EFFECT OF TURMERIC (CURCUMA LONGA) SUPPLEMENTATION ON GROWTH AND BLOOD CHEMISTRY OF BROILERS


Received 11 February 2016, revised 05 May 2016

ABSTRACT: To access the effect of turmeric (Curcuma longa) supplementation on growth and blood chemistry of broiler chickens, seventy five day old straight run coloured synthetic broiler chicks were randomly divided into 3 groups (25 chicks per group). Group I served as control (without any supplementation), whereas birds in groups II and III were supplemented with 0.5% and 1.0% Curcuma longa powder respectively and the trial was lasted for 7 weeks, during which weekly body weight changes were recorded. Blood samples were collected at the end of the experiment to study the blood profile of birds. The results indicated that addition of Curcuma longa powder caused significant (P<0.05) increase in body weight gain and blood Hb concentration. On the other hand Curcuma longa supplementation had non-significant (P>0.05) effect on blood biochemical parameters of birds. The present results confirmed the beneficial effects of dietary Curcuma longa powder to improve body weight and Hb concentration of broiler chickens.

Key words: Curcuma longa, Broilers, Growth, Blood chemistry.

INTRODUCTION

Turmeric (Curcuma longa) is a rhizomatous herbaceous perennial herb of ginger family that is widely used and cultivated in India (Govindarajan and Stahl 1980). It belongs to the family Zingiberaceae along with ginger, cardamom, and galangal. This medicinal plant possesses rhizomes and underground root-like stems that had been originally used as a food additive in curries to improve the storage condition, appearance, flavour, palatability and preservation of food (Jayaprakasha et al., 2005).

The active ingredients of turmeric are curcumin, demethoxycurcumin, bis-demethoxycurcumin and colourless metabolites tetrahydrocurcumin (Huang et al. 1995). Turmeric has antioxidant, antibacterial, antifungal, antiprotozoal, antiviral, anti-inflammatory, anticarcinogenic, anti-hypertensive, and hypo-cholesteremic activities (Chen and Huang 2009). Kumari et al. (2007) and Rajput et al. (2012) showed
that supplementation of turmeric increased the body weight gain of broiler chickens. Turmeric also has beneficial effects on blood parameters in broiler chickens (Swathi et al., 2012). Therefore, an experiment was conducted on broiler chicken to find out the effect of different doses of turmeric supplementation on their growth and blood chemistry.

MATERIALS AND METHODS
An experiment was conducted on 75 straight run day old coloured synthetic broiler chicks, randomly distributed in 3 groups containing 25 chicks each and fed as per specification of Bureau of Indian Standards (BIS, 1992). Birds were reared in deep litter system and given feed and water ad libitum. Broiler birds were given broiler starter feed from 0 to 3rd weeks and broiler finisher diet from 4th to 7th week. The ground turmeric powder was procured from local market of Bhubaneswar, Odisha, India. Treatments were: group I (control), group II supplemented with 0.5% turmeric powder, group III supplemented with 1 % turmeric powder through the concentrate mixture. Various rations were also analysed for proximate composition (AOAC, 2005). Body weights of birds were recorded at weekly intervals. At the end of the experiment blood was collected from three birds of each group. The serum was collected in vials and kept at -40°C until further analysis. Haemoglobin (Hb) content and packed cell volume (PCV) were determined as per Schalm et al. (1975) and Jain (1986), respectively. The serum biochemical parameters like glucose, total protein, albumin, globulin, A: G ratio, cholesterol were estimated by using Crest Biosystems Kit (Goa, India). The data were analysed by Statistical Package for Social Science (SPSS) software version 16.

RESULTS AND DISCUSSION
The composition and proximate analysis of different rations used in the present experiment has been shown in Table 1. The crude protein content (%) of the broiler starter and broiler finisher was 22.75 and 20.09 respectively. The
protein and energy requirement was as per the BIS (1992) requirement.

The body weight gain was higher (P<0.05) in groups fed diets containing turmeric compared to control group (Table 2). This could be attributed to the phytobiotic stimulant property of turmeric. Turmeric has the ability to stimulate digestive enzymes and depress pathogenic microbial flora in the small intestine which compete the host for nutrients (Dieumou et al., 2009). These results are in agreement with Herawati (2010) and Elmakki et al. (2013). However, Fakhim et al. (2013) and Akbarian et al. (2012) did not record any positive response following the inclusion of turmeric in broiler diets.

Results of haematological and blood biochemical parameters are presented in Table 3. The mean haemoglobin (Hb) values increased significantly (P<0.05) in turmeric fed groups.
compared to control group (Table 3) but PCV values were in normal range and were found to be comparable (P>0.05) in all the three groups. Similarly Swathi et al. (2012) and Kumari et al. (2007) observed increased Hb values in birds supplemented with turmeric followed by tulsi. This may be due to enhanced absorption of iron and protein in turmeric supplemented birds than control (Kumari et al., 2007). Spectrophotometric analysis of serum samples indicated that, during the whole experimental period all biochemical parameters related to glucose and protein metabolism (Total protein, albumin, globulin and their ratio) remain unchanged in birds fed turmeric compared with the control group (Table 3). The present findings also demonstrated that total cholesterol were not changed significantly (P>0.05) in all treated groups throughout the experimental period (Table 3). Similar to this Abou-Elkhair et al. (2014) observed that supplementation of 0.5% turmeric powder did not has any significant effect on total protein, albumin, glucose urea, total cholesterol concentration in broiler birds, but Emadi and Kermanshahi (2007) concluded that incorporation of turmeric powder into the male broiler diets for 42 days significantly increased total cholesterol in blood.

CONCLUSION
Supplementation of 0.5% and 1.0% turmeric powder improved the body weight and Hb concentration without affecting blood biochemical parameters of broiler chickens.

ACKNOWLEDGMENT
The authors are thankful to the Vice Chancellor, Orissa University of Agriculture and Technology, Bhubaneswar, Odisha, India, for providing the necessary facilities to carry out this work.

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