



RESEARCH ARTICLE.....

Effect of turmeric (*Curcuma longa*) powder in diet on growth performance of broiler chicks

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ABSTRACT..... The experiment was conducted at the Livestock Production and management unit, M.G.C.G.V. Chitrakoot - Satna M.P., during 2016 to April, 2016. Day old 45 broiler chicks (DOC) of same hatch were produced and reared in Deep litter system. The chicks were weighed, leg banded and distributed randomly into 5 groups of 9 chicks each as treatment. Chicks of each treatment were further divided into 3 sub groups of 3 chicks in each in Randomized Block Design (RBD). Chicks of each sub group were accommodated comfortably in deep litter providing 1 sq. ft./ chick. Chicks were fed standard starter ration upto 3 weeks age (1 to 21 days) and then broiler finisher ration upto 3-4 weeks (22-28 days). An experiment was conducted with DOC to 45 broilers chicks divided into five groups T₀, T₁, T₂, T₃ and T₄ which were supplemented with Turmeric powder @ 1.0g, 2.0g, 3.0g and 4.0g/kg of broiler ration, respectively. Weekly observations were recorded for live body weight, weekly gain in weight, weekly feed consumption and feed conversion ratio (FCR) of birds for four Weeks. All the treatment groups T₁ (724.17), T₂ (745.00), T₀ (695.92), T₄ (763.17) recorded significantly higher means for live body weight than of control T₃ (769.25) FCR of chicks at first, second, third, and fourth week of age was recorded 1.61, 1.83, 1.93, and 1.90, respectively. FCRs of broiler chicks due to treatment as well as due to week were significant

KEY WORDS..... Turmeric powder, Growth performance, Broiler chicks

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INTRODUCTION.....

Poultry sector in India has developed unprecedented growth during last three decade and now transformed itself into the status of an industry. Today, India ranks third largest producer in eggs and fifth largest producer in broiler chicken in the world. The major factors for successful poultry production are high genetic potential, balanced nutrition and health maintenance. On

the other hand, there is a major demand to produce high quality poultry meat and egg at low price without rely antibiotics and other medicines in poultry feed and water, (Shivappa-Nayaka *et al.*, 2012).

People of modern times are very much conscious about their health and quality of food items that they will consume. The term feed additive is applied in a broad sense, to all products other than those commonly called

feedstuffs, which could be added to the ration with the purpose of obtaining some special effects (Feltwell and Fox, 1979).

Turmeric rhizome (*Curcuma longa*) is an extensively used spice, food preservative and colouring material that has biological actions and medicinal applications. Curcumin is the main important bioactive ingredient responsible for biological activity of curcuma longa. The purpose of this research was to investigate the effect of adding different level of turmeric powder, on growth performance (Nouzarian *et al.*, 2011).

Studies have shown that supplementing broiler diets with turmeric enhance their performance (Al-Sultan, 2003). However demonstrated that 0.1 and 0.2 per cent turmeric powder used as feed additive had on significant effect on the performance and carcass yield of broiler chickens (Mehala and Moorthy, 2008).

Moreover, microbial resistance too many antibiotics is becoming increasingly evident. Therefore, the use of antibiotics as growth promoters in poultry and animal feed has been banned in the European Union since January 2006 have described many studies in which bioactive plant have been used as additives in poultry feed to stimulate the appetite and feed intake with increased secretion of digestive enzymes. Additionally, as antimicrobial drugs, the additives may also activate the immune system (Jayaprakasha *et al.*, 2005).

How peeping in the above aspect, on experiment was conducted to study the effect of turmeric powder on growth performance of broiler chicks.

RESEARCH METHODS.....

The experiment was conducted at the of Livestock Production and Management unit, faculty of Agriculture M.G.C.G.V. Chitrakoot - Satan M.P., during the March, 2016 to April, 2016. To day old 45 broiler chick (DOC) of same hatch were produced and reared in Deep litter system.

The chicks were weighed, leg banded and distributed randomly into 5 groups of 9 chicks each as treatment. Chicks of each treatment were further divided into 3 sub groups of 3 chicks in each in Randomized Block Design (RBD). Chicks of each sub group were accommodated comfortably in deep litter providing 1 sq. ft. / chick. Chicks were fed standard starter ration upto 3 weeks age (1 to 21 days) and then broiler finisher ration upto 3-6 weeks (22-28 days).

The treatments consented of 04 dose of turmeric powder (1.0g, 2.0g, 3.0g, and 4.0g) with 1 kg feed along with a control having basal diet (standard ration). In all 5 treatments were tested in Randomized Block Design with 03 replication. The standard broilers starter ration contained CP: 22 and, ME:2900 and broiler finisher ration contained CP: 19 and ME:3000 were fed *adlib* to the birds as per BIS (1992) given below:

Ingredients (%)	Broiler starter (0-21 days)	Broiler finisher (22-28) days
Maize	60.00	63.00
Groundnut cake	23.35	18.00
Mineral mixture	3.00	3.00
Common salt	0.05	0.38
Fish meal	13.00	15.00
Vit. Premix	0.05	0.02
Moisture (%)	6.29	6.22
Crude fibres (%)	5.50	6.00
Total ash (%)	8.02	9.34
Crude protein (%)	22	19
ME(Kcal/kg)	2900	3000

Initial weight of each chick was recorded on arrival and then weekly to obtain the growth rate. The feed consumption was also recorded weekly to determine the feed conversion ratio. Turmeric powder was prepared from freshly collected root dried in hot air oven, and grind in mixture turmeric to make powder. Broiler chicks of T₀ were fed ration as per NRC standard CP (22) and ME (2900), but broiler of T₁, T₂, T₃ and T₄ were fed standard ration mixing with turmeric powder @ 1.0, 2.0, 3.0 and 4.0 g per kg. of feed, respectively. All broilers were offered feed *adlib* during the whole day. They were housed in Deep litter system in animal farm. Birds were managed under identical management condition. The data were recorded body weight weekly to determined weight gain and Feed conversion ratio. Litter, feeders and bulbs, caterers and other equipment's were properly cleaned disinfected and sterilized before use.

RESEARCH FINDINGS AND ANALYSIS.....

The results obtained from the present investigation as well as relevant discussion have been summarized under the following heads :

Body weight of broiler chicks :

In treatments T₀, T₁, T₂, T₃ and T₄, the mean weekly

body weight of broiler chicks was 695.92, 724.17, 745.00, 769.25, and 763.17 g, respectively (Table 1). Irrespective of treatments, the mean body weight of chicks at first, second, third, and fourth week of age was recorded 156.73, 468.33, 922.00, and 1410.93 g, respectively. The results revealed that feed supplement caused significant increase and growth in body weight of chicks in different treatments in first, second, third and fourth week of age. The differences in weekly mean weight were significant. The differences in body weight between Treatments T₂, T₃ and T₄ over T₀ were significant. However, T₀, T₁ and T₂, T₃, T₄ were statistically at par.

Gain in body weight :

In treatments T₀, T₁, T₂, T₃ and T₄, the mean weekly gain in body weight of broiler chicks was 330.50, 339.17, 346.67, 342.50, and 352.33 g, respectively (Table 2). Irrespective of treatments, the mean gain in body weight of chicks at first, second, third, and fourth week of age was recorded 114.73, 311.60, 453.67 and 488.93 g, respectively. The results revealed that there was a non-significant effect of feed supplementation (different treatments) on average weekly gain in body weight of chicks during first, second, third and fourth week of age. The differences in weekly mean weight gain were,

Table 1 : Body weight of broiler chicks

Weeks	Treatment wise weekly body weight of broiler chicks					
	T ₀	T ₁	T ₂	T ₃	T ₄	Mean
1	140	153.33	153.33	170.33	166.67	156.73
2	431.67	490	463.33	496.67	460	468.33
3	853.33	856.67	930	996.67	973.33	922.00
4	1358.67	1396.67	1433.33	1413.33	1452.67	1410.93
Mean	695.92	724.17	745	769.25	763.17	

Table 2 : Gain in body weight

Weeks	Treatment wise weekly Gain in body weight of broiler chicks					
	T ₀	T ₁	T ₂	T ₃	T ₄	Mean
1	103.33	113.33	106.67	127	123.33	114.73
2	291.67	336.67	310	326.33	293.33	311.60
3	421.67	366.67	466.67	500	513.33	453.67
4	505.33	540	503.33	416.67	479.33	488.93
Mean	330.50	339.17	346.67	342.50	352.33	

Table 3 : Feed consumption of broiler chicks

Weeks	Treatment wise weekly feed consumption of broiler chicks					
	T ₀	T ₁	T ₂	T ₃	T ₄	Mean
1	65.67	67.67	66.67	84.67	72.67	71.47
2	161.67	185	171.67	182	154.67	171.00
3	208	205.67	243.00	272.67	253.33	236.53
4	267	300.33	256	217.67	244	258.80
Mean	177.83	189.67	184.33	189.25	181.17	

Table 4 : Feed efficiency/Feed conversion ratio of broiler chicks

Weeks	Treatment wise weekly feed efficiency/Feed conversion ratio of broiler chicks					
	T ₀	T ₁	T ₂	T ₃	T ₄	Mean
1	1.56	1.67	1.61	1.71	1.50	1.61
2	1.82	1.84	1.81	1.90	1.80	1.83
3	1.06	1.79	1.94	1.04	1.83	1.93
4	1.83	1.80	1.97	1.97	1.91	1.90
Mean	1.82	1.77	1.83	1.90	1.76	

however, significant. The mean weight gains in third and fourth week were, however, statistically at par.

Feed consumption of broiler chicks :

Average weekly feed consumption of broiler chicks irrespective of treatments ranged from 65.67 to 300.33 g. In treatments T₀, T₁, T₂, T₃ and T₄, the mean feed consumption of broiler chicks was 177.83, 189.67, 184.33, 189.25 and 181.17 g, respectively. The mean feed consumption of chicks at first, second, third, and fourth week of age was recorded 71.47, 171.00, 236.53 and 258.80 g, respectively (Table 3). The results revealed that there was a non-significant effect of feed supplementation (different treatments) on average feed consumption of chicks during first, second, third and fourth week of age. The differences in weekly mean weight gain were, however, significant. The mean feed intake in third and fourth weeks was, however, statistically at par. Feed intake increased with age of broiler chicks, which was a natural phenomenon.

Feed efficiency/Feed conversion ratio of broiler chicks :

In treatments T₀, T₁, T₂, T₃ and T₄, the mean FCR of broiler chicks was 1.82, 1.77, 1.83, 1.90 and 1.76, respectively. Irrespective of treatments, the mean FCR of chicks at first, second, third, and fourth week of age

was recorded 1.61, 1.83, 1.93 and 1.90, respectively (Table 4). The results revealed that there was a non-significant effect of feed supplementation (treatments) on average weekly FCR of chicks from first to fourth week of age. The differences in weekly mean weight gain were, however, significant. The mean feed efficiency in third and fourth weeks was, however, statistically at par. Feed efficiency increased with age of broiler chicks up to third week, which was a natural phenomenon. In fourth week, however, there was a slight decline.

Conclusion :

Based on the result of the experiment, it may be concluded that feed supplementation with turmeric powder influenced body weight, gain in body weight, feed intake and feed efficiency of broiler chicks. Based on feed intake and feed efficiency, the best performance of broilers was obtained with feed supplementation of 4 g turmeric powder per kg of standard ration, followed by 3 g turmeric powder.

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