Egypt. Poult. Sci. Vol (31) (I): (139-147)

EFFECTS OF DIETARY BLACK CUMIN GROWTH SEEDS (NIGELLA SATIVA L.) OR ITS EXTRACT ON PERFORMANCE AND TOTAL COLIFORM BACTERIA COUNT ON BROILER CHICKS

By

Z.S.H.Ismail

Animal Production Department, Faculty of Agriculture, South Valley University, Egypt

.Received: **26/02/2011** Accepted: **07/03/2011**

Abstract: *The aim of this study was to evaluate the effects of dietary black cumin seed (Nigella Sativa L.) or its extract on the growth performance, some carcass characteristics, total caecal coliform bacteria count. A total of 360 one-day-old broilers (Ross 308) were allocated to three treatment groups with four replicates each of 30 chicks to 42 days of age. Treatments were prepared by mixing the black cumin seed and/or seed extract into the basal diet at the rate of 0 g/kg (control, C), 10g/kg (BCS) or 1 g/kg (BCSE). The BCS diet increased (P< 0.05) the body weight gain compared to BCSE and C diets at the age of 42 days. The BCS and BCSE in the broiler diets increased (P<0.05) feed intake compared to C diet. The birds on BCS diet had higher (P<0.05) feed efficiency compared to those on BCSE and C diets. Dietary BCS increased (P<0.05) the carcass weight compared to the C diet. No significant effects of dietary BCS or BCSE were observed on the dressing percentage, edible inner organs, abdominal fat, full gut weight, gut length and the total coliform bacteria counts of broilers. The results of the present study indicated that BCS supplementation to the broiler diet have a beneficial effect on body weight gain, feed conversion ratio, carcass weight by increasing feed intake. This diet also showed a decrease tendency in total coliform bacteria counts in the caecal intestine in the treated broilers.*

INTRODUCTION

A number of feed additives including antibiotics have been widely used in the poultry industry for several decades. Recently, the concerns about possible antibiotic residues and disease resistance have aroused great caution in use of antibiotics in the animal industry (Jang et al., 2007). The ban on the use of antibiotics as feed additives has accelerated and led investigations of alternative feed additives in animal production. One of the alternatives is additions of aromatic plants and/ or extracts from these plants. As an example, Nigella sativa L. is an annual herbaceous plant belonging to the Ranunculaceae family, growing in countries bordering the Mediterranean Sea (Cheikh-Rouhou et al., 2007), commonly known as black seed or black cumin (Denli et al., 2004). Nigella sativa seed contains volatile oil, alkaloids, sterols, saponins and quinines and the seeds are used for folk medicine as an antispasmodic, antihelminthic, antiseptic, antiarthritic, nerve tonic, appetiser and emmenagogue in the treatment of ascites, asthma and pustular dermatitis (Al-Homidan et al., 2002). It has been indicated that the outcome of a test can be affected by factors such as the method used to extract the essential oil from herb, and also the chemical compositions of the extract and culinary herbs or seeds, depending upon the geographical and climatic differences, appears to be important in obtaining the optimal effects (Cross et al., 2007; Ocak et al., 2008).

There are some studies conducted on the effects of dietary black cumin seed or oils on the performance of poultry. In some studies conducted in broilers, it was reported that black cumin seed had positive effect on weight gain and feed conversion ratio (Tollba and Hassan, 2003, Al-Beitawi and El-Ghousein, 2008, Al-Harthi, 2004; Mansoori et al., 2006; Guler et al., 2006) on feed intake, dressing percentage, weight of different internal organs (Durrani et al., 2007) and on the performance and survivability (Abu-Dieyeh and Abu-Darwish, 2008). In another study, it was reported that diet supplemented with 10% black cumin seed had no adverse effects on the performance (Al-Homidan et al., 2002). Also, Guler et al., (2007) reported that black cumin seeds could be considered as a natural potential antioxidant promoter for poultry. Some researchers reported that supplementation of black seed to the diet increased egg production, egg mass, egg shell thickness and Haugh unit (Akhtar et al., 2003) and egg weight from laying hens (Aydin et al., 2006). Recently, Denli et al., (2004) showed that black seed extract at the level of 0.1% significantly increased egg weight, shell weight and shell thickness. It was also shown that diet supplemented with 0.5% black seed extract increased albumen height, albumen length and yolk height in the quail.

The effect of black cumin seed (BCS) and its extract (BCSE) on performance and total caecal coliform bacteria count in broiler diet under the same experimental conditions have not been reported. The objectives of the present study were to examine the performance, some carcass characteristics and total caecal coliform bacteria count of broilers fed on a diet containing BCS and BCSE.

MATERIALS AND METHODS

This study was performed the period from January 26th to March 9th 2009 at the Poultry Research Unit, Faculty of Agriculture, South Valley University, Egypt. A total of 360 mixed-sex broiler (Ross 308) chicks at one day old were individually weighed (54.0 ± 0.01 g) and randomly assigned to floor pens with litter consisting of wood shavings. The chicks were allocated randomly to three equal treatment groups. Each treatment group consisted of four replicates of 30 chicks (15 males and 15 females). Treatments were prepared by mixing the black cumin seed BCS into the basal diet at the rate of 0 g/kg (control, C), 10g/kg (BCS) or 1 g/kg seed extract (BCSE). The floor area of each pen was 3.35 m^2. Plastic feed troughs were replaced in 2 weeks by cylindrical hanging feeders. Feeder space was 2 cm per bird for all groups. Water was available all day through experimental period by using one hanging drinker per pen. Continuous lighting was provided throughout the experiment. Ambient temperature was gradually decreased from 32 °C on day one to 25 °C through day 21 and was then kept constant.

All diets, in mash form, were formulated to meet recommended nutrient concentrations (22% crude protein with 3000 Kcal ME / kg starter from one to 21, 21% crude protein with 2900 Kcal ME / kg grower from 22 to 35, and 19 % crude protein with 2800 Kcal ME / kg finisher from 36 to 42 days of age) for broilers (Table 1). The BCS and BCSE provided by a hydro distillation extract of black cumin seed were used in this study. The BCS and BCSE were supplemented to diets contained 10g/kg BCS or 1 g/kg BCSE.

Table 1: Ingredients and composition of experimental diets

Ingredients	Concentration (g/kg) Starter (1-21 days)	Grower (22-35 days)	Finisher (36-42 days)
Corn bran	400	400	400
Full-fat Soyabean	210	210	230
Corn	134	150	185
Soyabean Meal (44% CP)	123	103	53
Poultry Meal	35	35	40
Meat-Bone Meal	33	34.5	34
Fish Meal	15	12.04	-
Wheat	41	40	40
Vegetable Oil	1.37	7.42	11.09
Sodium Chloride	1.5	1.5	1.50
Vitamin premix 1	2.5	2.5	2.0
Mineral premix 2	1.0	1.0	1.0
Lysine	0.28	0.29	0.60
Liquid methionine	1.35	1.75	1.31
Sodium bicarbonate	0.50	0.50	0.50
Coccidiostat	0.50	0.50	-
Calculated Major Components (per kg of diet)			
Crude protein %	22	21	19
ME (Kcal/kg)	300	2900	2800
Calcium (g/kg)	9	9	8.5
Available phosphorus (g/kg)	5.2	5.2	4.8
Lysine (g/kg)	13	12	11
Methionine (g/kg)	5	4.6	4.2
Methionine + cystine (g/kg)	9	7.2	6.0

[a] Vitamin premix provided (per kg of diet): 6 000 000 IU vit. A, 800 000 IU vit. D_3, 8000 mg vit. E, 2000 mg vit. K_3, 1000 mg vit. B_1, 3000 mg vit. B_2, 2000 mg vit. B_6, 8 mg vit. B_{12}, 20000 mg vit. C, 4000 mg calcium D-Pantotenat, 10000 mg Niacin, 300 mg Folic acid, 20 mg Biotin, 400 000 mg Colin

[b] Mineral premix provided (per kg of diet): 80.000 mg Mn, 30 000 mg Fe, 60 000 mg Zn, 5000 mg Cu, 500 mg Co, 2000 mg I, 200 mg Se.

Experimental procedures followed the principles for care of animals in experimentation. During the experimental period of 42 days, body weight gain (BWG) and feed intake (FI) were recorded at first, 21st and 42nd days. Feed per gain (FCR, g feed/g gain) was calculated from BWG and FI data. The carcass, abdominal fat, and relative weights of edible inner organs (heart, liver and gizzard), full gut weight (GW) and gut length (GL) of four broilers (two males and two females at random) from each replicate were slaughtered to determine yields. Dressing percentage and weights of organs were recorded as g kg^{-1} live weight.

Coliform from the intestinal tract was isolated using the method described by the Food and Drug Administration (1984). Standard plate counts were done for bacterial enumeration. For this purpose, each of 16 caecum samples per treatment was removed from each bird and the fresh excreta of the caecum were gently squeezed and carefully collected in sterilized 25-mL tubes at the end of the experiment. Each tube contained pooled excreta of 4 birds (per pen). Three grams of fresh caecal samples were diluted with 10 ml distilled water and vortexed until pH 6 and viscosity 7. One gram of wet sample was diluted with 10 mL of sterilized distilled water, of which 1 mL was transferred into 9 mL of sterilized distilled water. Samples were serially diluted from 10^{-1} to 10^{-7}. One-tenth milliliter of each diluted sample was placed on Violet Bile Agar for enumeration of coliform bacterial populations. The plates were incubated at 37°C for 18 to 24 h. Coliform bacteria colonies were identified and counted while average number of live bacteria in gram of

original content of caecal intestine was calculated by multiplication of counted colonies by dilution factor. Dilution factor is a reciprocal value of dilution exponent. Such value is expressed as CFU g^{-1} (Colony Forming Units), i.e. units that form colonies (Barnes and Impey, 1970).

The study was approved by the local Ethical Committee of Ondokuz Mayis University for Experimental Animals, and ascertained that the experiment is not an unnecessary repetition of previous experiments.

Statistical Analysis

Data were statistically analyzed according to the General Linear Model (GLM) procedure of SAS (1998). The experimental design was a completely random design. Coliform counts were transformed to logarithms (base 10) for statistical analysis. Mean differences were separated using Duncan's multiple range test.

RESULTS AND DISCUSSION

Data illustrated in (Table 2) represents the effect of BCS and BCSE on the body weight gain, feed intake and feed conversion ratio of broilers (Ross-308). The BCS increased ($P< 0.05$) the body weight gain compared to BCSE and C diets at the age of 42 days. BCSE group has higher ($P<0.05$) body weight gain than C group at 42 days of age. Both BCS andBCSE diets increased ($P<0.05$) feed intake compared to the C diet. But feed intake was not significantly different between the BCS and BCSE. The supplementation of BCS into the diet improved feed conversion ratio compared to BCSE and control. There was no difference between BCSE and control in terms of feed conversion ratio. The results of the present study indicated that BCS supplementation to the broiler diet may have a beneficial effect on body weight gain, feed conversion ratio and carcass weight by increasing feed intake.

Table 2: Body weight gain (BWG), feed intake (FI) and feed conversion ratio (FCR) of broilers (Ross-308) fed black cumin seed (BCS) or seed extract (BCSE) diet

Item	Days	Diet			SEM
		C	BCS	BCSE	
Body Weight	1	54.2	54.3	54.2	0.476
	21	964.4	960.9	958.3	0.414
	42	2827.7^{c}	2973.3^{a}	2880.7^{b}	0.000
Feed Intake	21	1455.4	1452.7	1446.7	0.323
	42	4784.58^{b}	4957.4^{a}	4943.2^{a}	0.000
Feed Conversion	21	1.60	1.60	1.60	0.863
	42	1.73^{a}	1.70^{b}	1.75^{a}	0.000

^{a,b}Means in the same row with different superscript differ significantly ($P< 0.01$).
SEM: Standard error of the mean.

Also, results showed a decrease tendency in total coliform bacteria counts in the caecal intestine of broilers. These results are in agreement with the results obtained by Tollba and Hassan (2003), Al-Harthi (2004), Mansoori, B., M. Modirsanei et al. (2006), Guler *et al* (2006), Durrani *et al.* (2007), Al-Beitawi and El-Ghousein (2008) and Abu-Dieyeh and Abu-Darwish (2008) in broiler studies.

Also, these results confirm the idea that the use of various plant materials as dietary supplements, including herbs or extract, may positively affect poultry health and productivity and subsequent production performance (Lee *et al.*, 2003; Jamroz et *al.*, 2005; Cross *et al.*, 2007).

The carcass weight, dressing percentage, edible inner organs, abdominal fat, full gut weight, gut length and the total coliform bacteria counts of broilers (Ross-308) at 42 days of age are given in Table 3. Dietary BCS increased ($P<0.05$) the carcass weight as comparedto the control group. No significant effects of dietary BCS or BCSE were observed on the dressing percentage, edible inner organs, abdominal fat, full gut weight, gut length and the total coliform bacteria counts of broilers. However, BCS supplementation into the broiler diet had a numerically beneficial effect trend on the total coliform bacteria counts in the caecal intestine of broilers.

The improvement in weight gain achieved by the BCS could be attributed to increased total feed intake as was evident with improvements in feed conversion ratio compared to the control. The results with respect to feed efficiency confirm that phytogenic additives may stimulate digestibility, which can in turn improve feed efficiency (Lee *et al.*, 2003; Schiavone *et al.*, 2007; Ocak *et al.*, 2008). On the other hand, dietary BCS may give the diets a taste that is agreeable to the previous broilers studies. The increasing feed intake can be a result of a palatable diet, since it has been shown that the flavour of the diet can stimulate or depress feed intake in birds. Indeed, BCS, as an aromatic plant, have been widely used as digestive and appetite stimulant. Also, BCS is a natural feed additive, stimulating the activity of digestive system, improving diet palatability, enhancing appetite of poultry and increasing the amount of feed intake (Gilani *et al.*, 2004). Similarly increased feed intake in broilers by feeding BCS and ethenal essential oil from BCS was also reported (Osman and Barody, 1999; Halle *et al.*, 1999).

The higher body weight gain and feed efficiency observed in broilers on the BCS diets may be related to the reported properties of BCS or its chemical components (Guler et al., 2006; Al-Beitawi and El-Ghousein, 2008; Abu-Dieyeh and Abu-Darwish, 2008). Indeed BCS appear to be potential multipurpose feed growth promoter and may be promising in improving broiler performance, particularly feed efficiency, weight gain and immune system (Al-Beitawi and El-Ghousein, 2008).

Table 3: Carcass weight, dressing percentage, edible inner organs, abdominal fat, full gut weight, and gut length and caecal coliform counts at 42 days of age of broiler chickens fed dietary black cumin seed or seed extract

Items	Diet			SEM
	C	BCS	BCSE	
Carcass weight	2102.8^{b}	2186.1^{a}	2146.0^{ab}	0.011
Dressing percentage (g/100 g LW)	73.82	73.58	73.83	0.512
Edible inner organs (g/100 g LW)	3.77	3.83	3.80	0.521
Abdominal fat (g/100 g LW)	2.14	2.30	2.40	0.175
Full gut weight (g/100 g LW)	5.89	5.85	5.70	0.194
Gut length (cm/100 g LW)	7.71	7.50	7.62	0.118
Caecal coliform count, cfu/g	8.01	7.89	7.91	0.235

^{a,b}Means in the same row with different superscript differ significantly.
SEM: Standard error of the mean.

A possible reason for the positive effect of BCS on body weigh gain and feed conversion ratio in broilers may be related to the antimicrobial effects of BCS. It is clear that controlling gut microflora could positively influence poultry performance. Different investigations have reported that BCS had antimicrobial activity (El-Kamali *et al.*, 1998). The improved performance of BCS may also be due to active ingredients content of BCS. Indeed, many biological activities of the BCS have been attributed to the high content of active components and antioxidants like the thymoquinone thymol, carvacrol and p-cymene. Also, notable pharmacological properties such as gastric activity, gastric protective effect, immunopharmacology, hypoglycemy, cytogenetic, hematology, insulinotropic properties, neuro-pharmacology, bacteriology antiinflammatory, analgesic and anti-pyretic effects and cancerology have been reported recently (Benkaci-Ali *et al.*, 2006; Cheikh-Rouhou et al., 2007). Therefore, improved performance of BCS in this study may be attributed to combined effects of all these active ingredients working in a positive manner. In addition, there are other pharmacologically positive effects of BCS on growth performance of broilers which may also be attributed to its content of volatile oil or essential oil. It has been shown that the essential oil of BCS has certain biological functions that could act not only as antibacterials and antioxidants but also as a stimulant of digestive enzymes in the intestinal mucosa and pancreas that improve the digestion of dietary nutrients and feed efficiency, subsequently increasing the growth rate (Guler et al., 2007; Abu-Dieyeh and Abu-Darwish, 2008).

The lower activity of BCSE on weight gain compared to BCS could be attributed to the lack of active principles and the chemical composition of the BCSE which complete each other and enhance their action on the body. Also, the chemical composition of plant is considerably different in its different parts, and it is influenced by environmental factors, such as climate, soil, and harvest time (Barreto *et al.*, 2008). These factors may have hindered the observation of possible benefits of BCSE on performance.

The mortality was negligible with no difference between the C (2.5 %), dietary BCS (1.6%) and BCSE (1.6%) groups. Similarly, Guler et al., (2007) and Abu-Dieyeh and Abu-Darwish (2008) indicated that supplementation with BCS and BCSE did not affect mortality of broilers. The overall health of dietary BCS-treated birds appeared to be excellent, which was shown by the relative weights of major organs remaining stable.

The difference in body weights between BCS and the control group were reflected in the dressed bird weights at slaughter. As a result of discrepancies in feed intake, the amount of metabolizable energy and protein ingested by the birds could explain the differences observed in carcass yields. Similarly Guler et al., (2007) reported that the broilers consuming the diets containing 1% BCS had a higher carcass yield than the control.

The cecum is one of the areas of greatest microbial activities in the gastrointestinal tract of chickens, and thus, can be described as the location for a very complex microbial ecosystem. Relative to other parts of the gastrointestinal tract, the cecum provides a stable environment for microorganisms, resulting in a large microbial population due to the slower transit time. Intestinal microflora plays an important role in the health status of host animals. In general, intestinal bacteria may be divided into species that exert either harmful (pathogenic) or beneficial effects on host health. Therefore, a common approach to maintain host health is to increase the number of desirable bacteria in order to inhibit colonization of invading

pathogens (Guo *et al.*, 2004). Low caecal coliform populations in the broilers given dietary BCS may be explained that BCS had an antibacterial activity against different pathogenic bacteria (El-Kamali *et al.*, 1998). The gut health issues can result in a loss of live weight and feed efficiency. Although there were no significant differences among the treatments in terms of the caecal coliform bacteria count, the BCS may prevent the gut health by numerically decreasing bacteria count.

This paper suggests that BCS supplementation to the broiler diet under the condition of this experiment may have a beneficial effect on body weight gain, feed conversion ratio and carcass weight by increasing feed intake. The treatments can also have a decreasing tendency effect in total coliform bacteria counts in the caecal intestine in broilers. Further studies are needed to elucidate the effects of the different levels. BCS or BCSE as antibacterial, antioxidant, meat quality and blood characteristics in broiler chickens.

REFERENCES

Abu-Dieyeh, Z.H.M. and M.S. Abu-Darwish, 2008. *Effect of feeding powdered black cumin seeds (Nigella sativa L) on growth performance of 4-8 week old broilers. J. Anim. Vet. Adv., 3: 286-290.*

Akthar, M.S., Z. Nasir and A.R., Abid, 2003. *Effect of feeding powdered Nigella sativa L. seeds on poultry egg production and their suitability for human consumption. Veterinarski Archiv., 73:181-190.*

Al-Beitawi, N. and S.S. El-Ghousein, 2008. *Effect of feeding different levels of Nigella sativa seeds (black cumin) on performance, blood constituents and carcass characteristics of broiler chicks. Int. J. Poultry Sci., 7:715-721.*

Al-Harthi, M.A., 2004. *Efficiacy of utilizing some spices and herbs with or without antibiotic supplementation on growth performance and carcass characteristics of broiler chicks. Egypt. Poultry Sci. J., 24:869-899.*

Al-Homidan, A., A.A. Al-Qarawi, S.A. Al-Waily and S.E.I. Adam, 2002. *Response of broiler chicks to dietary Rhazya stricta and Nigella sativa. Br. Poultry Sci., 43:291-296.*

Aydın, R., M.A. Bal, A.K. Ozugur, H.H.C. Toprak, A. Kamalak and M. Karaman, 2006. *Effect of black seed supplementation on feed efficiency, egg yield parameters and shell quality in chickens. Pakistan J. Biol. Sci., 9:243-247.*

Barnes, E.M and C.S. Impey, 1970. *The isolation and properties of the predomiant anaerobic bacteria in the caeca of chickens and turkeys. Br. Poult. Sci., 11:467-481.*

Barreto, M.S.R., J.F.M. Menten, A.M.C. Racanicci, P.W.Z. Pereira and P. Rizzo, 2008. *Plant extracts used as growth promoters in broilers. Rev. Bras. Cienc. Avic. (Brazilian Journal of Poultry Science), 2:109-115.*

Benkaci-Ali, F., A. Baaliouamer and B.Y. Meklati, 2006. *Kinetic study of microwave extraction of essential oil of Nigella sativa L. seeds. Chromatographia, 64:227-231.*

Cheikh-Rouhou, S., S. Besbes, B. Hentati, C. Blecker, C. Deroanne and H. Attia, 2007. *Nigella sativa L.: Chemical composition and physicochemical characteristics of lipid fraction. Food Chem., 101:673-681.*

Cross, D.E., R.M. Mc Devitt, K. Hillman and T. Acamovic, 2007. *The effect of herbs and their associated essential oils on performance, dietary digestibility and gut microflora in chickens from 7 to 28 days of age. Br. Poultry Sci, 48: 496-506.*

Denli, M., F. Okan and A.N. Uluocak, 2004. *Effect of dietary black seed (Nigella sativa L.) extract supplementation on laying performance and egg quality of quail (Coturnix coturnix japonica). J. Appl. Anim. Res., 26:73-76.*

Durrani, F.R., N. Chand, K. Zaka, A. Sultan, F.M. Khattak and Z. Durrani, 2007. *Effect of different levels of feed added black seed (Nigella sativa L) on the performance of broiler chicks. Pakistan J. Biol. Sci., 10:4164-4167.*

El-Kamali, H.H., A.H. Ahmed, A.S. Mohamed, A.A.M. Yahia, I.H. Eltayeb and A.A. Ali, 1998. *Antibacterial properties of essential oils from Nigella sativa seeds, Cymbopogon citratus leaves and Pulicaria undulata aerial parts. Fitoterapia, 69: 77-78.*

Food and Drug Administration, 1984. *Bacteriological Analytical Manual, 1998. 6th ed. Food and Drug Administration, Association of Official Analytical Chemists, Arlington, VA.*

Gilani, A.H., Q. Jabeen and M.A.U. Khan, 2004. *A Review of medicinal uses and pharmacological activities of Nigella sativa. Pakistan J. Biol. Sci, 7: 441-451.*

Guler, T., B. Dalkılıc, O.N. Ertas and M. Ciftci, 2006. *The effect of dietary black cumin seeds (Nigella sativa l.) on the performance of broilers. Asian-Aust. J. Anim. Sci., 19: 425-430.*

Guler, T., O.N. Ertas, M. Kızıl, B. Dalkılıc and M. Ciftci, 2007. *Effect of dietary supplemental black cumin seeds on antioxidant activity in broilers. Medycyna Wet. 63:1060-1063.*

Guo, F.C., B.A. Williams, R.P. Kwakkel, H.S. Li, X.P. Li, J.Y. Luo, W.K. Li and M.W.A. Verstegen, 2004. *Effects of mushroom and herb polysaccharides, as alternatives for an antibiotic, on the cecal microbial ecosystem in broiler chickens. Poult. Sci., 83:175-182.*

Halle, I., R. Thomann, R and G. Flachowsky, 1999. *Effect of ethereal (essential) oil and oil seeds on the growth of broilers. Vitamin und Zusatzstoffe in der ernahrung von Mensch und Tier; 7. Symposium Jena/Thuringen, Germany, 22 und 23 September, pp:469-472.*

Jamroz, D., A. Wiliczkiewicz, T. Wertelecki, J. Orda and J. Skorupin'Ska, 2005. *Use of active substances of plant origin in chicken diets based on maize and locally grown cereals. Br. Poult. Sci., 46:85-493. URL Address: http://dx.doi.org/10.1080/00071660500191056*

Jang, I.S., Y.H. Ko, S.Y. Kang and C.Y. Lee, 2007. *Effect of a commercial essential oil on growth performance, digestive enzyme activity and intestinal microflora population in broiler chickens. Anim. Feed Sci. Technol. 134:304-315.*

Lee, K.W., H. Everts, H.J. Kappert, M. Frehner, R. Losa and A.C. Beynen, 2003. *Effects of dietary essential oil components on growth performance, digestive enzymes and lipid metabolism in female broiler chickens. Br. Poultry Sci., 44:450-457.*

Mansoori, B., M. Modirsanei and M.K. Saied Mohammad, 2006. *Cumin seed meal with enzyme and polyethylene glycol as an alternative to wheat bran in broiler diets. J. Sci. Food Agric., 86:2624-2627. DOI: 10.1002/jsfa.2662*

Ocak, N., G. Erener, B.F. Ak, M. Sungu, A. Altop and A. Ozmen, 2008. *Performance of broilers fed diets supplemented with dry peppermint (Mentha piperita L.) or thyme (Thymus vulgaris L.) leaves as growth promoter source. Czech J. Anim. Sci., 53: 169-175. "URL Address http://journals.uzpi.cz/uniqueFiles/01131.pdf"*

Osman, A.M.A. and M.A.A. El-Barody, 1999. *Growth performance and immune response of broiler chicks as affected by diets density and Nigella sativa seeds supplementation. Egyp. Poultry Sci., 19:619-633.*

SAS Institute, 1998. *SAS/ STATE Users Guide. 1998 Edition: SAS Institute Inc., Cary. Nc.*

Schiavone, A., F. Righi, A. Quarantelli, R. Bruni, P. Serventi and A. Fusari, 2007. *Use of Silybum marianum fruit extract in broiler chicken nutrition: influence on performance and meat quality. J. Anim. Physiol. Anim. Nutr., 91:256-26*

Tollba, A.A.H. and M.S.H. Hassan, 2003. *Using some natural additives to improve physiological and productive performance of broiler chicks under high temperature conditions. Black cumin (Nigella sativa) or Garlic (Alium sativum). Egyp. Poultry Sci., 23:327-340.*

الملخص العربى

تأثير استخدام بذور حبة البركة و مستخلصها فى الغذاء على أداء النمو والعدد الكلى للبكتريا النافعة لكتاكيت بدارى اللحم

زينهم شيخون حسن اسماعيل

قسم الانتاج الحيوانى و الدواجن - كلية الزراعة - جامعة جنوب الوادى - مصر

تم إجراء هذه التجربة بهدف دراسة تأثير استخدام بذور حبة البركة او مستخلصها على الأداء الإنتاجى و بعض صفات الذبيحة و العدد الكلى لبكتيريا الكوليفورم فى الأعور. استخدم ٣٦٠ كتكوت لحم من سلالة روس – ٣٠٨ عند عمر يوم حيث تم توزيعها على ٣ معاملات تجريبية بكل منها ٤ مكررات تحتوى كل مكررة على ٣٠ كتكوت لحم لمدة ٤٢ يوم. تم التغذية على الأعلاف التجريبية بالتغذية على عليقة كنترول(بدون إضافات) و ١٠جم/ كجم علف بذور حبة البركة او ١جم/ كجم علف مستخلص بذور حبة البركة. التغذية على بذور حبة البركة أدت الى تحسن معنوى للزيادة فى وزن الجسم مقارنة بالمعاملات الأخرى. التغذية على كل من بذور حبة البركة أو مستخلصها ادت الى زيادة معنوية فى استهلاك العلف مقارنة بالكنترول كذلك فان كفاءة تحويل العلف للكتاكيت المغذاه على حبة البركة كانت أفضل مقارنة بالمعاملات الأخرى. التغذية على بذور حبة البركة ادت الى زيادة معنوية فى وزن الذبيحة مقارنة بالكنترول فى حين ان كلا من نسبة التصافى و الأجزاء المأكولة و الدهن البطنى و وزن القناة الهضمية و طولها و العدد الكلى لبكتيريا الكوليفورم فى الأعور لم تتأثر معنويا بالمعاملات المستخدمة. نتائج الدراسة الحالية اوضحت ان إضافة بذور حبة البركة فى أعلاف كتاكيت اللحم بنسبة ١٠جم / كجم علف ادت الى زيادة معنوية فى كل من الزيادة فى وزن الجسم و كفاءة تحويل العلف و وزن الذبيحة كذلك ادت الى نقص نسبى فى عدد بكتيريا الكوليفورم فى الأعور لكتاكيت اللحمتحت ظروف هذه التجربة.