

Original Research Article

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Effect of Supplementation of Neem (*Azadirachta indica*) Leaf Powder on Growth Performance and Carcass Characteristics of Broilers

P. D. Mali*, S. B. Adangale, N. Sharma, Y. G. Fulpagare and S. S. Patale

Department of Animal Husbandry and Dairy Science, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra-413 722, India

*Corresponding author

ABSTRACT

Keywords

Broilers, Neem leaf powder, Supplementation, Growth performance, Carcass characteristics

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The present study was conducted to evaluate the effect of supplementation of *Azadirachta indica* leaf powder on growth performance of broilers. A One hundred and sixty, day-old broiler chicks (Ven Cobb) were procured and randomly distributed in to four treatments. Growth trial was conducted in a completely randomized design comprising four dietary treatments. The control (T₀) group was fed standard ration and treatment T₁, T₂ and T₃ group were provide standard ration supplemented with neem leaf powder (NLP) @ 5gm,10gm and 15gm/kg of broiler ration respectively. The result showed that improvement in live body weight with the inclusion of neem leaf powder in the ration. The significantly higher (p<0.05) weekly body weight was observed in treatment group T₂ compared to those in T₀, T₁ and T₃group. The birds fed with 10gm/kg feed NLP recorded significantly higher mean weight gain compared to control and other treatment groups. The overall feed intake of the birds showed non-significant differences in all the treatment groups for the entire experimental period. The feed conversion ratio among the all treatment groups was found to be better compared to control. No significant (p>0.05) influence was observed in carcass parameters like dressing yield and giblet yield (liver, heart and gizzard) in all treatment groups. The results from the present study, it could be concluded that supplementation of neem leaf powder in broiler diet at 10g/kg of feed as it proved be significantly better growth performance, feed intake and feed conversion ratio.

Introduction

Today poultry industry is one of the fastest growing segments of the agricultural. Poultry is major source of meat in India. Use of feed additives like antibiotics and others have residual effect and these are most expensive. To avoid the harmful effects of chemical feed additives on human body due to its indiscriminate use, the nutritionist all over the

world are trying to find the phytogetic feeds additives for betterment in production.

Many plants have beneficial multifunctional aspects which are derived from their specific bio-active components (Kamel 2000). One of such plants Neem *Azadirachta indica* is evergreen, non-leguminous multipurpose tree belongs to family Meliaceae and widely distributed in Asia, Africa and other tropical

parts of the world (Sombatsiri *et al.*, 1995). Neem leaves contain crude protein 15.8%, crude fibre 14.6 %, Ether Extract 8.5%, Ash 4.5%, Moisture 13.0%, NFE 56.6% (Bonsu *et al.*, 2012). These percentages vary from one place to another. More than one hundred and thirty-five bio-active compounds have been isolated from different parts of neem trees including azadichtin, meliacin, gedunin, salanin, nimbin, valassin, sodium nimbolide, cyclic trisulphides etc. The neem leaf exhibits a wide range of pharmacological activities *viz.*, anti-inflammatory, anti-hyperglycaemic, anti-ulcer, anti-malarial, anti-fungal, anti-bacterial, anti-viral, anti-oxidant, anti-mutagenic, immunomodulatory and various others properties without showing any adverse effects (Supriya and Nagini, 2005). Therefore, considering the vast benefits of the neem the present study has been undertaken to evaluate the performance and carcass parameters of broiler chickens.

Materials and Methods

The trial was conducted on 160 day old, vencobb-400 broiler chicks at Poultry Unit, veterinary Polyclinic and AI Center MPKV, Rahuri – 413722, Dist. Ahmednagar, Maharashtra. The 160 birds were divided in to 4 treatments groups and housed under deep litter system. The T₀ birds were fed on a basal ration (Control), T₁ Basal ration + 5gm NLP /kg of feed, T₂ Basal ration + 10gm NLP/ kg of feed and T₃ basal ration + 15gm NLP/kg of feed. Immediately arrival of chicks was weighed and distributed randomly in to 4 treatment groups *viz.*, T₀, T₁, T₂ and T₃ with 40 chicks in each group, on body weight basis.

Body weight and feed consumption were recorded at weekly interval up to 6th 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 trial, three birds from each group were randomly selected and slaughtered for estimating dressing percentage.

Statistical analysis

Proximate composition of broiler ration and feed additives analysis was carried out as per the method given in A. O. A. C., 2005. The data were analysed by standard statistical techniques (Snedecor and Cochran, 1994).

Results and Discussion

The data pertaining to growth performance and allied traits as influenced by neem leaf powder supplementation in broiler chickens are elucidated here under.

Chemical composition of experimental feed ingredients (% DM basis)

The experimental feed *viz.* broiler starter and finisher which were supplemented with neem leaf powder as per treatment details. The proximate composition of the rations is presented in Table 1.

Starter ration

The crude protein, crude fibre, ether extract, total ash, nitrogen free extract and acid insoluble ash of starter ration were 23.00, 4.60, 4.80, 7.20, 60.40 and 1.25 per cent respectively and calculated metabolizable energy (ME) of the diet was 2863.11 Kcal/kg.

Finisher ration

The crude protein, crude fibre, ether extract, total ash, nitrogen free extract and acid insoluble ash of finisher ration were 20.00,

3.78, 4.30, 6.85, 65.15 and 1.44 per cent respectively and calculated metabolizable energy (ME) of the diet was 2939.75 Kcal/kg.

Body weight changes (g)

The average body weight of broilers under different treatment groups differed significantly ($p < 0.05$). The significantly ($P < 0.05$) higher body weight was observed in treatment group T_2 (1928.35 ± 16.45) fed

NLP 10g per kg feed. The results of present study were similar with Manwar *et al.*, (2007) supplemented neem leaf powder @ 1-2 gm/kg feed and reported significant increase in the live body weight of broilers in the neem fed groups when compared with control group. Results are in agreement with Khan *etal.* (2014) who observed that broilers fed 1% neem seed cake showed significantly ($p < 0.05$) higher body weights at six weeks of age over those of the control group (Table 2).

Table.1 Percent proximate composition of experimental broiler ration on dry matter basis

Nutrients	Broiler ration	
	Starter	Finisher
Crude protein	23.0	20.0
Crude fiber	4.60	3.78
Ether extract	4.80	4.3
Total ash	7.20	6.85
Nitrogen free extract	60.40	65.15
Acid insoluble ash	1.25	1.44
ME (kcal/kg)	2863.81	2939.75

Table.2 Broilers traits in different groups of chicks up to 6th weeks of age

Treatment	Body Weight	Weight Gain	Feed Intake	FCR
T_0	1764.65 ± 14.72^a	405.58 ± 11.82^a	960.03 ± 9.03	1.96 ± 0.02^c
T_1	1849.30 ± 13.43^b	425.98 ± 12.97^{ab}	952.75 ± 10.94	1.88 ± 0.01^b
T_2	1928.35 ± 16.45^c	458.75 ± 14.24^b	946.25 ± 13.77	1.80 ± 0.02^a
T_3	1869.90 ± 17.72^b	445.78 ± 17.35^{ab}	950.55 ± 12.79	1.86 ± 0.02^b

Values bearing different superscripts in column differ significantly ($p < 0.05$)

Table.3 Effect of supplementation of neem leaf powder on carcass traits

Treatment	Live weight (g)	Dressing weight (%)	Breast (%)	Giblet (%)	Drumstick (%)	Thigh (%)
T_0	1861 ± 19.71	67.22 ± 1.35	20.75 ± 0.83	4.89 ± 0.20	13.35 ± 0.50	11.88 ± 0.40
T_1	1920.5 ± 21.02	68.38 ± 0.28	20.97 ± 0.86	4.75 ± 0.19	13.68 ± 0.12	12.04 ± 0.58
T_2	1960.33 ± 31.08	69.94 ± 0.45	21.00 ± 1.18	4.53 ± 0.23	13.78 ± 0.61	13.25 ± 0.44
T_3	1934.17 ± 34.24	67.77 ± 0.44	20.26 ± 1.13	4.43 ± 0.18	13.33 ± 0.20	13.17 ± 0.24

Body weight gain (g)

The average gain in body weight in treatment T_2 (458.75 ± 14.24) group was significantly

($P < 0.05\%$) higher. Then followed by T_3 (445.78 ± 17.35), T_1 (425.98 ± 12.97) and T_0 (405.58 ± 11.82). The results obtained in the study corresponds with the results of Sarkar *et*

al., (2014) observed that broilers supplemented with 1% neem leaves extract (Group A, C and D) gained the significantly higher ($p < 0.001$) live weight compared to untreated control group regardless of calibacillosis induction. These results are in agreement with Khatun *et al.*, (2013) revealed that supplementation 1-3 ml of tulsi and neem leave extract per kg poultry ration increase in live body weight and improvement in weekly gain in weight and feed efficiency as compared to that control group of poultry.

Cumulative feed consumption (g)

The overall feed intake of the birds showed non-significant differences in all the treatment groups for the entire experimental period. The treatment T₂ showed lower feed consumption and highest in control. The trend indicated that the decline in feed intake with an increase in the level up to 15gm per kg of feed, supplementation of neem leaf powder was recorded during the experiment. This might be due to presence of miltiacin which forms bitter principles of leaves (National Research Council, 1994). A similar finding is reported by Khan *et al.*, (2014) was showed that broiler in control group consumed high feed quantity and it was decreased significantly in group C birds fed to 1% level of neem seed cake.

Feed Conversion ratio

The better feed conversion ratio from first to sixth week ranged from 1.80 to 1.96 which was significantly ($p < 0.05$) better feed conversion ratio of 1.80 obtained in T₂ group followed in T₃, T₁ group and poor in feed conversion i.e. 1.96 in T₀ control at the end of 6th week. The result of present study supports the findings of similarly Abujradah *et al.*, (2018) offered basal diet supplemented with probiotic + garlic + neem leaf @ 1 kg per ton of feed to which they get the best

performance ($p < 0.05$) in final body weight, weekly gain, weekly feed intake and feed conversion ratio. The results obtained are contrary to the findings of Alam *et al.*, (2015) found identical non-significant FCR in all neem treated groups compared to that of control group of broilers.

Carcass traits

The carcass characteristics and cut-up part of broiler chickens fed dietary levels of neem leaf powder are presented in Table 3. The average dressing percentage among the different treatment groups varied between 67.22 ± 1.35 to 69.94 ± 0.45 percent. The differences among all treatment groups were non-significant. The breast yield was highest in the T₂ group. However, the difference among all the treated groups was non-significant. Although a slight variation was observed in giblet and drum stick per cent of the carcass weight of different treatment groups, it was statistically non-significant. Thigh yield was highest in the T₂ group. However, the difference among all treatments was non-significant. Results are in agreement with Kharde *et al.*, (2014) who observed no significant ($p > 0.05$) influence of supplementation of garlic and neem leaf powder (NLP) on carcass parameters like dressing yield and giblet yield (heart, gizzard and liver) in all treatment groups.

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