

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.

References

1. Abaza, I. M. K. 2001. The use of some medicinal plants as feed additives in broiler diets. Ph. D. in poultry production, Fac. of Agr. Alex. Univ., Egypt.
2. Abu-Dieyeh, Z.H.M. and M.S. Abu-Darwish, 2008. Effect of feeding powdered black cumin seeds (*Nigella sativa* L.) on growth performance of 4-8 week-old broilers. *J. Anim. Vet. Adv.*, 3: 286-290. Direct Link (<http://medwelljournals.com/abstract/?doi=javaa.2008.286.290>)
3. Naemasa, M., A. A. AalwQotbi. A. Seidavi, D. Norris., D. Brown and M. Ginisdzaa 2015 Effect of coriander (*Coriandrum sativum* L.) powder and extract on performance of broiler chickens. *Islamic Azad Univ. Rasht. Iran. Res. Jour. (Sci. Ser.)* Vol. 45 (4) 2221-4062
4. Ahmed, Abdulkarim A. and Mohammeda A. Radman (2013) Effects of dietary blackcumin seeds (*Nigella sativa*) on performance, carcass traits and some blood parameters in broiler chickens. Conference on International Research on Food Security, Natural Resource Management. 18. N.2 pp. 190-198.
5. Ahmed, manal M. K. 2006. Effect of various dietary levels of black cumin seeds (*nigella sativa*) on performance and meat quality of broiler chicks. M.Sc. in Animal Production (Poultry Production), depart of Poultry Production, faculty of Animal Production, University of Khartoum.
6. Durrani, FR Chand, N., Zaka, K, Sultan, A Khattak, F. M and Durrani, Z. (2007). Effect of different levels of feed added black cumin seed (*Nigella sativa* L.) on the performance of broiler chicks Pak J. Biol. Sci. 10: 4164-4167.
7. El-Deek A.A., Hamdy S. M., Attia Y.A. and Khalifah M. M. (2009). *Nigella sativa* seed oil meal as a source of plant protein in broiler diets. *Egypt. Poult. Sci.* 29: 39-52.
8. Feltwell, R. and Fox, S. 1979 Practical poultry feeding English language book society Great Britain; 92-105.
9. G. Erener A. Altop. N. Ocak H M Acsoy, S. Can Kaya and E. Ozturk (2010) Influence of black cumin seed (*Nigella sativa* L.) and seed extract on broiler performance and total coliform bacteria count. vol 5(2):128-135 pp.
10. Ghule K.R, 2010. Comperative study of *Embllica officinalis* (Amla) and vitamin C of performance of broilers under Nutritional Stress. Unpublished M.V.Sc. thesis submitted to Maharashtra Animal and Fishery Science University, Nagpur.
11. Guler, T.; Dalkilic, B., Ertas, O.N. and Ciftci, M. (2006). The effect of dietary black cumin seeds (*Nigella sativa*) on

- the performance of broilers. *Asian-Aust. J. Anim. Vet. Adv.* 5: 128-135 pp.
12. Hermes I.H., Faten A.M., Attia K.A., Ibrahim and S.S. El-Nesr S.S. (2009). Effect of dietary *Nigella sativa* L. on productive performance and nutrients utilization of broiler chicks raised under summer conditions of Egypt. *Egypt. Poult. Sci.*, 29: 145-172.
 13. Khatun S, M. Mostofa, F. Alom. J. Uddin, M. N. Alam and N. F. Moitry. 2014. Efficacy of Tulsi and Neem Leaves Extract in broiler production. *Bangal J. Vet. Med.* 11 (1):1-5 pp.
 14. M.saleh and AL jassir (1992) Chemical composition and microflora of black cumin (*Nigella sativa* L.) seeds growing in Saudi Arabia food chemistry. Vol. 45(4): 239-242.pp.
 15. Makwana R.B., S.S. Parikh, B.D. Savaliya., H.D. Chauhan, S.S. Patil and Patbandha, T.K. 2018 Growth Performance and Carcass Characteristics of Broilers Fed Garlic (*Allium sativum*) Supplemented Diets *Int. J. Pure App. Biosci.* 6 (1): 927-932
 16. Olmo, C., Y. Martinez, E. Leon, L. Leyva, M. Nunez, R. Rodriguez, A. Labrada, M. Isert, C. Betancur, M. Merlos and G. Liu, 2012. Effect of mulberry foliage (*Morus alba*) meal on growth performance and edible portions in hybrid chickens. *Int. J. Anim. Vet. Adv.*, 4(4): 263-268.
 17. Pandey N. K., D. P. Singh., and Ram Niwas. 2013. Broiler characteristics, sensory qualities and economics efficiency in Vencobb-400 chick's supplementation with a conjugated herbal feed additive in diet. *Animal Science Reporter*, 7(4): 128-132.
 18. Prasad C. M. and Sen, A. K. 1993. Study the effect of four different growth promoters on performance of broiler. *Poult. Advisory*, 26(7): 49.
 19. Rajendran K., B. Mohan., K. Viswanathan and S.C. Edwin. 2008. A study cost of production of broiler at market age at Palladamarea. *Tamilnadu J. Vet. and Anim. Sci.* 4(4):67-70.
 20. Rashid MM, M.U Ahammad, MS Ali, M.S Rana, MY Ali and N. Sakib.2014. Effect of different levels of Dhania seed (*Coriandrum sativum*) on the performance of broilers. *Bangladesh J. of Animal Science*, 43(1): 38-44.
 21. Saber S. A. Hassan and Mohamed A. Mandour 2018. Effect of *Nigella sativa* seeds on growth performance. Carcass trait and economic efficiency of broiler chicks under EY Egyptian condition. *Egypt. Poult. Sci.* Vol (38) (II): (331-344)
 22. Safa M.A. and Eltazi 2014. Response of Broiler Chicks to Diets Containing Different Mixture Levels of Garlic and Ginger Powder as Natural Feed Additives *international Journal of Pharmaceutical Research & Allied Sciences* Volume 3, Issue 4 27-35.
 23. TamoorAzeema, Zaib-Ur-Rehmanb, Sajid Umar A, Muhammad Asia. Muhammad Arif Abdur Rahma (2014) Effect of Nigella Sativa on poultry health and production *Journal a Department of Veterinars Pathology, Faculty of Veterinary and Animals Sciences, PMAS Arid Agriculture University, Rawalpindi, Pakistan* vol.2 issue 2. 70 82.pp
 24. Venkatachallam, T. V., S. Divakar, H. Pattekhan, (2010). Chemical composition of *Nigella sativa* L. seed extracts obtained by supercritical carbon dioxide. *J Food Sci Technol* (Nov-Dec 2010) 47(6):598-605.
 25. Yasser A. A. El-Nomeary R. I. El- Kady and A. A. El-Shahat. (2015). Effect of Some Medicinal Plant Seed Meals Supplementation and their Effects on the Productive Performance of Male Rabbits. *Int.J. Chem Tech Res.* 2015,

- 8(6), pp 401-411.
26. Yonatan Kassu, Berhan Tamir and Elatem Tesfaye 2016. Effect of Supplementing Natural Feed additives: Black cumin Fenugreek and Turmeric on the Growth Performance and Economic Efficiency of Broiler Chickens. *Advanced in Biological Research*. Vol 10 93 0. No: 335-334pp.
27. Zelenka . J, Schneidevora. D. and Mr kvicova. E. (2006) Linseed oils with different fatty acid paterns in the diet of broiler chickens. *Czech J. of Anim. Sci.* 51(3): 117-121.
28. Ziad H. M. Abu-Dieyh and Mohammad S. Abu-Darwash. (2009) Effect of feeding Powdered black cumin seed (*Nigella sativa* L.) on growth performance of 4-8 week-Old broilers. Vol. 7(3): 292-296 pp.

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