

Original Research Article

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Effect of Dietary Supplementation of Black Cumin (*Nigella sativa*) Seed Powder on Growth Performance and Economics of Giriraja Poultry Birds

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ABSTRACT

Keywords

Giriraja Poultry birds, Black cumin powder, Supplementation, Production, Economics

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The 150 chicks of day old Giriraja breed were procured from Govt. Regional Hatchery, Nagpur (Maharashtra). Which were divided into five treatment groups T₁, T₂, T₃, T₄, and T₅ with 30 numbers of chicks in each group. The dietary treatments consisted of one basal control (T₁), supplemented with 1.0 % Black cumin seed powder (T₂), 1.5 % Black cumin seed powder (T₃), 1.75 % Black cumin seed Powder (T₄), and 2.0 % Black cumin seed powder (T₅). Body weight and feed consumption were recorded at weekly interval. Feed conversion ratio, dressing percentage, economics of broiler production were calculated. Black cumin seed powder feeding were done separately and compared by completely randomized design (CRD). The body weight of the significantly better growth was recorded in T₃ (1329.73) and followed by T₄ (1172.50). The higher feed consumption was recorded in T₁ followed by T₂. The data indicates that higher feed conversion efficiency in T₁ whereas less feed conversion efficiency observed in treatment T₃ (1.5% BC) followed by the T₂ (1% BC). Numerically higher dressing percentage was recorded in treatment T₃ (72.14) and followed by T₂ (70.81). It seems that the highest profit was received for the treatment T₃ (1.5% BC) follow by T₂ (1% BC) and standard feed control.

Introduction

Poultry is one of the largest growing segments of the agriculture sector in India today. The production of agricultural crop has been rising at the rate of 1.5 to 2 per cent per annum but the eggs and broilers have been rising at the rate of 8 to 10 per cent per annum. As a result, India is now the world's 5th largest in egg production and 18th largest producer in broiler (APEDA, 2015). The total poultry population

in India is 729.2 million and Maharashtra state contributes about 10.6% of it with poultry population of 77.79 million (Anonymous, 2012). Indian poultry industry has made tremendous and remarkable progress evolving from small scale back yard venture to the status of commercial because of small capital increased return, quick turn over, comparatively less risk involved, low land requirement, easy of production and high feeding efficiency. The special programme

are formulated for its promotion, hence effort have been diverted into promoting dual purpose native breed with improved potential profile of these breed have capacity to grow fast and attain body weight gain within shortest time as compare to local breed.

Poultry meat is the fastest growing component of global meat demand and India, the world's 2nd largest developing country is experiencing rapid growth in its poultry sector. The poultry has exported 5, 56,698.80 MT of poultry products to the world for Rs. 651.21 crores during the year 2014-15 (APEDA, 2015).

Black cumin (BC) belonging to *Nigella sativa* (NS) is an annual spicy herb native to Mediterranean regions to the Rununculaceae family BC is used for medicinal purposes, as herb and pressed oil. BC is traditionally used for a variety of conditions and treatments related to respiratory health, stomach and intestinal health, kidney and liver functions, circulatory and immune system support and for general wellbeing.

Materials and Methods

The 150 day old chicks of Giriraja poultry birds were purchased from Government Regional hatchery center Nagpur (MS). The trial was carried out in the Department of Animal Husbandry and Dairy Science, Dr. PDKV Akola and Department of Poultry Science, Post Graduate Institute of Veterinary and Animal Sciences. Fresh Black cumin powder was prepared by procured Black cumin seed in the were collected from laboratory of Department of Animal Husbandry and Dairy Science, Dr. P.D.K.V., Akola. Black cumin seed powder mixed with feed as per treatment diet and used as feed additives for conducting the feeding trial in Giriraja birds. Before arrival of Giriraja chicks the pens, water (Drinker), feeders,

brooders floor were cleaned, washed, disinfected and fumigated. All the experimental chicks were reared on deep litter system of rearing with use of saw dust as a litter material in a well-ventilated house with identical management and environmental conditions. Based on the literature available, the five treatments including control (no feed additive) were formulated.

T₁- Standard ration (control)

T₂- Standard ration + 1 % Black cumin seed powder. (BCSP)

T₃- Standard ration + 1.50 % Black cumin seed powder. (BCSP)

T₄- Standard ration + 1.75 % Black cumin seed powder. (BCSP)

T₅- Standard ration + 2.0 % Black cumin seed powder. (BCSP)

The diets were fed *ad-libitum* to experimental birds by adding Black cumin seed powder as given above.

Body weight and feed consumption were recorded at weekly interval up to 7th weeks of age. Feed conversion efficiency was estimated as quantity (kg) of feed consumed for every kg gain in body weight. Performance efficiency (%) was calculated as the ratio of body weight (kg) and feed conversion efficiency (kg), multiplied by 100. At the end of experiment birds from each group were randomly selected and slaughtered for estimating dressing percentage. The economics of broiler production was worked out by considering the total cost of production which included the feed cost, chicks, labour, medicines, vaccines and the overhead costs.

The data denoted on weekly body weights, feed consumption and feed efficiency was analyzed by completely randomized design (CRD) as described by Amble (1975).

Results and Discussion

The data pertaining to growth performance and allied traits as influenced by dietary black cumin seed powder supplementation in giriraja poultry birds are elucidated here under.

Chemical composition of black cumin seed powder

The chemical composition of black cumin seed shows higher content of protein (26.7%) and fat (28.5%). The crude fiber level is less (8.4%) which is admissible for mixing into poultry feed. The major active ingredient is Thymoquinone (30%-48%) which improves the digestion and digestibility. It also contains oleic acid and linoleic acid.

Body weight gain of Giriraja poultry birds

The data on body weight gain 7th week of live body weight gain was 209.97, 189.43, 183.07 and 169.13 gm/bird for the treatments T₁, T₂, T₃, and T₄ and T₅ respectively. This indicates that T₃ (1.5% BC) had higher body weight gain follow by control (T₁) and T₂ (1% BC). The reducing trend of body weight gain observed on the level black cumin increases. Also reported by Eman, H. *et al.*, (2014), Ali O (2014), Rashid *et al.*, (2014), Afr S. *et al.*, (2015)

Cumulative feed consumption

The average cumulative feed consumption of Giriraja chicks was recorded, The cumulative feed consumption at seventh weeks of age was 2686.9, 2660.9, 2658.4, 2665.0 and 2624.89 gm respectively in T₁ T₂, T₃, T₄ and T₅ treatments groups. The cumulative feed consumption of Giriraja poultry birds for the treatment groups T₅ was lesser as compared to T₁, T₂, T₃ and T₄ group. The significant difference in cumulative weekly feed consumption was found from second week

onward. The trend of decreasing significantly cumulative feed consumption was recorded in T₁, (2686.9), T₂ (2660.9), T₃ (2658.4), T₄ (2650.0) and T₅ (2624.89) groups during fourth to seventh week.

Feed conversion efficiency

The feed conversion efficiency recorded during 7th week of experiment was 2.44, 1.85, 1.72, 2.20 and 2.41 under treatments T₁ (control), T₂, T₃, T₄ and T₅. The data indicates that higher feed conversion efficiency in T₁ whereas less feed conversion efficiency observed in treatment T₃ (1.5% BC) followed by the T₂ (1% BC). It is observed that as the level of black cumin increased the FCE increased that indicates poor digestibility of feed.

Dressing percentage of Giriraja poultry birds

The average dressing percentage (Table 1) among the different treatment groups were recorded as 68.14, 70.81, 72.14, 69.78 and 68.99 percent under treatment T₁, T₂, T₃, T₄ and T₅, respectively. The difference among all the treatment groups was found to be significant. Numerically higher dressing percentage was recorded in treatment T₃ (72.14) and followed by T₂ (70.81). The present findings are in agreement with Guler *et al.*, (2006) who reported that, the highest cold carcass, thigh, breast, wing, neck and liver weight were observed that in 1% black cumin antibiotics groups (P<0.05). The result of the experiment are in live with the finding AL – Hothaity *et al.*, (2016) who express higher dressing percentage at 1% NSS (17.45± 0.53) and per with 0.25% NSS (72.24±0.38) and 2% NSS (72.63± 0.48).

This clearly indicates that lower level of *Nigella sativa* at 0.25% and higher 2% are non-effective in respect of dressing percentage and carcass yield.

Table.1 Dressing percentage of giriraja poultry bird

Treatments	Mean dressing percentage
T ₁	68.14
T ₂	70.81
T ₃	72.14
T ₄	69.78
T ₅	68.99

This clearly indicates that lower level of *Nigella sativa* at 0.25% and higher 2% are non-effective in respect of dressing percentage and carcass yield.

Table.2 Cost of Production of Black Cumin for Giriraja poultry birds (g/birds)

SN	Particulars	T1	T2	T3	T4	T5
1	Cost of day old chick (Rs.)	22.00	22.00	22.00	22.00	22.00
2	Cost of feed (Rs/kg) or 1450 Rs/50 kg/bag	29.00	29.00	29.00	29.00	29.00
3	Cost of Black cumin 500 (Rs/kg)	-	5.0	7.50	8.75	10.00
4	Total cost of feed (Rs/kg)	29.00	34.00	36.50	37.75	39.00
5	Average total feed consumed per bird (Kg)	2.68	2.66	2.58	2.65	2.63
6	Cost of feed consumed per bird (Rs.) ⁴ * 5	77.72	90.44	94.17	100.03	102.57
7	Average body weight at the end of 7th week (Kg)	1.11	1.23	1.34	1.17	1.1
8	Feed consumption per kg live weight gain (Kg) ⁵ / ₇	2.41	2.16	1.93	2.26	2.39
9	Cost of feed per kg live weight gain (Rs.) ⁶ / ₇	70.02	73.53	70.28	85.50	93.25
10	Rearing Cost per bird (Rs.)*	70.00	70.00	70.00	70.00	70.00
11	Total cost of production (Rs.) (1+6+10)	169.7	182.44	186.17	192.03	194.57
12	Average price realized @ Rs. 200 per kg live weight (Rs.)	222	246	268	234	220
13	Net profit per bird (Rs.) ¹² -11	52.3	63.56	81.8	41.97	25.43

Economics of Giriraja poultry birds

The total cost of production was worked out under treatments T₁, T₂, T₃, T₄ and T₅ were Rs 169.7, 182.44, 186.17, 192.03 and 194.57 per bird. The net profit per bird was calculated under treatments T₁, T₂, T₃, T₄ and T₅Rs 52.3, 63.56, 81.83, 41.97 and 25.43. It

seems that the highest profit was received for the treatment T₃ (1.5% BC) followed by T₂ (1% BC) and standard feed control.

In conclusion, the supplementation of black cumin powder in the diet of Giriraja poultry birds at 1.5% level significantly (P>0 .05) improved the weight gain and live body

weights. The weekly and cumulative feed consumption under supplemented and non-supplemented group differ significantly and nearly equal feed consumption in 1.0 to 1.5 % level of supplementation. The present study confirmed that, with the inclusion of 1.5% of black cumin powder in the feed of Giriraja poultry birds improved feed conversion efficiency. The study indicates that 1.5 % level of supplementation of black cumin powder show significant ($P < 0.05$ %) differences for dressing percentage of Giriraja chicken. The cost economics of Giriraja poultry production under the present experiment showed that 1.5 % level of incorporation of black cumin powder could be beneficial over the non-supplementation and higher level, supplementation and received higher market price in respect of net profit with better margin of profit in addition it rank as enrich functional food with providing health benefit to the consumer.

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