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Effect of Dietary Coriander Seeds Supplementation on Growth Performance Carcass Traits and Some Blood Parameters of Broiler Chickens

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Abstract: A trial was conducted to determine the effect of different levels of coriander seed supplementation in diets on performance and blood parameters in broilers. Two hundred and fourty (1-day old) commercial broiler chicken (ROOS) were divided into groups of 60 birds in each and randomly assigned to four treatment diets with three replicate. Birds were fed basal diets or the basal diet supplemented with 0.1, 0.2 and 0.3% of coriander seed. Experiment was continued 42 days. Birds that fed 0.3% coriander seed diet exhibited the largest body weight gain, feed conversion ratio and carcass yield and decreased feed intake and fat pad (%BW). There was differences in PCV%, RBC counts and Hb concentration in 0.3% coriander seed supplemented groups, but differences of the other group were not statistically important. There was no different in total number of WBC, H/L as well as H/L ratio among the treatment groups. There was no significant difference for GPT and GOT enzyme activity between the treatments. The coriander seed supplementation also led to decrease the glucose and cholesterol concentration in blood serum. Based on the results of this study, it could be advised to supplement broiler feed with 0.3% coriander seed.

Key words: Coriander seed, broiler, growth, blood parameters

INTRODUCTION

Synthetic non-nutritive feed additive are extensively used in poultry ration as growth promoter and as prophylactic measures to overcome various disease and stress. The use of antibiotics as growth promoters in the chicken feed develops resistance in the pathogenic microorganisms that is serious threat to human health (Botsglou and Fletouris, 2001). To avoid the residual effects of antibiotics and other synthetic feed additives in meat and eggs. Extensive research is this required in order to find alternative growth promoters. It has been reported that medical plants and herbs contain a wide variety of active phytochemicals including the flavonoids, terpenoids, lignans, linalool and essential oil. These plants possess biological activities such as that of antioxidants and stimulate the function of animal digestive systems to increase production of digestive enzymes through enhance liver functions (Hernandez *et al*., 2004) and there fore could be effectively utilized in poultry ration as feed additives.

Coriander (*Coriandrum sativum* L.) is culinary and medicinal plant from the umbeliferae family. This plant is widely distributed and mainly cultivated for seed. The seed contain an essential oil up to 1% and the monoteroid, Linalool in the mean component. Coriander the active ingredient is a potential antibacterial (Burt, 2004; Cantore *et al*., 2004; Kubo *et al*., 2004), antioxidant (Wangensteen *et al*., 2004) antidiabetic (Gallagher *et al*., 2003) and stimulatory effects in the digestion process (Cabuk *et al*., 2003). However, no or limit reports are available on the effect of coriander seed on poultry performance. The aim of the present trial was to study the effects of coriander seed on production performance and hematobiochemical profile of broiler chickens.

MATERIAL AND METHODS

The experiment was conducted in Completely Randomized Design (RCD). A total of 240 day old unisexual chickens of the commercial strain (ROSS) and a mean mass of 36±1.5 g were divided into four groups and each group was further divided into three replicates having 20 chicks/replicate. Between day 1 and 21 the chicks were fed a starter diet followed by finisher diet between day 22 and 42 (Table 1). The birds were raised on congenital letter system. The bird were fed a basal diet or the basal diet supplemented with 0.1, 0.2 and 0.3% of coriander seed, during six weeks experimental period. Blood was collected from the neck the blood vessel was cut at slaughter.

Five ml without anticoagulant to obtain serum, blood sample were allowed to clot and centrifuged for 20 min at 1500 rpm to separate the sera. The sera sample were stored at -20^{o}C for the analysis of Serum to Total Protein (STP), albumin, cholesterol, triglyceride, uric acid and Gamma Pyruvic Transferees (GPT) and Glulamic Oxalocetic Transferees (GOT). Using commercially

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available kit (Bro;abo SA, 02160, Mazaiy France). Another 5 ml samples were collected with EDTA from the same birds from the some birds for hematological parameters tests such as Red Blood Cells (RBC), White Blood Cells (WBC), Packed Cells Volume (PCV) and Hemoglobin (Hb) together with absolute count of Hetrophils (H), Lymphocytes (L) as well as H/L ratio were determined by routine (Campbell, 1995).

Data were subjected to one-way analysis of variance according to Snedecor and Cochran (1980) while significant mean differences separated by Duncan's Multiple Range Test (1955). All statements of significances are based on the 0.05 level of probability.

Table 1: Composition of the broiler diet (for 100 kg feed)

Ingredients	Starter	Finisher
Wheat	55.1	66.1
Soybean meal (40%)	30.0	21.0
Meat meal	10.0	8.0
Sunflower oil	2.0	4.0
Limestone	1.0	1.0
Dicalcium phosphor	1.0	1.0
Vit + Min mix*	0.3	0.3
Salt	0.3	0.3
DL-Methionine	0.15	0.15
Lysine	0.15	0.15
Total	100.0	100.0
Calculated composition**		
ME (kcal/kg)	25.31	21.7
Crude protein	2819.32	3035.3
Lys.	2.814	2.545
Meth + Cyc.	0.416	0.373
Ca (%)	0.115	0.094
P (%)	0.403	0.378

*Vitamins and minerals mixture provide per kilogram of diet: Vitamin A (as all-trans-retinly acetate); 12000 IU; vitamin E; 10 IU; k3 3 mg; Vit. D3, 2200 ICU; riboflavin, 10 mg; Ca pantothenate, 10 mg; niacin, 20 mg; choline chloride, 500 mg; vitamin B12, 10 Ug; vitamin B6, 105 mg; thiamine (as thiamine mononitrate), 2.2 mg; folic acid, 1 mg; D-biotin, 50 ug. Trace mineral (milligrams perkilogram of diet): Mn, 55; Zn, 50; Fe, 30; Cu, 10; Se, 1 and Ethoxyquin 3 mg.

**Calculated composition was according to NRC (1994)

RESULTS AND DISCUSSION

Body weight, body weight gain, feed intake and feed conversion ratio are presented in Table 2. Birds fed diets contain coriander seed had an improved BE, BWF and FCR compared to control diet, but significant ($p<0.05$) effects of coriander seed supplementation were observe only in high level 0.3% diet. The groups supplemented with coriander seed showed lower FI ($p<0.05$) than control group, which is always desirable in poultry industry. No different were noted in comparison for carcass yield measurements of chill weight, breast, thigh drum, wing weight across treatment.

This indicates that coriander seed was effective in improving production performance in broiler chickens such as BW, BWG and FCR. These results are supported by the finding of Ali *et al.* (1992) who reported that coriander seed supplementation improved Bw, BWG and FCR in broiler chickens. Similar results were reported by Guler *et al.* (2005) who stated that coriander seed supplementation at rate 2 kg/ton improved BW and FCR in Japanese quail. Moreover it has been reported that the essential oil extracted from coriander seed and in particular the linalool components were responsible for stimulates the digestive process in animals (Cabuk *et al.*, 2003). Positive effects improve feed intake feed conversion ratio and carcass yield (Ather, 2000; Hertrampt, 2001; Hernandez *et al.*, 2004).

The effect of coriander seed supplementation of basal diet on digestive organs of broiler chicken is showed in Table 3. There was significant difference ($p<0.05$). Higher values of liver and pancreas (% BW) were obtained from birds on 0.3% coriander seed diet. However, birds on 0.1 and 0.2% coriander seed not different significantly. The gizzard and proventriculus relative weight (%BW) and intestine long of birds in different treatments and control group found really the same. Where as the fat pad relative weight (%BW) was reduced significantly ($p<0.05$) in broilers supplemented with coriander seed (0.1, 0.2 and 0.3%) than those of non-supplemented group. These results was in

Table 2: Effect of coriander seed on production parameters of broiler (42 days age)

		Coriander seed (%)		
Parameters	Control	0.1	0.2	0.3
Live weight (g/bird)	2169±18^{b}	2177±22.0^{b}	2196±21^{b}	2266.0±10^{a}
Feed intake (g/bird)	4327±50.9^{a}	4261±21.5^{b}	4259±22.5^{b}	4298±23.0^{b}
Feed conversion (kg/kg)	2.03±0.04^{b}	2.02 ±0.02^{b}	1.96± 0.02^{b}	1.92±0.01^{a}
Carcass yield chill weight (g)	1607±19^{b}	1616±22^{b}	163±18^{b}	1701±23^{a}
Chill weight (% chill weight)	74.07±0.29^{a}	74.43±0.19^{a}	74.44±0.09^{a}	75.17±0.09^{a}
Breast weight (% chill weight)	28.5±2.22^{a}	28.36±1.04^{a}	29.93±0.46^{a}	28.13±1.40^{a}
Thigh weight (% chill weight)	17.55±0.24^{a}	17.24±1.04^{a}	17.00±1.15^{a}	17.80±1.98^{a}
Dram weight (% chill weight)	12.51±1.06^{a}	12.67±0.50^{a}	12.45±0.50^{a}	12.71±0.62
Wing weight (% chill weight)	10.89±0.64^{a}	11.20±0.50^{a}	11.37±0.52^{a}	11.56±0.60^{a}

^{a,b}Mean within same row lacking common supplement differ significant ($p<0.05$)

Table 3: Effect of coriander seed on digestive organs of broiler (6 weeks)

		Coriander seed (%)		
Parameters	Control	0.1	0.2	0.3
Body weight (g)	2359±7.6[b]	2422±6.9[b]	2418±4.6[b]	2496±2.5[a]
Liver (g)	1.850±0.09[b]	1.852±0.85[b]	1.890±0.07[b]	1.934±0.06[a]
Pancreas (g)	0.220±0.006[b]	0.221±0.009[b]	0.218±0.005[b]	0.250±0.007[a]
Proventriculus (g)	0.373±0.022[a]	0.358±0.012[a]	0.362±0.022[a]	0.390±0.020[a]
Gizzard (g)	1.467±0.049[a]	1.350±0.043[a]	1.352±0.043[a]	1.351±0.056
Fat pad (g)	1.467±0.108[a]	1.138±0.107[b]	1.206±0.073[b]	0.963±0.103[b]
Intestine long (cm)	276±6.1[a]	284±8.3[a]	269±4.3[a]	273±6.0[a]

[a,b]Mean within same row lacking common supplement differ significant ($p<0.05$)

Table 4: Effect of coriander seed on hematological parameters of broiler (42 days age)

		Coriander seed (%)		
Parameters	Control	0.1	0.2	0.3
PCV (%)	29.67±0.33[b]	30.33±0.67[b]	30.67±0.67[b]	32.67±0.33[a]
Hb (g/100 ml)	8.2±0.15[b]	8.6±0.26[b]	8.8±0.06[b]	9.4±0.08[a]
RBC (10^6/mm^3)	2.41±0.158[b]	2.56±0.024[b]	2.69±0.046[b]	2.84±0.127[a]
WBC (10^3/mm^3)	22.07±0.09[a]	22.15±0.12[a]	22.13±0.03[a]	22.00±0.06[a]
H (10^3/mm^3)	7.97±0.16[a]	8.04±0.39[a]	7.89± 0.54[a]	7.61±0.39[a]
L (10^3/mm^3)	15.73±0.12[a]	15.87±0.18[a]	15.70±0.09[a]	15.50±0.12[a]
H/L ratio	0.506±0.009[a]	0.507±0.026[a]	0.503±0.003[a]	0.491±0.022[a]

PCV: Packed Cells Volume; Hb: Hemoglobin; RBC: Red Blood Cells; WBC: White Blood Cells; H: Hetrophils; L: Lymphocytes.
[a,b]Mean within same row lacking common supplement differ significant ($p<0.05$)

Table 5: Effect of coriander seed on biochemistry parameters of broiler (42 days age)

		Coriander seed (%)		
Parameters	Control	0.1	0.2	0.3
Total protein (g/100 ml)	3.10±0.58[b]	3.13±0.89[b]	3.30±0.58[b]	3.80±0.15[a]
Albumin (g/100 ml)	1.6±0.07[a]	1.64±0.03[a]	1.67±0.07[a]	1.70±0.05[a]
Glucose (mg/100 ml)	214.33±6.69[a]	213.67±2.03[a]	200.33±4.26[ab]	190.33±2.33[b]
Cholesterol (mg/100 ml)	86.33±3.71[a]	80.00±3.61[ab]	79.67±1.20[b]	74.33±2.03[b]
Triglyceride (mg/100 ml)	128.00±5.03[a]	124.00±4.16[a]	122.33±5.24[ab]	102.33±4.91[b]
Uric acid (mg/100 ml)	12.00±0.57[a]	10.67±0.67[a]	10.33±0.67[a]	9.67±0.67[a]
GPT (IU/mol)	79.33±1.53[b]	81.33±1.45[b]	81.67±1.45[b]	83.33±1.53[a]
GOT (IU/mol)	164.00±8.00[b]	167.67±9.33[b]	168.67±6.77[b]	174.67±3.53[a]

[a,b]Mean within same row lacking common supplement differ significant ($p<0.05$)

agreement with other study performance on Japanese quail (Guler *et al*., 2005). In addition the supplementation of poultry diets with aromic plants have a stimulating effects on digestive system of the animals through the increasing the production of digestive enzymes and by improving the utilization of digestive products through enhanced liver function (Hernandez *et al*., 2004). A decline in the fat pad due to coriander seed supplementation groups could be due a hypolipidemic effect has been reported by (Chithra and Leelamma, 1999).

The average hematological values, PCV, RBC and Hb concentration in broilers supplemented with coriander seed was higher ($p<0.05$) than those of non-supplemented groups (Table 4). No significant different were observed in WBC, H, L and H/L ratio among dietary treatments. Talebi *et al*. (2005) however noted that increases in PCV, RBC and Hb concentration occurs, which could be attributed to positive correlations for those traits. Ali *et al*. (1992) previously observed that addition of coriander seed 0.1% increased Hb concentration and WBC counts in blood serum of broilers compared to those fed the control group. In this study it is evident from the low H/L ratios during the treatments, that broilers were non experiencing stress. Vijayan and Rema (1997) reported that H/L ratio shown to be associated with increased levels of stress in the birds.

Table 5 shows the effect of coriander seed on serum biochemistry of broiler chickens. The mean values of total serum protein in the serum of the broiler chickens were significantly ($p<0.05$) influenced by coriander seed supplementation. Higher mean values were obtained from bird on 0.3% coriander seed. The increase of FPS in 0.3% coriander seed came in agreement with pervious report using dietary coriander seed supplementation rate of 0.1, 0.5 and 1.0 Kg/ton (Ali *et al*., 1992). No significant difference with respect to albumin, uric acid, GPT and GOT concentration were detected due to dietary treatments. The glucose, cholesterol and

triglyceride concentration was significantly ($p<0.05$) lower at 0.3% diet of coriander seed, but the mean effect of 0.1 and 0.2% diet was not significant compared with control group. This was in agreement with other studies performed on animal (Chithra and Leelamma, 1999, 2000; Ertas *et al*., 2005) have been clearly demonstrated that coriander seed has a progressive metabolic control on mechanism involved in elimination of lipids from body.

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