

## EFFECT OF FEED RESTRICTION AND TURMERIC POWDER SUPPLEMENTATION ON BROILER PERFORMANCE

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### ABSTRACT

A study was conducted to find out the effect of feed restriction and turmeric supplementation on broilers performance. 120 day-old broiler chicks were reared at KVK, Hoshiarpur for 35 days. The chicks were randomly allotted to 4 treatments having 3 replicates with 10 chicks in each replicate. Body weight gain and feed intake were recorded weekly as well as phase wise and for overall period also. FCR was calculated accordingly. A significant decrease in body weight gain was observed during 2<sup>nd</sup> week of age and starter phase. Due to feed restriction (7-15 days) there was a significant decrease in body weight gain at 2<sup>nd</sup> week of age. Combined effect of turmeric supplementation and feed restriction reduces the body weight gain at 2<sup>nd</sup> week of age as well as starter phase, finisher phase and over all period. Feed restriction reduced the feed intake at 2<sup>nd</sup> and 3<sup>rd</sup> week of age and at starter phase. Turmeric supplementation and feed restriction reflected the significant reduction in feed intake at 2<sup>nd</sup> and 3<sup>rd</sup> week of age as well as during starter and grower phase and for overall period. Better FCR was observed during 2<sup>nd</sup> and 3<sup>rd</sup> week of age as well as during grower phase due to turmeric supplementation. It was concluded that feed restriction and turmeric supplementation may be beneficial to improve the feed conversion ratio.

**Keywords:** Broilers performance, Feed intake, Feed restriction, Turmeric supplementation

Growth performance of broiler chickens has increased significantly mainly due to the genetic progress, improvements of nutrition and controlled environment and now it takes only 35 days to reach finishing body weight (Wilson, 2005). Feed restriction can be considered as an option to reduce these problems and to produce a leaner bird and thus feed restriction programs can lower cost of broiler chickens production. Early feed restriction programs used to reduce abdominal and carcass fat in broiler chickens relied on the phenomenon called Compensatory growth which is defined as abnormally rapid growth relative to age.

Use of in-feed antibiotics leads to residues in meat and develops antibiotic resistance in human being consuming the poultry meat. Recently, many countries tended to prohibit antibiotics because of their side effect on both birds and human. Removing these kinds of growth promoters from broilers diet resulted in low growth performance and also less resistance against diseases. To overcome the poor performance and the increased susceptibility to diseases, attempts have been made to find other alternatives (Khawairakpam *et al.*, 2018). Mondal *et al.* (2015) reported that turmeric powder supplemented at a level of 0.5% has significant effect on body weight gain, FCR, abdominal fat content and dressing percentage of broiler, except feed intake and survivability. So efforts are made to study the effects of feed restriction along with turmeric powder supplementation on broiler performance.

### MATERIALS AND METHODS

To undertake this study, 120 day-old broiler chicks were reared at KVK, Hoshiarpur for 35 days. The chicks

were procured from Guru Angad Dev Veterinary and Animal Sciences University (GADVASU), Ludhiana. The chicks were randomly allotted to 4 treatments. Each treatment group comprised of 3 replicates with 10 chicks each. The treatment groups included-

- T1:- Control group fed *ad-lib*s as per ICAR specification i.e. starter diet (1-14 days, 22% CP and 3000 Kcal/kg ME), grower diet (15-21 days, 21.5% CP and 3050 Kcal/kg ME) and finish diet (22-35days, 19.5% CP and 3100 Kcal/kg ME).
- T2:- T1 with additional 0.5% turmeric powder.
- T3:- T1 with feed restriction at 7-15 DOA (8-10 hrs).
- T4:- T1 with feed restriction at 7-15 DOA (8-10 hrs) and additional 0.5% turmeric powder.

Each bird was weighed and feed residue was recorded at weekly intervals. The feeders were removed for 8-10 hr during 8 pm to 6 am (next day) for feed restriction. Standard management practices were followed during the entire experimental period. The chicks were reared under deep litter system containing saw dust and hygienic conditions were maintained. All efforts were made to keep litter dry by frequent racking and removing the wet litter. Manual chick/hanging feeder and drinkers usually practiced during the experiment. The weekly feed intake, body weight gain and FCR was recorded. *Ad Libitum* watering was practiced throughout the experiment. The drinkers were kept in corners of the pen and filled twice a day to ensure regular availability of water. Vaccination was done against Ranikhet, Gumboro and Ranikhet diseases at the age of 7days, 14 days and 21 days, respectively. The statistical analysis was done using

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t-test and one way ANOVA in SAS, 2000 (version 9.3) to test the difference between various treatments.

## RESULTS AND DISCUSSION

**Effect of turmeric powder and feed restriction on body weight:** Performance of broilers fed turmeric powder and feed restriction on body weight has been depicted in Table 1. During first week of age, there was no significant effect of turmeric supplementation on body weight. A significant decrease in body weight gain was observed during 2<sup>nd</sup> week of age and starter phase. In other weeks and phases, there was no significant effect of turmeric supplementation on body weight gain. The results are in agreement with Khwairakpam *et al.* (2018) who reported that turmeric supplementation in broilers diet had no significant effect on average body weight gain. But contradict with the findings of Raghdad and Al-Jalcel (2012); Mondal *et al.* (2015) who reported that inclusion of turmeric at the rate of 5 gm/kg significantly increase body weight of broiler.

Due to feed restriction (7-15 days), there was a

significant decrease in body weight gain at 2<sup>nd</sup> week of age. Similar results were obtained by Sidhu *et al.* (2018) and Malpotra (2017), who reported a decrease in body weight gain during feed restriction. But there was no significant difference at different ages (in week), growth phases and for over all period. But, Saber *et al.* (2011) and David and Subalini (2015) have reported no significant effect by feed restriction. It indicated that body weight gain was reduced during restriction period.

Combined effect of turmeric supplementation and feed restriction reduced the body weight gain at 2<sup>nd</sup> week of age as well as starter phase, finisher phase and over all period as compared to control. It indicated that turmeric supplementation and feed restriction was not beneficial for overall growth performance.

**Effect of turmeric powder and feed restriction on feed intake:** Turmeric supplementation reduces the feed intake at 2<sup>nd</sup> and 3<sup>rd</sup> week of age as well as starter and grower phase (Table 1). But Abou-Elkhair *et al.* (2014) and Akbarian *et*

**Table 1**  
**Effect of feed restriction and turmeric supplementation on different parameters (Mean  $\pm$  S.E.)**

Age	Treatment (on average body weight gain in g)			
	1	2	3	4
1-7 days	103.04 $\pm$ 1.213	100.88 $\pm$ 1.048	103.74 $\pm$ 1.447	102.29 $\pm$ 0.811
8-14 days	173.25 <sup>bc</sup> $\pm$ 5.164	150.78 <sup>a</sup> $\pm$ 3.913	163.63 <sup>bc</sup> $\pm$ 4.248	147.45 <sup>a</sup> $\pm$ 4.904
15-21 days	274.85 <sup>b</sup> $\pm$ 8.609	272.79 <sup>b</sup> $\pm$ 4.164	268.23 <sup>a</sup> $\pm$ 6.040	269.46 <sup>a</sup> $\pm$ 4.274
22-28 days	310.23 $\pm$ 4.913	295.46 $\pm$ 6.096	296.72 $\pm$ 3.700	288.16 $\pm$ 1.025
29-35 days	488.11 <sup>ab</sup> $\pm$ 7.751	478.51 <sup>a</sup> $\pm$ 1.007	518.65 <sup>b</sup> $\pm$ 3.670	478.79 <sup>a</sup> $\pm$ 1.801
1-14 day	276.29 <sup>b</sup> $\pm$ 3.188	251.66 <sup>a</sup> $\pm$ 2.480	267.37 <sup>b</sup> $\pm$ 2.847	249.74 <sup>a</sup> $\pm$ 2.857
22-35 day	798.34 <sup>b</sup> $\pm$ 6.332	773.97 <sup>ab</sup> $\pm$ 3.551	815.37 <sup>b</sup> $\pm$ 3.685	766.95 <sup>a</sup> $\pm$ 1.413
1-35 day	1349.48 <sup>b</sup> $\pm$ 5.530	1298.42 <sup>ab</sup> $\pm$ 3.245	1350.97 <sup>b</sup> $\pm$ 3.821	1286.15 <sup>a</sup> $\pm$ 2.563
Age	Treatment (on average feed intake in g)			
	1	2	3	4
1-7 days	121.54 $\pm$ 3.295	120.28 $\pm$ 3.223	112.99 $\pm$ 3.505	115.16 $\pm$ 0.607
8-14 days	262.49 <sup>b</sup> $\pm$ 4.322	218.60 <sup>a</sup> $\pm$ 3.755	206.37 <sup>a</sup> $\pm$ 4.527	205.90 <sup>a</sup> $\pm$ 7.068
15-21 days	471.68 <sup>b</sup> $\pm$ 5.231	429.14 <sup>a</sup> $\pm$ 4.223	459.89 <sup>b</sup> $\pm$ 6.416	417.15 <sup>a</sup> $\pm$ 7.738
22-28 days	589.26 <sup>a</sup> $\pm$ 1.546	612.34 <sup>ab</sup> $\pm$ 4.522	619.97 <sup>b</sup> $\pm$ 3.214	609.80 <sup>ab</sup> $\pm$ 1.116
29-35 days	890.22 $\pm$ 26.463	883.89 $\pm$ 2.733	899.15 $\pm$ 9.379	872.99 $\pm$ 22.659
1-14 day	384.03 <sup>b</sup> $\pm$ 3.308	338.88 <sup>a</sup> $\pm$ 3.489	319.36 <sup>a</sup> $\pm$ 4.016	321.06 <sup>a</sup> $\pm$ 3.837
22-35 day	1479.48 $\pm$ 14.004	1495.22 $\pm$ 3.627	1519.12 $\pm$ 6.296	1482.79 $\pm$ 23.775
1-35 day	2325.22 <sup>b</sup> $\pm$ 40.857	2250.56 <sup>ab</sup> $\pm$ 3.691	2292.90 <sup>b</sup> $\pm$ 5.408	2179.50 <sup>a</sup> $\pm$ 7.837
Age	Treatment (on average feed conversion ratio)			
	1	2	3	4
1-7 days	1.18 $\pm$ 0.025	1.19 $\pm$ 0.025	1.11 $\pm$ 0.026	1.11 $\pm$ 0.008
8-14 days	1.52 <sup>c</sup> $\pm$ 0.034	1.45 <sup>bc</sup> $\pm$ 0.036	1.26 <sup>a</sup> $\pm$ 0.027	1.37 <sup>b</sup> $\pm$ 0.019
15-21 days	1.72 <sup>b</sup> $\pm$ 0.041	1.57 <sup>a</sup> $\pm$ 0.029	1.71 <sup>b</sup> $\pm$ 0.038	1.55 <sup>a</sup> $\pm$ 0.044
22-28 days	1.90 <sup>a</sup> $\pm$ 0.034	2.07 <sup>b</sup> $\pm$ 0.044	2.09 <sup>b</sup> $\pm$ 0.027	2.12 <sup>b</sup> $\pm$ 0.085
29-35 days	1.82 $\pm$ 0.031	1.85 $\pm$ 0.034	1.73 $\pm$ 0.024	1.83 $\pm$ 0.047
1-14 day	1.35 <sup>c</sup> $\pm$ 2.950	1.32 <sup>c</sup> $\pm$ 0.030	1.19 <sup>a</sup> $\pm$ 0.026	1.28 <sup>ab</sup> $\pm$ 0.013
22-35 day	1.86 <sup>a</sup> $\pm$ 0.032	1.96 <sup>bc</sup> $\pm$ 0.039	1.90 <sup>ab</sup> $\pm$ 0.025	2.05 <sup>c</sup> $\pm$ 0.066
1-35 day	1.73 $\pm$ 0.033	1.76 $\pm$ 0.033	1.72 $\pm$ 0.280	1.78 $\pm$ 0.041

<sup>abc</sup> Values bearing different superscripts within a row differ significantly at  $p < 0.05$ .

al. (2012) reported that feed intake of broilers was not influenced by inclusion of turmeric in the diet.

Feed restriction reduced the feed intake at 2<sup>nd</sup> and 3<sup>rd</sup> week of age and at starter phase. Malpotra *et al.* (2017) reported lower ( $P<0.05$ ) feed intake at 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> week in feed restricted group as compared to control. Similar reduction in feed intake was also reported by Zhan *et al.* (2007) and Mehmood *et al.* (2013). Feed intake was reduced due to restriction and level of restriction. Omosebi *et al.* (2014) also reported reduction in feed intake following restriction during 7-14 days of age. On the other hand, no significant effect of feed restriction on feed intake has been reported by Saber *et al.* (2011) and Afsharmanesh *et al.* (2016). But significantly increase in feed intake at 4<sup>th</sup> week of age was also reported. This may be because of compensatory growth and higher body weight gain during this week.

Combined effect of turmeric supplementation and feed restriction reflected the significant reduction in feed intake at 2<sup>nd</sup> and 3<sup>rd</sup> week of age as well as during starter and grower phase as well as for overall period.

**Effect of turmeric powder and feed restriction on FCR:** Better FCR was observed during 2<sup>nd</sup> and 3<sup>rd</sup> week of age as well as during grower phase due to turmeric supplementation (Table 1). Raghlad and Al-Jaleel (2012) and Swathi *et al.* (2012) also reported that addition of turmeric powder in the diet of broiler had significant importance in FCR. But better FCR was not observed in 4<sup>th</sup> week of age and finisher phase. This may be because of higher feed intake during this week. Addition of turmeric powder in broiler ration did not show significant difference in feed conversion ratio according to findings of several workers (Vashan *et al.*, 2012 and Fallah and Mirzaei, 2016).

FCR was significantly better at 2<sup>nd</sup> week of age as well as starter phase due to feed restriction (7-15days). Malpotra (2017) reported that FCR in 2<sup>nd</sup> week of feed restriction group was better as compared to control. Moreover, Omosebi *et al.* (2014) also observed better FCR with feed restriction. But poor FCR was observed in 4<sup>th</sup> week of age. It may be because of significant higher feed intake during 4<sup>th</sup> week of age. Combined effect of turmeric supplementation and feed restriction was observed as better FCR during 2<sup>nd</sup> and 3<sup>rd</sup> week of age as well as in starter phase. Turmeric supplementation and feed restriction are beneficial for poultry production and improve the feed conversion ratio.

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