



E-ISSN: 2320-7078

P-ISSN: 2349-6800

www.entomoljournal.com

JEZS 2020; 8(4): 707-709

© 2020 JEZS

Received: 16-05-2020

Accepted: 18-06-2020

Premavalli K

Associate Professor and Section Head, Poultry Breeding Unit, Postgraduate Research Institute in Animal Sciences, Tamil Nadu Veterinary and Animal Sciences University, Kattupakkam, Tamil Nadu, India

Sangilimadan K

Professor and Head, Poultry Research Station, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, India

Balasubramanyam D

Professor and Head, Postgraduate Research Institute in Animal Sciences, Tamil Nadu Veterinary and Animal Sciences University, Kattupakkam, Tamil Nadu, India

Omprakash AV

Director, Directorate of Centre for Animal Production Studies, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, India

Corresponding Author:**Premavalli K**

Associate Professor and Section Head, Poultry Breeding Unit, Postgraduate Research Institute in Animal Sciences, Tamil Nadu Veterinary and Animal Sciences University, Kattupakkam, Tamil Nadu, India

Effect of dietary supplementation of turmeric powder (*Curcuma longa* Linn.) on production performance of Nandanam broiler-3 birds

Premavalli K, Sangilimadan K, Balasubramanyam D and Omprakash AV

Abstract

The present study was conducted to investigate the effect of dietary supplementation of turmeric powder (*Curcuma longa* Linn.) on production performance of Nandanam broiler-3 birds. A total of 320 day old chicks were randomly divided into four treatment groups with four replicates of twenty chicks each. The dietary treatments consisted of control - 0 (T1), 0.5 (T2), 0.75 (T3) and 1% (T4) turmeric powder added to the basal diet. There were no significant ($P>0.05$) differences observed in mean body weight (g), feed conversion ratio and livability between different treatment groups. However, the birds fed with basal diet supplemented with turmeric powder exhibited numerically higher body weight, better feed conversion ratio and livability from 0 - 8 weeks than control. It is concluded that dietary supplementation of turmeric powder at 0.5, 0.75 and 1% level did not have significant influence on the production performance of Nandanam broiler-3 birds.

Keywords: Turmeric powder, production performance, Nandanam broiler-3 birds

Introduction

Intensive rearing system of improved varieties of rural poultry has become an important poultry business in India to meet huge demand for their meat and eggs among consumers. Nandanam Broiler-3 a synthetic multi plumage coloured broiler variety developed at the Poultry Research Station, Tamil Nadu Veterinary and Animal Sciences University, by crossing multi plumage coloured broiler strain Nandanam B2 females with Vencobb males through artificial insemination. These birds are multi-coloured broiler strains having good disease resistance, good meat sensory attributes and brown colored eggs which are being promoted for rural poultry farming in Tamilnadu. Scientists throughout the globe are working on to increase the productivity of birds by various scientific nutritional interventions especially on nutritive and non nutritive feed additives supplementations as growth promoters. Recently, many countries banned the usage of antibiotics as growth promoters because of their side effects on both birds and human health. Among various alternatives to antibiotics, phytobiotics, especially the use of turmeric powder due to its medicinal properties, as an as natural growth promoter in the poultry production is being researched extensively throughout the world. Turmeric is a natural herb of the ginger family, *Zingiberaceae*. It contains tetrahydrocurcuminoids, curcumin, demethoxycurcumin and bisdemethoxycutcumin [1, 2]. Curcumin (diferuloyl methane) the natural yellow pigment in the roots of Turmeric, is a polyphenolic compound. Curcumin, is one of the most active ingredients, responsible for the biological activity. Chemical analysis of Turmeric yielded essential oils (2.4-4%) and fatty oils (1.7-3%). Other curcuminoids as well as fats, minerals, fibre, vitamins, protein and carbohydrate levels have been reported [3]. The therapeutic properties of curcumin included antibacterial, anticoccidial, antioxidant, hypocholesteremic and hypolipidaemic [4-6]. It also posses anti-inflammatory [7], antiseptic, nematocidal, immunomodulatory and hepatoprotective properties [8, 9]. Many research studies of the effect of turmeric powder on the production performance were conducted on commercial broilers [10-15] and are limited in improved varieties of rural poultry. Therefore, the purpose of this research was to investigate the potential use of turmeric powder as natural growth promoter on performance of Nandanam broiler-3 birds.

Materials and Methods

This study was conducted at the Poultry Research Station, Tamil Nadu Veterinary and Animal Sciences University, Chennai, India. A total of 320 day old chicks were randomly divided into four treatment groups with four replicates of twenty chicks each. The dietary treatments consisted of control - 0 (T1), 0.5 (T2), 0.75 (T3) and 1% (T4) of *Curcuma longa* powder added to the basal diet. The computed rations were isocaloric and isonitrogenous. All the experimental diets were formulated without supplementation of any antibiotics, probiotics, prebiotics and enzymes. Experimental diets and fresh water were provided ad libitum during this experiment. Birds were reared in cages from 0-3 weeks and then in deep litter system for 4-8 weeks and standard management conditions were followed throughout the experiment. Production performance of birds was assessed based on live body weight; feed consumption and livability were recorded biweekly from 0 day to 8 weeks of age. Feed conversion ratio was calculated from the feed consumption and live body weight gain, and mortality was recorded daily throughout the

experimented period. The recorded data were analyzed statistically [16].

Results and Discussion

The data on effect of dietary supplementation of turmeric powder (*Curcuma longa*) on production performance of Nandanam broiler-3 birds was furnished in Table 1. The results revealed that there were no significant ($P>0.05$) differences observed in mean body weight (g) between different treatment groups at different ages. However, the birds fed with basal diet supplemented with turmeric powder at 0.5, 0.75 and 1% level exhibited numerically higher body weight from 2 - 8 weeks than unsupplemented control birds. The 8th week mean body weight (g) in T1, T2, T3 and T4 were 1116.51±19.92, 1139.06±21.91, 1161.39±21.85 and 1156.63±37.55, respectively. This is in agreement with the results of previous studies in broilers who also reported that body weight was not affected by dietary supplementation of turmeric powder in broiler chicken [6, 10, 11-15].

Table 1: Effect of dietary supplementation of turmeric powder (*Curcuma longa* Linn.) on production performance of Nandanam broiler-3 birds

Parameters	Control T1 (0%)	T2 (0.5%)	T3 (1.0%)	T4 (1.5%)
Hatch weight ^{NS}	43.13±0.42	43.17 ±0.43	43.28±0.43	43.15 ±0.48
2 nd week body weight(g) ^{NS}	142.57±3.64	151.06 ±3.92	154.46 ±3.86	152.77±2.88
4 th week body weight(g) ^{NS}	368.86±11.02	373.66±9.56	379.89±10.89	373.45±10.29
6 th week body weight (g) ^{NS}	665.15±10.66	675.31±9.34	688.16±12.68	693.84±17.09
8 th week body weight (g) ^{NS}	1116.51±19.92	1139.06±21.91	1161.39±21.85	1156.63±37.55
FCR ^{NS}	2.74	2.72	2.70	2.67
Livability (%) ^{NS}	87.50	88.75	88.75	90.00

**-. Highly Significant ($p<0.01$), *- Significant ($p<0.05$),

Mean values having the same superscript in a row do not differ significantly.

On the other hand, Kumari *et al.* (2007) [17] and Al-kassie *et al.* (2011) [18] and Choudhury *et al.* (2018) [19] who reported that dietary supplementation of turmeric powder improved final body weight of broiler chicken. Variation in results of various experiments with the dietary supplementation of turmeric powder in broilers may be due to the variation in curcuminoids contents of turmeric, which varies greatly (2-7%) from species to species. The harvesting of turmeric plant at the different stages of growth also influenced the curcumin contents [13], which vary from 0.25 to 2.7% [20]. Tayyem *et al.* (2006) [21] found that curcumin contents for specific brands of turmeric vary from 0.58 to 3.14% of dry root weight in different countries and regions. Moreover, the studies have shown that soil factors, genus diversity, level of acidity and available nutrients can affect the curcumin content in turmeric plants [22].

The statistical analyses showed that the feed conversion ratio did not differ significantly ($P\geq 0.05$) between different levels of turmeric powder supplementation and control groups. It was consistent with the earlier studies of Emadi and Kermanshahi (2006) [10], Mehala and Moorthy (2008) [11], and Nouzarian *et al.* (2011) [13] also reported no improvement in FCR of broiler chickens fed turmeric powder supplemented diets at various levels. In contrast to our results, addition of turmeric powder in the broiler ration showed significant differences in feed conversion ratio according to findings of several workers [15, 19, 23].

There was no significant difference in mean per cent livability between the turmeric powder supplemented groups and control. This is in accordance with the reports of Abou Egla *et al.* (1995) [24] and Abaza (2001) [25] who found lack of effect of different types and levels of spices on mortalities in various

broiler trials. On contrary, AlJaleel (2012) [26] found differences in mortality rates in broiler chicken supplemented with turmeric and control diets.

Conclusion

The results of the present study indicated that the mean body weight, feed conversion ratio and livability parameters did not differ significantly ($P\geq 0.05$) between different levels of turmeric powder supplementation and control groups. Hence, it can be concluded that the dietary supplementation of turmeric powder at 0.5, 0.75 and 1% level did not have significant influence on the production performance of Nandanam broiler-3 birds. However, further research on the potential use of turmeric powder in different forms, levels and modes of supplementation for different periods in various poultry species must be explored for its recommendation in the commercial use in poultry production.

Acknowledgment

The authors are very much thankful to the authorities of Poultry Research Station, Directorate of Centre for Animal Production Studies and Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, India for offering appropriate facilities required to conduct this research work.

References

- Osawa T, Sugiyama Y, Inayoshi M, Kawakisi S. Antioxidative activity of tetrahydrocurcuminoids. *Biotechnology and Biochemistry*. 1995; 59:1609-161.
- AL-sultan S.I. The effect of *Curcuma longa* (turmeric) on overall performance of broiler chickens. *International Journal of Poultry Science*. 2003; 2:351-353.

3. Khan RU, Naz S, Javdani M, Nikousefat Z, Selvaggi M, Tufarelli V *et al.* The use of Turmeric (*Curcuma longa*) in poultry feed. *World's Poultry Science Journal*. 2012; 68:97-103.
4. Hussein SN. Effect of turmeric (*Curcuma longa*) powder on growth performance, carcass traits, meat quality, and serum biochemical parameters in broilers. *Journal of Advanced Biomedical and Pathological Research*. 2013; 3(2):25-32.
5. El-Khtam AO, El-Latif AA, El-Hewaity MH. Efficiency of turmeric (*Curcuma longa*) and garlic (*Allium sativum*) on *Eimeria* species in broilers. *International Journal of Basic and Applied Science*. 2014; 3(3):349-356.
6. Qasem MAA, Alhadj MS, El Nabi ARG, Al-Mufarrej SI. Effect of turmeric powder as a dietary supplement on performance indicators and immune responses in broiler chickens. *Journal of Animal and Veterinary Advances*. 2015; 14(2):30-35.
7. Holt MDPP, Seymour Katz MD, Kirshoff R. Curcumin Therapy in Inflammatory Bowel Disease: A Pilot Study. *Digestive Disease Science*. 2005; 50(11):2191-2193.
8. Daneshyar M, Ghandkanlo MA, Bayeghra FS, Farhangpajhoh F, Aghaei M. Effects of dietary turmeric supplementation on plasma lipoproteins, meat quality and fatty acid composition in broilers. *South African Journal of Animal Science*. 2011; 41(4):420-428.
9. Rajput N, Muhammad N, Yan R, Zhong X, Wang T. Effect of dietary supplementation of Curcumin on growth performance, intestinal morphology and nutrients utilization of broiler chicks. *Journal of Poultry Science*. 2013; 50(1):44-52
10. Emadi M, Kermanshahi H. Effect of turmeric rhizome powder on performance and carcass characteristics of broiler chickens. *International Journal of Poultry Science*. 2006; 5:1069-1072.
11. Mehala C, Moorthy M. Production performance of broilers fed with *Aloe vera* and *Curcuma longa* (Turmeric). *International Journal of Poultry Science*. 2008; 7:852-856.
12. Mondal MA, Yeasmin T, Karim R, Siddiqui MN, Raihanun-Nabi SM, Sayed MA *et al.* Effect of dietary supplementation of turmeric (*Curcuma longa*) powder on the growth performance and carcass traits of broiler chicks. *SAARC Journal of Agriculture*. 2015; 13(1):188-199.
13. Nouzarian R, Tabeidian SA, Toghyani M, Ghalamkari, G. Effect of turmeric powder on performance, carcass traits, humoral immune responses, and serum metabolites in broiler chickens. *Journal of Animal and Feed Sciences*. 2011; 20:389-400.
14. Sugiharto S, Isroli I, Widiastuti E, Prabowo NS. Effect of turmeric extract on blood parameters, feed efficiency and abdominal fat content in broilers. *Journal of the Indonesian Tropical Animal Agriculture*. 2011; 36:21-26.
15. Naderi M, Akbari MR, Asadi-Khoshoei E, Khaksar K, Khajali F. Effects of dietary inclusion of Turmeric (*Curcuma longa*) and Cinnamon (*Cinnamomum verum*) powders on performance, organs relative weight and some immune system parameters in broiler chickens. *Poultry Science Journal*. 2014; 2(2):153-163.
16. Snedecor GW, Cochran WG. *Statistical methods*. 8th ed. Oxford and IBH Publishing Co., Calcutta, 1994.
17. Kumari P, Gupta MK, Ranjan R, Singh KK, Yadava R. *Curcuma longa* as feed additive in broiler birds and its patho-physiological effects. *Indian Journal of Experimental Biology*. 2007; 45:272-277.
18. Al-Kassie GAM, Mohseen AM, Al-Jaleel RAA. Modification of productive performance and physiological aspects of broilers on the addition of a mixture of cumin and turmeric to the diet. *Research Opinions in Animal and Veterinary Science*. 2011; 1(1):31-34.
19. Choudhury D, Mahanta J, Sapkota D, Saikia B, Islam R. Effect of dietary supplementation of turmeric (*Curcuma longa*) powder on the performance of commercial broiler chicken. *International Journal of Livestock Research*. 2018; 8(7):182-191.
20. Asghari G, Mostajeran A, Shebli M. Curcuminoid and essential oil components of turmeric at different stages of growth cultivated in Iran. *Research in Pharmaceutical Sciences*. 2009; 4:55-61.
21. Tayyem RF, Heath DD, Al-Delaimy WK, Rock CL. Curcumin content of turmeric and curry powders. *Nutrition and Cancer*. 2006; 55(2):126-131.
22. Sasikumar B. Genetics resources of *Curcuma*: diversity, characterization and utilization. *Plant Gen. Res. Charac*. 2005; 3:230-251.
23. Kafi A, Uddin MN, Uddin MJ, Khan MMH, Haque ME. Effect of dietary supplementation of turmeric (*Curcuma longa*), ginger (*Zingiber officinale*) and their combination as feed additives on feed intake, growth performance and economics of broiler. *International Journal of Poultry Science*. 2017; 16:257-265.
24. Abou-Egla, El-Samra H, Attia YA, El-Deek AA, Mafret, Saleh El-Din, Growth promoting influence of some herbs on performance and carcass quality of broilers and ducklings. *Journal of Agricultural Science, Mansoura University*. 1995; 20:3315-3332.
25. Abaza IM. The use of some medicinal plants as feed additives in broiler diets. Ph.D. Thesis, Faculty of Agriculture, Alexandria University, Egypt, 2001.
26. Al-Jaleel RAA. Use of turmeric (*Curcuma longa*) on the performance and some physiological traits on the broiler diets. *Iraqi Journal of Veterinary Medicine*. 2012; 36:51-57.