Abdominal fat, %	2.11	1.77	2.18	2.14	0.457	0.5071

$^{a,\,b}$ Means in the same row followed by different letters are significantly different at ($p \leq 0.05$); SEM = standard error of mean.

Table (6): Effect of different levels of Nigella sativa seeds on physical and chemical composition meat at 45 days of age

Criteria	Control	Nigella sativa seeds g/kg diet			SEM	P value
		0.5	1	1.5		
DM, %	25	25	25.1	25	0.028	0.9479
CP, %	19.2	19.1	19.2	19.2	0.025	0.8342
Lipid, %	4.68	4.72	4.66	4.68	0.026	0.9049
Ash, %	1.06	1.06	1.06	1.06	0.003	0.9377
PH	5.68	5.69	5.72	5.68	0.017	0.8874
Color (Optical density)	0.243	0.238	0.243	0.247	0.004	0.945
Tenderness (gm/cm2)	3.03	3.02	3.01	2.94	0.027	0.7081
WHC (gm/cm2)	5.3	5.31	5.25	5.33	0.034	0.9216

[a, b] Means in the same row followed by different letters are significantly different at ($p \leq 0.05$); SEM = standard error of mean. DM= dry matter, CP= crud protein, WHC= water holding capacity.

Table (7): Effect of different levels of Nigella sativa seeds on economic efficiency of broiler chicks at 45 days of age

Criteria	Control	Nigella sativa seeds g/kg diet			P value
		0.5	1	1.5	
Feed cost, LE[1]	14.1[ab]	15.8[a]	13.95[b]	14.6[a]	0.0122
Total cost, LE	20.1[ab]	21.8[a]	20.6[b]	22.5[a]	0.0122
Total revenue, LE[2]	25.76	29.02	28.32	27.66	0.4000
Net revenue, LE	5.66	7.22	7.72	5.16	0.3997
Economic efficiency, %	28.16	33.11	37.48	22.93	0.3195
Relative economic efficiency, %	100	117.6	133.1	81.4	---

[a, b] Means in the same row followed by different letters are significantly different at ($p \leq 0.05$).
[1] 4.5 LE / kg feed; [2] 17 LE/kg body weight; 1 kg of Nigella sativa seeds = 20 LE

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الملخص العربي

تأثير حبة البركة على كفاءة النمو وصفات الذبيحة والكفاءة الإقتصادية لبدارى اللحم تحت الظروف المصرية

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أجريت هذه التجربة لدراسة تأثير التغذية على الإضافات الغذائية الطبيعية لمستويات مختلفة من بذور حبة البركة على أداء النمو، صفات الذبيحة والقياسات الاقتصادية لبدارى اللحم. تم تربية 140 كتكوت غير مجنس من سلالة الأبورإيكرز عمر يوم في بطاريات في عنبر شبه مفتوح. وزعت الكتاكيت إلى 4 معاملات بكل معاملة سبعة مكررات وبكل مكررة خمسة طيور. المعاملة الأولى (الكنترول) بدون حبة البركة، والمعاملات الثلاثة الأخرى كانت تحتوي على ثلاثة مستويات من حبة البركة 0.5 و1 و1.5% على الترتيب. وأظهرت النتائج أن إضافة حبة البركة عند مستويات 0.5 و 1 و 1.5٪ أدى إلى زيادة وزن الجسم عند التسويق مقارنة بالكنترول. علاوة على ذلك، حبة البركة أدت إلى تحسن ملحوظ في معدل هضم الدهون والألياف الخام مقارنة بالكنترول.
وزادت نسبة وزن الذبيحة بالتغذية على مستويات مختلفة من حبة البركة من74.7 إلى 76.5٪ مقارنة بالكنترول 66.4٪. بالإضافة لزيادة نسبة وزن غدة البرسا والقلب عند 1 و1.5٪ حبة البركة مقارنة بالكنترول. والكتاكيت التي تغذت على حبة البركة بنسبة 0.5 و1٪ كانت أكثر كفاءة اقتصادية مقارنة بالكنترول حيث زاد إجمالي الإيرادات وصافي الإيرادات والكفاءة الاقتصادية النسبية. ويمكن الاستنتاج أن إضافة 1٪ من حبة البركة لها تأثيراً إيجابياً على النمو وصفات الذبيحة والأداء الاقتصادي، علاوة على أنه يمكن استخدامها كمنشط نمو لبدارى اللحم.