The Pharma Innovation Journal 2022; 11(2): 1821-1824

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(2): 1821-1824

www.thepharmajournal.com
Received: 03-12-2021
Accepted: 09-01-2022

Priyanka Kayath
Department of Animal Production, Rajasthan College of Agriculture, MPUAT, Udaipur, Rajasthan, India

Dr. Mahesh Datt
Professor, Department of Livestock Production Management, Shri Karan Narendra Agriculture University, Jobner, Rajasthan, India

Lekhu Kumar
Department of Livestock, Production Management, Shri Karan Narendra Agriculture University, Jobner, Rajasthan, India

Goatm Chopra
Department of Animal Production, Rajasthan College of Agriculture, MPUAT, Udaipur, Rajasthan, India

Jhabar mal tetarwal
Department of Animal Husbandry and Dairying, Sam Higginbottom University of Agriculture, Technology & Sciences, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Priyanka Kayath
Department of animal production, Rajasthan College of agriculture, MPUAT, Udaipur, Rajasthan, India

Effect of neem (*Azadirachta indica*) supplementation on performance and mortality rate of kuroiler chicks

Priyanka Kayath, Dr. Mahesh Datt, Lekhu Kumar, Goatm Chopra and Jhabar Mal Tetarwal

Abstract
The present investigation was conducted to detect the effect of Neem (*Azadirachta indica*) supplementation on growth rate, haematological parameters and mortality rate of Kuroiler chicks. One hundred twenty unsexed Kuroiler chicks (day old) were used on a completely randomized design (CRD) in 4 treatments with 3 replicates, each consisting of 10 chicks. The treatments involved the control group (T_1) fed with chick starter feed and other group were fed on basal diet mixed with neem powder @ 2g, 4g, 6g in T_2, T_3, T_4 respectively. All other management practices were followed as per recommendation throughout the investigational period of 8 weeks. The feed consumption and body weight of chicks was recorded weekly for further analysis. The average performance index (PI) values of birds recorded during 8th week of experiment ranged 33.12 (T1) to 55.36 (T4). Average performance index of T_3 (58.65±7.90) group was showing significantly ($P< 0.05$) good result as compare to T_1 control group (53.02 ± 0.81), T_2 group (55.72±1.72) and T_4 group (55.36±3.02). Average protein efficiency ratio was significantly ($P< 0.05$) higher in T_3 group (1.44±0.10) and lowest in T_1 group (1.35±0.04) as compare to control group T_4 and treated group T_2 (1.39 ±0.02). Average energy efficiency ratio was significantly higher in T_3 group (10.27±0.70). The mortality during the research period of 56 days was 10%.

Keywords: Performance, feed consumption, mortality, Kuroiler

Introduction
India ranks 3rd in the world production of eggs and 5th in the production of broiler. (DHAD 2017-18). The poultry sector is one of the rare examples of socio-economic development, which attained its present advanced stage without much international aid and investment from the Five-Year-Plans. The total Poultry in the country is 851.81 million in 2019, increased by 16.8% over previous Census. He total Backyard Poultry in the country is 317.07 million in 2019, increased by 45.8% over previous Census. The total Commercial Poultry in the country is 534.74 million in 2019, increased by 4.5% over previous Census. Highest poultry population state in India is Tamil Nadu followed by Andhra Pradesh, Telangana, West Bengal, and Maharashtra. The Kuroiler chicken is a dual-purpose hybrid breed developed in India. It was created by Vinod Kapur of Kegg Farms Private Ltd. in the early 1990s. And the name 'Kuroiler' is a multiple of Keggg and Broiler. A dual-purpose breed producing meat and eggs. Multi-coloured in appearance and highly preferred by smallholder farmers, also useful for camouflage. Hens attain 2.5 kg within 12 months, begin laying eggs at five to six months, and then lay 150–200 eggs during their 12–16month egg laying period, initially more than 20 eggs per month (Keg farms). Poultry is one among the fastest growing sectors of India. Chicken subsidizes the lion's share to poultry production in India owing to 95% of the total egg production. Feed cost accounts for 65- 70% of total cost of production in broilers and 75-80% for layers. Majority of the population in India still survives in villages and they are receiving access only to 25% of total poultry products as commercial poultry farming is limited to urban and semi urban areas. In this context, the major setback of high feeding cost for the small-scale farmers in the villages, keeping handful of the birds require a boost up. Poultry products and its by-products have marvellous potential to enhance the nutrient stability in any household, be it in rural or urban areas. Thus, economic cum healthy production of these little birds gratifies and Neem is an ideal choice for it. Neem, a large evergreen fast growing perennial tree is having medicinal as well as nutritive value for poultry. Neem leaves have been found to be useful in relieving pain, fevers, infections and other complaints that it has been called the "village pharmacy". Scientific trainings showed that the inclusion of neem leaf meal in the diet of broilers, layers and other birds showed significant enhancement in their immunity, decreased cholesterol levels and increased body weight gain.

Also, neem leaves can be used as an alternative to the antibiotic growth promoter in the poultry ration. Henceforth, it's high time that poultry industry must explore to include Neem as a feed supplement in the ration. Poultry Industry, one of the chief role players of Livestock sector, having the maximum growth rate is facing one set back ahead their ultimate success, i.e., growing feed cost. The annual egg production, the per capita availability of eggs per annum and growth rate of egg production has touched 88139 million, 69 eggs, and 6.28%, respectively in the year 2016-17 (AHS series-18) in India. Also, the consumeristic health-conscious societies of the modern day are looking for advancing for the intake of low antibiotic residue items in their menu. In this context, Neem leaf meal (NLM) is an ideal candidate for the poultry industry to make their production economically feasible and environmentally sustainable. *Azadirachta indica* (Neem) belongs to the family Meliaceae, a tropical evergreen tree which is widely distributed in Asia, Australia, Africa and other parts of the world. Neem, a strong-growing tree, grows in an extensive arrangement of soils and it is a robust tree which can flourish in poor dry soils without irrigation. Neem tree is also known as the nature's gift to mankind, the tree for many occasions, the tree of the 21st century and a tree for solving global problems. The short, usually straight trunk has a moderately thick, strongly furrowed bark that has a garlic-like odour and a bitter, astringent taste. The Neem plant is hardly leafless and is usually in full foliage even during months of prolonged drought. It is grown from the southern tip of Kerala to the Himalayan hills, in tropical to subtropical regions, in semi-arid to wet tropical regions, and from sea level to about 700 metres (NRC, 1992). Recent biological trials of certain herbal formulations in India as growth have shown encouraging results and some of the reports have demonstrated improvement with respect to weight gain, feed efficiency, lowered mortality, increased immunity and increased liability in poultry birds (Kumar, 1991) [12]. Neem (*Azadirachia indica*) dry leaves powder as medical herbs could be beneficial in immunosuppressant diseases of poultry. The feeding neem leaves to immunosuppressed birds increase their humoral and cell mediate immune responses (Sadekar *et al*., 1998) [19]. Low dose of neem leaves powder has an inhibitory action on wide spectrum of microorganisms (Talwar *et al*., 1997) [23] and immunomodulator actions that induce cellular immune reaction (Devakumar and Sukett, 1993).

Composition of Neem leaf meal

The nutrient composition of Neem leaf meal is 9% moisture, 20.52% crude protein (CP); 16.45%crude fibre (CF); 4.25% ether extract (EE); 7.00%total ash and 42.78% nitrogen free extract (NFE). Leaf meal contained macro minerals (per cent) that is Ca (0.71), P (0.28), Mg (0.75), Na (0.58) and K (2.00) and microminerals (ppm) that is Cu (34), Zn (18), Fe (745), Co (10), Mn (60), Cr (0.8) and Pb (27) (Ansari *et al*., 2012).

Material and Methods

The experiment was conducted at Poultry farm, S.K.N. College of Agriculture, Jobner District Jaipur, (Rajasthan, India). Geographically Jobner is located 45.0 km west of Jaipur at $26^0$05' North latitude, $75^0$28' East longitude and at an altitude of 427 meter above the mean sea level. The area falls in agro-climatic zone III–A (Semi-arid eastern plain zone of Rajasthan). The climate of this region is a typically semi-arid, characterized by extremes of temperature during both summers and winters. The present investigation was conducted to study the effect of need feeding on performance and mortality rate of Kuroiler chicken from (day old) to 8 weeks of age.

Experimental design

The chicks were randomly distributed into four treatment groups each having 30 chicks and each group were further divided into three replicates of 10 chicks each.

Table 1: Details of Treatments

Groups	Treatment
T_1 (Control feed)	Standard chick starter feed
T_2	Dry neem leaves powder 2 g/kg standard feed
T_3	Dry neem leaves powder 4 g/kg standard feed
T_4	Dry neem leaves powder 6 g/kg standard feed

Procurement of Neem leaf

Neem leaves for the experiment were procured from SKNCOA, campus.

Preparation of Neem leaf powder for feed

Neem leaf were dried in sunshine and crushed to make fine powder were mixed at appropriate concentration in feed as specified for different treatments.

Production indices

Performance Index

Performance Index (P.I) was calculated by applying the following formula advocated by Bird, (1995).

$$\text{P.I.} = \frac{(\text{Body weight gain})^2}{\text{Feed consumed}}$$

Protein efficiency

Protein efficiency (P.E) was calculated as suggested by Kamran *et al*. (2008). Protein efficiency is based on the weight gain of a test subject divided by its intake of a particular feed protein during the test period. The protein efficiency had been a widely used method for evaluating the quality of protein in feed.

$$\text{P.E.} = \frac{\text{Body weight gain (g)}}{\text{Protein intake (g)}}$$

Energy efficiency

Energy efficiency (E.E) was calculated as suggested by Kamran *et al*. (2008). It is a measure for estimation of efficiency of energy utilization and its conversion into the production from a given feed.

$$\text{E.E} = \frac{\text{Body weight gain (g)}}{\text{Total ME intake (Kcal)}} \times 100$$

Mortality Rate

Mortality rate as a number of death chicks in a particular experimental unit in given specified time period. Statistical analysis Data obtained were subjected to statistical analysis as per Snedecor and Cochran (1994) [22] using Completely Randomized Design (CRD). All the data were subjected to

ANOVA using the General Linear Models procedure. The mean differences among different treatments were separated by Duncan's multiple range tests. Consequently, a level of (P< 0.05) was used as the criterion for statistical significance (Duncan, 1955) [7].

Statistical analysis

Data obtained were subjected to statistical analysis as per Snedecor and Cochran (1994) [22] using Completely Randomized Design (CRD). All the data were subjected to ANOVA using the General Linear Models procedure. The mean difference among different treatments were separated by Duncan's multiple range tests. Consequently, a level of (P< 0.05) was used as the criterion for statistical significance (Duncan, 1955) [7].

Results and Discussion

Performance index

The weekly performance index (PI) of birds fed diets supplemented with Neem is presented in table 2. The performance index values of birds at 8 weeks remained significantly different in all the treatments groups.

The average performance index (PI) value of T_3 was significantly higher as compare to control group (T_1) and the all-treatment groups. The average performance index (PI) values of birds recorded during 8th week of experiment ranged 33.12 (T_1) to 55.36 (T_4).

In the investigation the similar result of performance index reported by Wankar *et al*. (2008), Durrani *et al*. (2008) [8], Anurag *et al*. (2018) [4], Patel *et al.* (2014) [18] and Meena (2015) also found an improvement in growth performance of broiler chicken. Abujradah *et al*. (2018) [1] also reported similar improvement on performance index.

Table 2: Effect of neem on mean Performance index of Kuroiler chicken

Week	Treatments			
	T_1	T_2	T_3	T_4
1	33.12±3.70 ^{d}	48.53±0.79 ^{bc}	53.65±0.78 ^{ab}	59.84±1.22 ^{a}
2	27.17±3.5 ^{d}	34.21±0.70 ^{bc}	40.00±0.80 ^{ab}	42.11±1.31 ^{a}
3	37.21±5.90 ^{abcd}	41.04±2.06 ^{ab}	47.55±2.44 ^{a}	38.53±1.59 ^{abc}
4	61.45±5.42 ^{a}	60.23±1.43 ^{ab}	60.04±2.26 ^{abc}	59.83±0.54 ^{abcd}
5	71.53±3.10 ^{abc}	78.24±2.01 ^{a}	76.61±2.31 ^{ab}	67.07±3.60 ^{bcd}
6	63.32±1.78 ^{bcd}	65.89±0.34 ^{abc}	71.22±2.21 ^{a}	69.26±3.23 ^{ab}
7	59.54±0.44 ^{bcd}	62.39±1.48 ^{ab}	65.06±1.70 ^{a}	60.74±0.83 ^{bc}
8	53.02±0.81 ^{abcd}	55.72±1.72 ^{ab}	58.65±7.90 ^{a}	55.36±3.02 ^{abc}

Each value is a mean of three replicates.

Means bearing different superscripts, differ significantly (P<0.05) row wise

Protein Efficiency Ratio

The mean value of protein efficiency ratio is showing the significance of neem feeding have been shown in table 3. The protein efficiency ratio (PIR) T_3 is comparatively higher than the control group and the other treatment groups, the data of protein efficiency ratio of T_3 were 6.16, 3.21, 2.79, 2.29, 2.02, 1.77, 1.57, and 1.44. The protein efficiency ratio (PIR) T_1 was lowest at 1st, 3rd, 6th week than the other treatment groups. However, the maximum PIR in T_4 (6.97) at 1st week. The results were favourably compared with Singh *et al*. (2015) [21] and Elbushra (2012) [10] and Padalwar *et al*. (1994) [16] reported that supplementation of 1 gm NLP / kg feed increases feed efficiency in broiler birds. Upadhyay *et al.* (1992) [24], Chakravarty and Prasad *et al.* (1991) [5] and Kukde *et al*. (1993) [11] were recorded similar results as further investigation.

Table 3: Effect of neem on mean protein efficiency ratio of Kuroiler chicken

Week	Treatments			
	T_1	T_2	T_3	T_4
1	5.20±0.30 ^{cd}	5.70±0.10 ^{bc}	6.16±0.04 ^{ab}	6.97±0.20^{a}
2	2.47±0.20 ^{d}	2.91±0.03 ^{abc}	3.21±0.02 ^{a}	3.09±0.05 ^{ab}
3	2.26±0.20 ^{bc}	2.54±0.04 ^{ab}	2.79±0.10 ^{a}	2.23±0.10 ^{bcd}
4	2.21±0.10 ^{abc}	2.28±0.03 ^{ab}	2.29±0.05 ^{a}	2.19±0.01 ^{abcd}
5	1.89±0.05 ^{abc}	2.02±0.02 ^{ab}	2.02±0.04 ^{a}	1.86±0.05 ^{abcd}
6	1.62±0.02 ^{bcd}	1.70±0.01 ^{ab}	1.77±0.03 ^{a}	1.69±0.04 ^{abc}
7	1.48±0.01 ^{abd}	1.51±0.02 ^{ab}	1.57±0.02 ^{a}	1.48±0.01 ^{abc}
8	1.35±0.01 ^{abcd}	1.39±0.02 ^{ab}	1.44±0.10 ^{a}	1.35±0.04 ^{abc}

Each value is a mean of three replicates.

Means bearing different superscripts, differ significantly (P< 0.05) row wise.

Energy Efficiency Ratio

The mean value of energy efficiency ratio is showing the significance of neem feeding have been shown in table 4. The energy efficiency ratio of T_1 was constantly lowest comparatively other treatment groups and the data of T_1 were 28.33, 17.65, 16.12, 15.76, 13.50, 11.57, 10.57 and 9.63. The value of E.E.R remain higher in T_3 Comparatively control and other treated groups and the data of T_3 were 36.80, 22.95, 19.90, 16.37, 14.40, 12.65, 11.23 and 10.27.

Wankar *et al.* (2009) [25] recorded the similar results of energy efficiency ratio as compare to control group. The results were favourably compared with the Anurag *et al.* (2018) [4].

Table 4: Effect of neem on mean energy efficiency ratio of Kuroiler chicken

Weeks	Treatment			
	T_1	T_2	T_3	T_4
1	28.33±1.6 ^{d}	34.50±0.2 ^{c}	36.80±0.3 ^{ab}	39.50±0.6 ^{a}
2	17.65±1.2 ^{d}	20.65±0.2 ^{bc}	22.95±0.2 ^{a}	22.05±0.3 ^{ab}
3	16.12±1.4 ^{bc}	18.11±0.4 ^{ab}	19.90±0.5 ^{a}	15.92±0.4 ^{bcd}
4	15.76±0.7 ^{abc}	16.28±0.2 ^{ab}	16.37±0.4 ^{a}	15.63±0.04 ^{abcd}
5	13.50±0.3 ^{c}	14.43±0.1 ^{a}	14.40±0.3 ^{ab}	13.26±0.4 ^{cd}
6	11.57±0.1 ^{d}	12.11±0.04 ^{ab}	12.65±0.2 ^{a}	12.09±0.3 ^{abc}
7	10.57±0.09 ^{bcd}	10.82±0.13 ^{b}	11.23±0.15 ^{a}	10.57±0.08 ^{bc}
8	9.63±0.1 ^{abcd}	9.96±0.2 ^{ab}	10.27±0.7 ^{a}	9.65±0.3 ^{abc}

Each value is a mean of three replicates.

Means bearing different superscripts, differ significantly (P< 0.05) row wise

Mortality rate

The birds were observed repeatedly for any irregular behaviour and death, during the investigational period. Examination findings of mortality of birds were recorded. The percentage mortality recorded has been presented in the Table 5.The complete mortality was 10% during entire investigational period and mortality rate was highest (13.3%) in control and T_3, T_4 treatment shows 10% mortality. The lowest mortality rate in (6.66) treated group T_2. As such on post mortem no lesion could be noted due to effect of supplementation of Neem. In the investigation result agreement with those reported by Omar *et al.* (2016) [15], Anurag *et al.* (2018) [4] and Eevuri and Putturu (2013) [9], Upadhyay *et al.* (1992) [24], Sadekar *et al.* (1998) [19], Manwar *et al.* (2005) [13], Durrani *et al.* (2005) [8], Shihab *et al.* (2017)

[20] and Pagrut *et al.* (2018) [17] reported the similar trend of moratality rate.

Table 5: Effect of neem on mean mortality rate of Kuroiler chicken at 56 days

Treatments	Chicks Taken	Weeks of experiment							Total mortality	Mortality %
		1	2	3	4	5	6	7		
T_1	30	1	1	1	-	1	-	-	4	13.3
T_2	30	-	2	-	-	-	-	-	2	6.66
T_3	30	2	1	-	-	-	-	-	3	10
T_4	30	-	1	-	2	-	-	-	3	10
Total	120								12	10

Conclusion

Average performance index of T_3 (58.65±7.90) group was showing significantly ($P< 0.05$) good result as compare to T_1 control group (53.02 ± 0.81), T_2 group (55.72±1.72) and T_4 group (55.36±3.02). Average protein efficiency ratio was significantly ($P< 0.05$) higher in T_3 group (1.44±0.10) and lowest in T_1 group (1.35±0.04) as compare to control group T_4 and treated group T_2 (1.39 ±0.02). Average energy efficiency ratio was significantly higher in T_3 group (10.27±0.70). The feeding of neem as a feed additive has not shown any significant effect on mortality rate of Kuroiler chickens. The mortality during the research period of 56 days was 10%.

Reference

1. Abujradah M, Neeraj Pandey R, Limboo A. Effect of dietary supplementation of probiotics, garlic and neem leaf powder on growth performance in caged broiler. Journal of Pharmacognosy and Phytochemistry. 2018;7(3):542-544.
2. Anonymous, Basic Animal Husbandry and Fisheries Statistics. 2017-18.
3. Ansari J, Khan HS, Haq AU, Yousaf M. Effect of the levels of *Azadirachta indica* dried leaf meal as phytogenic feed additive on the growth performance and haemato-biochemical parameters in broiler chicks. Journal of Applied Animal Research. 2012;40(4):336-345.
4. Anurag Kumari S, Uddin A, Effect of Supplementation of Ajwain (*Trachyspermum ammi* L.) on the Growth of Pratapdhan Chicken. International Journal of Current Microbiology and Applied Sciences. 2018;7(5):2319-7706.
5. Chakarverty A, Parsad J, Study on the effect of Neem leaf extract and Neem and cake extract on the performance of broiler chicks. Indian Poultry Adviser. 1991;24(9):37-38.
6. Chesson A, Stewart CS, Wallace RJ, 1 Influence of plant phenolic acids on growth and Cellulytic activity of rumen bacteria. Applied Environmental Microbiology. 1982;44:597-603.
7. Duncan DB, Multiple Range and Multiple F-Test. Biometrics. 1955;11:1-5.
8. Durrani FR, Chand N, Jan M, Sultan A, Durrani Z, Akhtar S. Immunomodulatory and growth promoting effects of neem leaves infusion in broiler chicks. Sarhad Journal of Agriculture. 2008;24(4): 655-659.
9. Eevuri TR, Putturu R. Use of certain herbal preparations in broiler feeds - A review, Vet World, 2013;6(3):172-179.
10. Elbushra ME. Effect of dietary Fenugreek Seeds (*Trigonella foenum*) as natural feed addition on broiler chick's performance. Journal of Science and Technology, 2012;13(2):27-33.
11. Kukde RJ, Jhadav SB, Ramteke BN, Nemade PP. Effect of Neem Leaves extract on broilers performance. Mahavet. 1993;15(1):13-16.
12. Kumar OM. Effect of Liv-52 syrup on broiler performance in North Eastern Region. Indian Poultry. 1991;31:37–38.
13. Manwar SJ, Thirumurgan P, Konwar D, Chidanandaiah DK, Karna DK. Effect of *Azadirachta indica* leaf powder supplementation on broiler Performance. lndian Veterinary Journal. 2005;84:159-162.
14. Meena MK. Effect of Feeding Rosmarinus officinalis and *Trigonella foenum-graecum* alone and in combination on the performance of broiler chicks. M.V.Sc. Thesis. RAJUVAS, Bikaner. 2015.
15. Omar JA, Hejazi A, Badran R. Performance of broilers supplemented with natural herb extract. Open Journal of Animal Sciences. 2016;5:68-74.
16. Padalwar RV. Neem (*Azadirachta indica*) leaves as feed supplement in broiler ration. Unpublished M.V.Sc Thesis submitted to Dr. Punjabrao Deshmukh Krishi Vidyapeth, Akola. 1994.
17. Pagrut N, Ganguly S, Tekam S, Bhainsare P. Effects of neem leaf infusion supplementation as a growth promoter in the diet of broiler chicks. Journal of Entomology and Zoology Studies. 2018;6(4):249-250.
18. Patel RM, Garg DD, Patel VR, Vahora SG, Katariya MA. Choubey M. Effect of dietary supplementation of garlic (*Allium sativum*) and fenugreek (*Trigonella foenum-graecum*) seed powder on growth performance and blood biochemical parameters in broilers. Indian Journal of Poultry Science. 2014;49(1):17-20.
19. Sadekar RD, Kolte AY, Barmase BS, Desai VF. Immuno potentating effects of *Azadiracta indica* (Neem) dry leaves powder in broiler, naturally infected with IBD virus. Indian Journal of Experimental Biology. 1998;36(11):1151-1153.
20. Shihab IM, AL-Zuhariy MTB, Abdullah SM, Mutar SS. Impact of supplementation Neem powder (*Azadirachta indica*) to diet broiler in immunological, physiological and productive traits. Advances in Environmental Biology. 2017;11(3):44-51.
21. Singh J, Sethi APS, Sikka SS, Chatli MK, Kumar P. Effect of sun-dried whole bulb garlic powder on growth, carcass characteristics and meat quality of commercial broilers. Indian Journal of Animal Sciences, 2015;85(1):67-71.
22. Snedecor GW, Cochran WG. Statistical method 8th edition. Journal of Animal Sciences. 1994;85(1):67-71.
23. Talwar GP, Raguvanshi P, Misra R, Mukherjee S. Shah S. Plant immunomodulators for termination of unwanted pregnancy and contraception and reproductive health. Immunology and Cell Biology. 1997;75(2):190-192.
24. Upadhyay SN, Dhawan S. Garg S. Immunomodulatory properties of Neem (*Azardirachta indica).* Paper presented at World Neem conference held at Banglore, lndia. 1992.
25. Wankar AK, Shirbhate RN, Bahiram KB, Dhenge SA, Jasutkar RA. Effect of Neem (*Azadirachta Indica*) leaf powder supplementation on growth in broilers. Veterinary World. 2009;2(10):396-397.