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EFFECT OF FEEDING CORIANDER SEEDS, BLACK PEPPER AND TURMERIC POWDER AS FEED ADDITIVES ON HEMATO-BIOCHEMICAL PROFILE AND PERFORMANCE OF BROILER CHICKEN

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Abstract: This study was undertaken to investigate the effect of feeding coriander seeds, black pepper and turmeric powder, as a growth promoter in broiler feed on growth performance, carcass characteristics and blood profile. A total 240 day-old commercial broiler chicks (Cobb-400) were divided equally into four groups with 60 birds (three replicates each of 20 birds) and were assigned to four iso-nutritive diets, viz., Diet-I (basal control diet without feed additives), Diet-II (basal control diet with 2 % Coriander seeds), Diet-III (basal control diet with 2 % Turmeric powder) and Diet-IV (basal control diet with 0.5 % Black pepper). Feed and water were offered *ad libitum* till the termination of the trial at 42 days. The starter and finisher diets were given to birds from 1 to 28 and 29 to 42 days of age, respectively. Growth performance and blood parameters were measured. Overall feed intake (g) was found to be significantly ($P<0.05$) higher in different treatment groups as compared to control group with highest value for T_3 group followed by T_2, T_4 and T_1 groups. Final body weights (g) were found to be significantly ($P<0.05$) higher in all treatment groups (T_2,T_3 and T_4) as compared to control group (T_1) and highest total body weight of experimental birds was observed in coriander seed supplemented group (T_2) followed by black pepper (T_4), turmeric (T_3) and control group (T_1). Difference in feed conversion ratio was found to be non significant among control (T_1), T2, T3 and T_4 group. Non significant ($P>0.05$) difference for different haemato biochemical parameters like Hemoglobin (Hb), Packed cell volume (PCV), Total Erythrocyte Count (TEC), Total Leukocyte Count (TLC) and Alanine Amino Transaminase (ALT) were observed. Aspartate amino transferase (AST) value which was significantly higher in treatment groups (T_2, T3, T4) as compare to control (T_1). The results of the present investigation indicated that use of coriander seed @ of 2% improves the overall performance without any harmful effect on hemato-biochemical profile and can be included in the diet of broilers up to 42 days to maximize the profit.

Keywords: Broiler, Feed additives, Hemato-biochemical parameters, Performance.

Introduction

Feed additives used in poultry production are a group of natural and non-antibiotic growth promoters, derived from herbs, spices, essential oils. They are natural, less toxic,

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residue free and ideal feed additives for poultry when compared to synthetic antibiotics or inorganic chemicals. Feed additives have antimicrobial, antifungal, antiviral, antitoxigenic, antiparasitic and insecticidal properties. Potential benefits of using phytogenics in poultry nutrition are: increased feed intake, stimulation of digestion, increased growth performance, reduced incidence of disease, improved feed efficiency, increased profitability and reducing poultry house emissions. Coriander has been reported to posses many pharmacological activities like antioxidant (Darughe *et al*., 2012), anti-diabetic (Eidi *et al*., 2012), anti-mutagenic (Cortes *et al*., 2004) and anti-spasmodic (Alison and peter, 1999) etc. Moreover, coriander oil is used as an antimicrobial agent as it possesses broad spectrum antimicrobial activity (Silva *et al*., 2011). Black pepper improves digestibility (Moorthy *et al*., 2009) Therapetic Efficiency of pepper is due to its compound: cupsaeesin, cupsisin and cupsantine that some of them allay rheumatic aches. Piperine is one of the compounds of black pepper which has anti- ache effect (Mahady *et al*., 2008). Turmeric is known as the "golden spice" as well as the "spice of life." It is used in India as a medicinal plant, and held sacred from time immemorial. Not much research work has been carried out on feeding of herbs in the diet of broiler chicken. Therefore present study was planned to assess the effect of feeding coriander seeds, black pepper and turmeric powder as feed additives on hemato- biochemical profile and performance of broiler chicken.

Materials and methods

A total 240 day-old commercial broiler chicks (Cobb-400) were divided equally into four groups with 60 birds (three replicates each of 20 birds) and were assigned to four iso-nutritive diets, viz., Diet-I (basal control diet without feed additives), Diet-II (basal control diet with 2 % Coriander seeds), Diet-III (basal control diet with 2% Turmeric powder) and Diet-IV (basal control diet with 0.5 % Black pepper). Feed and water were offered *ad libitum* till the termination of the trial at 42 days. The starter and finisher diets were given to birds from 1 to 28 and 29 to 42 days of age, respectively. The Growth parameters were recorded weekly, which include feed intake, live body weight, weight gain and feed conversion ratio. At the end of the feeding trial, two chicks per replicate (six birds per group) were starved overnight so as to empty the crop and the birds were weighed and sacrificed. Blood was collected into labeled vial containing sodium ethylene diamine tetra acetic acid (Na-EDTA) as anticoagulant from wing vein. Hemoglobin was estimated by Sahli's acid hematin method, Packed Cell Volume by micro hematocrit method, while Total Leucocyte Count and Total Erythrocyte Count were counted by hemocytometer (Jain, 1986). Blood samples were

centrifuged at 3000 rpm for 10 minutes for plasma separation. Plasma was collected and stored immediately at -20°C for determination of Aspartate Amino transferase and Alanine Amino Transaminase by Merck's kit, using serum biochemical analyzer (Microlab-300, Merck) as per (Tietz *et al.,* 1976).

The data was analyzed statistically using complete randomized design (CRD) as per Snedecor and Cochran (1994).

Results and discussion

The effect of Coriander seeds, Black pepper and Turmeric Powder on the performance of broilers chicks are presented in Table 1. Statistical analysis of data on final body weights revealed that all treatment groups (T_2, T3 and T_4) showed significant ($P<0.05$) increase in final body weight as compared to control group (T_1). It was found that highest total body weight of experimental birds was observed in Coriander seeds supplemented group (T_2) followed by Black Pepper (T_4), Turmeric Powder (T_3) and control group (T_1). Improvement in body weight of birds in treatment groups T_2, T_3 and T_4 might be due to the better feed utilization and nutrient availability to birds. Dietary antibiotic growth promoters do play a key role in animal and poultry production. However, most of these antibiotics are banned in many countries, particularly the European Union, because of public health concern regarding their residues in the animal products and the development of antibiotic resistance in bacteria. Feed additives such as herbs and spices are commonly incorporated into the diets of poultry to improve flavor and palatability, enhance productive performance (Windisch *et al*., 2008) exert potent antimicrobial properties against various pathogens, and as alternative feeding strategy to replace antibiotic growth promoters.

Statistical analysis revealed that overall feed intake (g) were significantly ($P<0.05$) higher in different treatment groups like T_2, T_3 and T_4 when compared with control (T_1) group. Highest overall feed intake was found in T_3 group followed by T_2, T4 and T_1 groups. Total feed consumed in different groups for 0-6 weeks was comparable with BIS (1992) suggested feed intake of 3200g feed consumption per bird.

Feed Conversion ratio was non-significant ($P>0.05$) among different treatment groups and found to be lowest in T_2 and T_4 groups of birds followed by control and T_3 group. In the present study, the beneficial effects of a coriander seeds on FCR observed are in agreement with finding of previous studies (Gular *et al.,* 2005, Saeid and Al- Nasry (2010), Jaff (2011). Al.Sultan (2003) also reported that FCR in birds was the best with turmeric powder supplementation. While Nikola *et al*., (2014) reported that used of Black Pepper as an

additive in the broiler ration had no significant effect on FCR of broiler chickens. In contrast, Hosseini- Vashan *et al*. (2011) reported that use of Turmeric powder in the diet of broiler did not affect feed conversion ratio.

The average values of hematological parameters are presented in Table 2. Statistical analysis of Hb and PCV values showed non-significant difference among different treatment groups i.e. T_1, T2, T3, and T_4. Levels of Hb and PCV observed in the present study were within the normal physiological range and did not differ significantly ($P>0.05$) among different dietary treatments. Similar non- significant effect was observed by feeding of Coriander seeds (Saeid and AL- Nasry. 2010) and Turmeric Powder (Sugihotro et *al*., 2011) on haemoglobin and PCV were earlier reported. Stastical Analysis of TLC and TEC values showed non-significant difference among all experimental groups.

Similar non -significant findings values of TEC ($\times 10^6/\mu l$) were also reported by Galib *et al*., (2012) in black pepper supplemented group. While Sigihotro *et al*. (2011) also reported non-significant difference on erythrocyte count on supplementation of turmeric powder in broiler diets. Statistical analysis of values revealed that supplementation of coriander seeds, turmeric powder and black pepper in broiler ration significantly resulted in higher ($p<0.01$) ALT/AST level than control. AST (U/l) value was higher in T_3 group followed by T_2, T_4 and T_1 group respectivaly.

The results of the present investigation indicated that use of coriander seed @ of 2% improves the overall performance without any harmful effect on hemato-biochemical profile and can be included in the diet of broilers upto 42 days to maximize the profit.

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Table 1: Effect of Coriander seeds, Turmeric Powder and Black pepper on performance of Broiler chicks

Performance parameters	Treatments (n=24)			
	Control (D-I)	**Coriander seeds (2%) (D-II)**	**Turmeric powder (2%) (D-III)**	**Black pepper (0.5%) (D-IV)**
Body Weight (g/bird)	1790.83^{b} ±23.64	1964.40^{a} ± 31.61	1915.25^{a} ± 34.26	1940.80^{a} ± 31.30
Feed Intake (g/bird)	3140.10^{d} ±22.95	3367.90^{c} ± 21.9	3422.00^{a} ± 22.1	3333.90^{b} ± 21.8
Body Weight Gain (g/bird)	1735.67^{c} ± 23.29	1909.50^{a} ± 31.00	1859.90^{b} ± 33.68	1885.60^{ab} ± 31.40
FCR (kg/kg)	1.81± 0.27	1.76± 0.50	1.83± 0.50	1.76± 0.50

^{a,b}Means bearing different superscripts in a row differ significantly (P<0.05)

Table 2: Hematological profile of experimental birds

Parameters	Treatments (n=24)			
	Control (D-I)	**Coriander seeds (2%) (D-II)**	**Turmeric powder (2%) (D-III)**	**Black pepper (0.5%) (D-IV)**
Hb (mg/dl)	10.20±0.33	9.05±0.03	10.50±0.29	11.66±0.26
TEC ($\times 10^{6}$/µl)	2.30±0.20	2.58±0.04	2.76±0.45	3.40±0.05
TLC ($\times 10^{3}$/µl)	25.80±0.36	28.50±0.56	28.50±0.31	27.00±0.69
PCV (%)	25.20± 0.36	26.66±0.41	27.33±0.42	28.16±0.28
ALT (I/U)	11.50 ± 2.62	9.30± 0.51	8.50± 2.60	10.50 ± 3.40
AST (I/U)	54.50 ± 3.49	81.50± 1.88	84.83± 3.07	75.83± 3.00

Mean values bearing different superscripts in a raw differ significantly (P<0.05)