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Comparative Effect of *Chicory (Cichoriumintybus L.)* and *Nigella sativa*Extract with an Antibiotic onDifferent Parameters of Broiler Chickens

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ABSTRACT

The research was conducted the comparative effects of addition of *Chicory (Cichoriumintybus L.)* and *Nigella sativa*with an antibiotic growth promoter (flavophospholipol) on performance and serum composition of broiler chickens.The based control diet and 4experimental diets were fed to 5group with 3repetion (20 chickens/ pen). Treatments were as follows: 1)B, control group,2)C,basal diet plus 200ppm of*Chicory (Cichoriumintybus L.)*,3)N, fed by basal diet plus 200 ppm of*Nigellasativa,*4)CM, basal diet plus 200 ppm ofboth*Nigellasativa*and*Chicory (Cichoriumintybus L.),* 5)F, basal diet plusantibiotic (4.5 mg flavophospholipol/kg diet). According to the results, the best result for FCR was in CM also the highest percent of liver and the lowest level of abdominal fat were observed in this group. The highest level of weight gain and feed intake also the level of breast was seen in the group of five. The serum total cholesterol (Chol), triglyceride (TG),HDL,LDL and Glucose were measured in blood samples at the end of experience.The serum total cholesterol, Triglycerides and LDL concentration were significantly reduced in groups of 4 and 5 compared to the control group ($P<0.05$).
Keywords: *Chicory (Cichoriumintybus L.)*and *Nigella*, Cholesterol, Broiler, Triglyceride.

INTRODUCTION

Natural resources are available for the synthesis and polymerization of glucose into less mobile forms and stored such as in plant.Poultry scientists today are challenged to find out new alternatives to antibiotic growth promoters with no side effects for poultry that could be more or as effective against harmful microorganisms in the gastrointestinal tract and to stimulate the growth by increasing the efficiency of feed utilization and to enhance the immunity. The antimicrobial activity of essential oils derived from spices and herbs [1-2] is of interest as these oils could be used as feed additives alternative to antibiotics [3]. Recently, aromatic plants, and their associated essential oils or extracts are being concerned as potentially growth promoters. At present the scientists are working to improve feed efficiency and growth rate of livestock using useful herbs [3].Herbs have been used for some disease since long time ago because of availability, easy usage. They also exert certain immunological consequences in bird's body [4].Organic acids and plant extracts are among the candidates for AGP replacement. In poultry production, organic acids have been studied as a tool to reduce unwanted bacteria [5], and formic acid in particular has been shown to be particularly effective against Escherichiacoli [6].It was reported that some important bioactive components such as alkaloids, phenolic acids, guinones, lectins, terpenoids, bitters, flavonoids, bioflavonoids, glycosides, mucilage, saponins, tannins ,phenols, essential oils, andcoumarins in medical plants[7-8]. The inclusion of fiber in the diet has either positive or negative nutritive effects on the gut health of monogastric animals. Several studies have been carried out to describe the 'prebiotic effect' of chicory inulin type fructans and oligofructose [9-10]. Lots of studies on phytogenic compounds of plants essential oils have been performed while there are limited evidences about the effect of herbal solid forms on live birds health and performance. Easy and practical application, availability and less cost are known as advantages of the whole herbs application in compare to extracted or essential oil forms. In the other hand, a synergistic effect of phytogenic compounds have been reported in studies with essential oils [11]. The objective of this study was to was conducted the comparative effects of addition of *Chicory (Cichoriumintybus L.)* and *Nigella sativa*with an antibiotic growth promoter (flavophospholipol) on performance and serum composition of broiler chickens.

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MATERIAL AND METHOD

The based control diet and 4experimental diets were fed to 5group with 3repetion (20 chickens/ pen).In this study that starts 1 day following until 42 days there are five treatments, Treatments were as follows: 1) B, control group,2) C, basal diet plus 200ppm of *Chicory (Cichoriumintybus L.)*,3)N, fed by basal diet plus 200 ppm of *Nigella sativa,*4)CM, basal diet plus 200 ppm ofboth*Nigellasativa* and *Chicory (Cichoriumintybus L.),* 5)F, basal diet plus antibiotic (4.5 mg flavophospholipol/kg diet).

Performance parameters

During days 0-42, the experimental diets and drinking water were provided *ad libitum*. Dietary and chick weigh were going on weekly. Feed consumed was recorded daily, the uneaten discarded, and feed conversion ratio (FCR) was calculated(total feed : total gain).At the end of the experiment,8 birds were slaughtered to determine some measurements of carcass yield, breast, liver, thigh, abdominal fat, and gizzard. The hot carcass yields were calculated as percentages of the pre slaughter live body weight of broiler chickens.

Measurement of serum indices

4 ml of blood samples were collected from brachial vein from one bird of each in non-heparinised tubes at day 42 of age from 10 birds in each treatment. Serum was isolated by centrifugation at 3,000×g for 10 min.The serum concentrations of total triglyceride, cholesterol, highdensitylipoprotein (HDL) cholesterol and low-density lipoprotein (LDL) ratio in serum samples were analyzedby an automatic biochemical analyzer (SIGMA4-15 Lab Centrifuge, Germany). Some analyses was done via SAS (Statistical Analyses Software) in the statistical level of 5% according to data gathered from dietary, weight improvement, average of FCR, weight of rearing period and carcass yield.

Table 1. Ingredients and chemical analyses composition of the starter and grower diets

Ingredients (g/kg)	startergrower	
Maize	552	312
Wheat	5 318	
Soybean meal	370	295
Soybean oil	30	45
Fish meal	155	
Limestone	15	--
Oyster shell	--	17
Dicalcium phosphate	5	15
Vitamin-mineral mix[2]	5	5
dl-methionine	1	1
Sodium chloride	2	2
Vitamin E (mg/kg)	--	100
Zn	--	50
Analyzed chemical composition (g/kg)		
Dry matter	892.2	893.5
Crude protein	222.3	200.7
Fat	62.4	62.9
Fiber	36.1	35.6
Ash	61.7	57.0
Calcium	8.25	8.15
Phosphorus	5.51	5.55
Selenium (mg/kg)	0.56	0.59
ME by calculation (MJ/kg)	12.70	12.95

[1] starter diet fed to birds from 0 to 21 days.[2]Provides per kilogram of diet: vitamin A, 9,000 IU; vitamin D3, 2,000, IU; vitamin E, 18 IU; vitamin B1, 1.8 mg; vitamin B2, 6.6 mg B2,; vitamin B3, 10 mg; vitamin B5, 30 mg; vitamin B6, 3.0 mg; vitamin B9, 1 mg; vitamin B12, 1.5 mg; vitamin K3, 2 mg; vitamin H2, 0.01 mg; folic acid, 0.21 mg; nicotinic acid, 0.65 mg; biotin, 0.14 mg; choline chloride, 500 mg; Fe, 50 mg; Mn, 100 mg; Cu, 10 mg; Zn, 85 mg; I, 1 mg; Se, 0.2 mg.

RESULT AND DISCUSSION

The data which obtained from performance are shown in table 2, the best result for FCR was in CM also the highest level of weight gain and feed intake was seen in the group of five ($P<0.05$).It was indicated that diet supplementation with a plant extract containing capsaicin, cinnamaldehyde, and carvacrol at 300 ppm improved 8.1% in daily gain and 7.7% in feed conversion ratio in 17-d-old poults. Herbs and phytogenic products could

control and limit the growth and colonization of numerous pathogenic and nonpathogenic species of bacteria in chicks.[12-13].pharmacologically active substances (phenolic compounds and alkamides) that are supposed to enhance feed digestion and absorption by stimulating secretion of digestive enzymes leading to better feed utilization and assimilation [14].Table 3 shows the effect of plants and antibiotic on carcass and it's parameters.According to the results, the highest percent of liver and the lowest level of abdominal fat were observed in group 4 andthe highest level of breast was seen in the group of five.

There is an evidence to suggest that herbs, spices and various plant extracts have appetite and digestion stimulating factors, in addition to their antimicrobial activity against bacteria found in the intestine [15]. There is a possibility of gathering these to antimicrobial herbs made a remarkable decrease in the amount of intestine microbal colony and this prevented from lysis of amino acids and they used in formation of proteinic tissues and increased the breast percentage [1].*Lee et al* [16] found that the existence of harmful microbes in digestive system causes an increase in the lysis of protein and amino acids of nutrients, di-amination activity of proteins and amino acids and rapid decomposition of these molecules due to secretary substances from bacteria like urease. Considering this fact and antimicrobial activity of these herbs, the whole matter seems sensible. Chicory possibly promotes fat deposition along with live weight gain or since the increase in live weight gain is possibly by increased fat deposition. Increased abdominal fat in broilers fed by thyme leaves, is previously reported [17].

The effects of*Chicory (Cichoriumintybus L.)* and *Nigella sativa*with an antibiotic in starter and grower feeds on blood biochemical of broilers are summarized in Table 4.The serum total cholesterol (Chol), triglyceride (TG),HDL, LDL and Glucose were measured in blood samples at the end of experience. The serum total cholesterol, Triglycerides and LDL concentration were significantly reduced in groups of 4 and 5 compared to the control group (P<0.05).

Table 2: Effect of treatments on performance of broilers.

Treatment	Parameters		
Conversion	Weight gain (gram/day)	Feed Intake (gram/day)	Feed
B	**38.21^{a}**	**78.20^{a}**	**1.85^{a}**
C	**38.26^{a}**	**78.74^{ab}**	**1.81^{a}**
N	**38.30^{a}**	**78.30^{a}**	**1.75^{a}**
CN	**38.79^{b}**	**79.12^{ab}**	**1.68^{b}**
F	**39.15^{b}**	**79.04^{ab}**	**1.64^{b}**
SEM	**1.23**	**2.07**	**0.21**

Means with different subscripts in the same column differ significantly (P< 0.05)

Table 3. The effect of different levels of treatments on carcass traits of broilers

Parameters	B	C	N	CN	F	SEM
Abdominal fat	3.79^{a}	3.73^{a}	3.70^{a}	7.61^{ab}	7.64^{ab}	0.30
Gizzard	3.25^{a}	3.26^{a}	3.30^{a}	3.59^{ab}	7.73^{ab}	0.64
Breast	32.11^{a}	32.19^{a}	33.39^{ab}	33.82^{ab}	34.23^{ab}	1.31
Thigh	26.60	26.23^{a}	26.30^{a}	26.40^{a}	26.98^{ab}	1.06
Liver	3.15^{a}	3.23^{a}	3.21^{a}	3.87^{ab}	3.69^{a}	0.29

a-b Means with different subscripts in the same column differ significantly (P < 0.05)

Table 4. The effect of different levels of treatments on blood biochemical of broilers

Blood Parameters	Treatments B	C	N	CN	F	SEM
Glucose (mg/dl)	170.20	170.23	170.25	171.23	172.01	2.26
Cholesterol (mg/dl)	136.01	134.23^{ab}	135.22^{a}	132.52	131.56	4.69
Protein	3.91	3.86	3.79	3.65	3.87	0.90
Triglyceride (mg/dl)	42.56^{a}	40.33^{ab}	41.56^{a}	39.35^{ab}	38.99^{ab}	1.61
LDL	33.56^{a}	31.22^{a}	30.31^{ab}	30.01^{ab}	29.86^{ab}	1.50
HDL	78.50	78.89	79.02	79.21	79.33	1.21

a-b Means with different subscripts in the same column differ significantly (P < 0.05)

REFERENCES

[1] Mansoub, N.N. 2011 Comparative effect of using Zizaphora, Garlic and Probiotic on Performance and serum composition of broiler chickens.,Annals of Biological Research, 2: 373-378.

[2] Hammer, K.A., C.F. Carson and T.V. Riley, 1999. Antimicrobial activity of essential oils and other plant extracts. J. Appl. Microbiol., 86: 985-990.

[3] Taylor, D.J., 2001. Effects of antimicrobials and their alternatives. Br. Poult. Sci., 42: (Suppl) 67-68.

[4]Kong XF, Hu YL, Yin YL, Wu GY, Rui R, Wang DY, Yang CB (2006). Chinese herbal ingredients are effective immune stimulators for chickens infected with the Newcastle disease virus. Poult. Sci., 85: 2169-2175.

[5] Griggs, J. P., and J. P. Jacob. 2005. Alternatives to antibiotics for organic poultry production. J. Appl. Poult. Res. 14:750–756.

[6] Ratcliff, J. 2000. Antibiotic bans—A European perspective. Pages 135–152 in Proc. 47th Maryland Nutr. Conf. for Feed Manufacturers,Baltimore, MD. J. A. Doerr, ed. Univ. Maryland, College Park.

[7] Cowan MM (1999). Plant products as antimicrobial agents.Clin.Microbiol.Rev.

[8] Vandergrift B (1998). Biotechnology in the feed industry Proceedings of Altech's 14 th Annual Symposium Altech Technical Publications Nottingham University Press. Nicholasville. K.Y. Page 293-300

[9] Chen YC, Nakthong C, Chen TC (2005). Improvement of Laying Hen Performance by Dietary Prebiotic Chicory Oligofructose and Inulin. Inter J. Poult. Sci. 4 (2): 103-108.

[10] Castellini C, Cardinali R, Rebollar PG, Dal Bosco A, Jimeno V, Cossu ME (2007). Feeding fresh chicory (Chicoriaintybus) to young rabbits: Performance, development of gastro-intestinal tract and immune functions of appendix and Peyer's patch. Anim. Feed. Sci. Tech 134: 56-65.

[11] Mitsch P, Zitter-Eglseer K, Kohler B, Gabler C, Losa R, Zimpernik I (2004). The effect of two different blends of essential oil components on the proliferation of *Clostridium perfringens*in the intestines of broiler chicken. Poult. Sci., 83: 669-675.

[12] Bampidis VA, Christodoulou V, Flourou-Panerl P, Christaki E, Chatzopoulou PS, Tsiligianni T, Spais AB (2005). Effect of dietary dried oregano leaves on growth performance, carcase characteristics and serum cholesterol of female early maturing turkeys. Brit Poult Sci. 46: 595–601.

[13] Jamroz D, Kamel C (2002). Plant extracts enhance broiler performance. J. Anim. Sci. 80: (Suppl. 1): 4. (Abstr.).

[14] Durrani F.R., Chand N., Zaka K., Sultan A., Khattak F.M., Durrani Z., 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

[15] Zeweil, H. S., El-Fiky, A. A., and Kalamah, M. A. (1996). Effects of Fermacto-500 vs. virginiamycin on the performance of growing Japanese quail. Egypt. Poult. Sci. 16 (II): 201-220.

[16] Lee, K.W., H. Everts., and A.C. Beyen, 2003. Dietary carvacrol lowers body gain but improves feed conversion in female broiler chickens. Journal of Applied Poultry Research. 12:394-399.

[17] Ocak N, Erener G, Burak AKF, Sungu M, Altop A, Ozmen A (2008). Performance of broilers fed diets supplemented with dry peppermint (Menthapiperita L.) or thyme (Thymus vulgaris L.) leaves as growth promoter source. Czech J. Anim. Sci. 53: 169-175.