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Effect of Neem Leaves (*Azadirachta indica*) as a Growth Promoter in Broiler Chickens

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ABSTRACT

The experiment was conducted from 1st February to 14th March, 2022 (42 days) at the Model Dairy & Poultry Farm, Institute of Agriculture (PSB), Visva-Bharati University, Sriniketan, Birbhum, (731236) West Bengal, India, to evaluate the effect of neem leaves powder supplementation on growth performance, feed consumption (FC), feed conversion ratio (FCR), and carcass quality traits of broiler chickens. The inclusion of 1% dry neem leaves powder in the diet was assessed for its pharmacologically active ingredients bioavailability. The results indicated that 1% dietary inclusion led to significantly better body weight, body weight gain, and feed conversion ratio at the 6th week of age compared to other treatment groups. The body weights at the 6th week were 1916±62.02, 2024±51.08, 2010±15.36, and 1893.4±27.95 g for T_1 (control), T_2 (1%), T_3 (2%), and T_4 (3%) respectively, showing significant differences (p<0.01) among treatments. The body weight gain values were 377.56±4.61, 394.28±5.16, 386.2±5.49, and 356.48±6.28 g for T_1, T_2, T_3, and T_4 respectively, with significant differences (p<0.01). The feed conversion ratio values were 1.85±0.05, 1.78±0.03, 1.82±0.03, and 1.98±0.04 in T_1, T_2, T_3, and T_4 respectively, also showing significant differences (p<0.01). However, no significant differences were observed in other parameters. The findings suggest that 1% neem leaves powder supplementation enhances growth performance and feed utilization in broiler chickens, making it a beneficial dietary addition compared to other inclusion levels.

KEYWORDS: *Azadirachta indica*, antibiotics, broiler chicken, supplementation, growth performance

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1. INTRODUCTION

The poultry industry, a major contributor to human food supply, is one of the fastest-growing segments of Indian agriculture, with egg production increasing at a rate of 8–10% and broiler production at 11–12% (Sasidhar et al., 2015). India ranks as the third-largest egg producer after China and the USA (Chakrabortty, 2023) and the fourth-largest chicken producer after China, Brazil, and the USA (Kotaiah, 2016). Poultry products have gained immense popularity, with about 68% of the non-vegetarian population consuming them. Per capita egg consumption has increased from 30 to 68, while chicken consumption has risen from 400 g to 2.5 kg year^{-1} (Kothai et al., 2016). However, human nutritionists recommend a minimum of 180 eggs and 10 kg of chicken per year for a healthy adult (Chakrabortty, 2023).

To enhance poultry growth and overcome environmental challenges, producers have relied on probiotics, prebiotics, growth promoters, and even hormonal additives (Krysiak et al., 2021). Feed is the most significant expense, accounting for nearly 80% of total production costs. Feed additives improve feed utilization efficiency, reducing overall costs. While antibiotics were once commonly used as growth promoters (Moore et al., 1946), their widespread use in poultry feed since the 1950s has raised concerns regarding antibiotic resistance (Jukes, 1972). Growth promoters, including chemical and biological substances, enhance poultry productivity by improving appetite, feed conversion, immune response, and gut microflora regulation (Butaye et al., 2003; Peric et al., 2009). Research suggests that dietary supplementation with probiotics and acidifiers positively impacts growth and biochemical parameters in broilers (Rajoriya et al., 2024). Similarly, incorporating turmeric (Curcuma longa) and garlic (*Allium sativum*) in poultry feed has been shown to improve growth performance and immune response (Choudhary et al., 2022).

Due to the adverse effects of synthetic antibiotics, researchers have shifted focus toward natural alternatives such as medicinal plants, herbs, and essential oils (Afshar Mirzaei-Aghsaghali, 2012). Black cumin (*Nigella sativa*) supplementation has been found to enhance broiler performance, particularly in hot climates (Devi et al., 2022). Similarly, garlic supplementation improves growth, carcass traits, and blood parameters in broiler chickens (Khaidem et al., 2019). Feed restriction strategies have also been studied for their impact on carcass yield and meat quality (Sikder et al., 2012). Furthermore, dietary protein levels play a crucial role in broiler growth and reproduction (Talukdar et al., 2015). Stocking density affects feed and water intake, which in turn influences overall poultry performance (Sikder et al., 2012).

Considering the vast benefits of herbal additives in poultry nutrition, neem (*Azadirachta indica*) has emerged as a promising natural growth promoter. Research has shown that dietary supplementation of neem leaf powder or extracts can enhance broiler growth performance, improve feed efficiency, and reduce production costs (Talukder et al., 2020; Nath et al., 2023; Nawaz et al., 2023). Studies also suggest that neem supplementation positively affects carcass quality and immune function in broilers (Ubua et al., 2019; Mali et al., 2020; Egbeyale, 2021). Furthermore, neem leaf extract has been found to improve meat oxidative stability and overall poultry health (Sarker et al., 2020). The shift from synthetic antibiotics to herbal alternatives ensures safer poultry production, minimizing health risks while maintaining performance. Given the increasing demand for antibiotic-free poultry, further research on natural feed additives, including neem, is essential for sustainable poultry farming.

2. MATERIALS AND METHODS

The experiment was conducted during 1st February–14th to March, 2022 (42 days) at the Model Dairy & Poultry Farm" at the Institute of Agriculture (PSB), Visva-Bharati University, Sriniketan, Birbhum (731 236), West Bengal, India. To study the effect of neem leaves powder supplementation on growth performance, feed consumption (FC), feed conversion ratio (FCR), and carcass quality traits of broiler chickens.

2.1. Experimental location and weather conditions during experimental period

The feeding trial has been conducted in "The Model Dairy & Poultry Farm" at Institute of Agriculture (PSB) in Visva-Bharati University, Sriniketan, Birbhum (731236), West Bengal, India. The experiment was performed during February to March, 2022. The temperature ranged from 16 to 28°C, humidity was 65%, and rainfall was 10.5 mm during the experimental period. Permission was obtained from the Departmental ethical review board to carry out this experiment. The study protocol was conducted in line with the rules and regulations of the ethical committee.

2.2. Preparation of neem leaves powder

Neem leaves were dried in sun for 10 days, and then dried in oven at 55–60°C for 2 days (Jawad et al., 2013). The dried leaves were pulverized with a blender. A 25 μ mesh sieve was used to obtain the fine dust, and the dust was preserved in airtight plastic container until they were directly used.

2.3. Experimental fowls and their management

A total number of 100 one-day-old commercial broilers chicks of Cobb strain were obtained from (Venkys Breeder Company, Kolkata) and transported to farm premises, all

chicks were weighed. The chicks were then divided randomly into four treatment groups (T_1=Basal diet, T_2=Neem leaves powder @ 1 g kg^{-1} of feed, T_3=Neem leaves powder @ 2 g kg^{-1} of feed, T_4=Neem leaves powder @ 3 g kg^{-1} of feed) and reared under deep litter system. Electric canopy type brooders have been used for maintaining ideal temperature up to 3 weeks of age. All the Chicks were vaccinated (against Mariks, Ranikhet, infectious Bursal diseases) and standard management protocol was followed.

2.4. Experimental feeding

Experimental feeds were prepared by mixing the neem leaves powder to the normal feed @ 0 g kg^{-1}, 1 g kg^{-1}, 2 g kg^{-1} and 3 g kg^{-1}, and were provided to the T_1, T_2, T_3 and T_4 groups, respectively. This type of feeding regime was given to broilers from one-day-old to 42 days. Pre-starter mash was given during day-1 to day-10, Starter mash was given during day-11 to day-20, Grower mash was given during day-21 to day-34, and finally, Finisher mash was given during day-35 to day-42.

2.5. Estimation of weekly body weight and body weight gain

All the birds of different treatment groups were weighed at weekly interval from one-day-old to 42 days (i.e., up to 6th week) with the help of digital weighing balance. Body weight gain was calculated by subtracting the body weight of current week from previous week.

2.6. Estimation of weekly feed consumption and feed conversion ratio

The amount of daily feed offered to the birds was recorded group-wise. The group average feed consumption was calculated by subtracting the leftover feed in the feeder at the end of each week from the total feed supplied to the birds during that week. Cumulative feed consumption was calculated by adding the feed consumption from the 1st week up to the 6th week. The cumulative weekly feed consumption of the birds in a treatment group was divided by the weekly cumulative body weight gain of that group.

2.7. Processing of birds for carcass quality analysis

At the end of the experimental feeding (i.e., at 43 days of age), ante-mortem examination was conducted, and 5 birds from each treatment group were selected and processed according to standard protocols to study carcass characteristics. After recording the eviscerated weight of each bird, the carcasses were divided into different cut-up parts and weighed separately as bony cuts (wings, neck, back), meaty cuts (breast, drumsticks, thighs), and internal organs (liver, gizzard and heart).

2.8. Statistical analysis

The data was analyzed statistically between the control and treatment groups of chickens. Statistical analysis of all the obtained observations was performed under Completely Randomized Block Design (CRD). The complete data was analyzed using One-Way Analysis of Variance (ANOVA).

3. RESULTS AND DISCUSSION

3.1. Body weight

Effect of dietary supplementation of neem leaves powder on the weekly body weight of broiler birds was presented up to 6th week in Table 1. The average weekly body weight of one-day-old chicks are 49.94±2.64, 49.85±3.85, 50.57±4.31 and 50.92±3.17 g in T_1, T_2, T_3 and T_4, respectively. On 1st week, the average weekly body weight of chicks is 179.88±9.29, 208.36±7.10, 213.8±7.5 and 199.8±8.49 g in T_1, T_2, T_3 and T_4, respectively. There was significant difference (p<0.01) in body weight between 179.88±9.29 and 213.8±7.5 groups on 1st week. On 2nd week, the average weekly body weight of chicks is 406.4±29.84, 404.8±30.15, 559.6±55.33 and 426.79±53.33 g in T_1, T_2, T_3 and T_4, respectively. There was no significant difference among different treatments on 2nd week.

On 3rd week, the average weekly body weight of chicks is 775.2±59.79, 819.6±93.38, 813.6±78.25 and 816.8±64.27 g in T_1, T_2, T_3 and T_4, respectively. There was no significant difference among different treatments on 3rd week. On 4th week, the average weekly body weight of chicks is 1194.84±82.47, 1237.6±107.75, 1206.6 ±111.31 and 1190.4±89.45 g in T_1, T_2, T_3 and T_4, respectively. There was

Table 1: Effect of dietary supplementation of neem leaves powder on the average weekly body weight of broilers

Age of bird	Treatments			
	T_1: Control	T_2: 1 g kg^{-1}	T_3: 2 g kg^{-1}	T_4: 3 g kg^{-1}
1-day	49.94±2.64	49.85±3.85	50.57±4.31	50.92±3.17
1st week	179.88±9.29	208.36±7.10	213.8±7.5	199.8±8.49
2nd week	406.4±29.84	404.8±30.15	559.6±55.33	426.79±53.33
3rd week	775.2±59.79	819.6±93.38	813.6±78.25	816.8±64.27
4th week	1194.84±82.47	1237.6±107.75	1206.6±111.3	1190.4±89.45
5th week	1561.2±114.61	1628.4±107.25	1596.4±115.24	1549±100.78
6th week	1961±62.02	2024±51.08	2010±15.36	1893±27.95

significant difference (p<0.05) in body weight between T_4 and T_2 groups on 4th week. On 5th week, the average weekly body weight of chicks is 1561.2±114.61, 1628.4±107.25, 1596.4±115.24 and 1546.±100.78 g in T_1, T_2, T_3 and T_4, respectively. There was significant difference (p<0.05) in body weight between T_4 and T_2 groups on 5th week. On 6th week, the average weekly body weight of chicks is 1916±62.02, 2024±51.08, 2010±15.36 and 1893.4±27.95 g in T_1, T_2, T_3 and T_4 respectively. There was significant difference (p<0.01) in body weight between T_4 and T_2 groups on 6th week. In this experiment, the highest body weight was achieved in the T_2 group, which was supplemented with 1% neem leaves powder in the diets. It was observed that the active ingredients present in Azadirachta indica bound with serotonin receptors, which promoted growth in skeletal muscles by enhancing gastrointestinal functions (Mohammad, 2016). A low dose of neem leaves powder exhibited inhibitory action on a wide spectrum of microorganisms (Talwar et al., 1997) and demonstrated immune-modulating actions that induced cellular immune reactions (Devakumar et al., 1993). Considering the vast benefits of neem on poultry health and management the present study was aimed to evaluate the growth performance of broilers supplemented with neem leaves powder.

3.2. Body weight gain

Effect of dietary supplementation of neem leaves powder on the weekly body weight gain of broiler birds up to 6th week of age were presented in Table 2.

The average weekly body weight gain of chicks on the 1st weekis 155.95±7.97 g, 157.96±6.05 g, 162.56±6.52 g and 162.76±5.19 g in T_1, T_2, T_3 and T_4, respectively.

Table 2: Effect of dietary supplementation of neem leaves powder on the average weekly body weight gain

Age of bird	Treatments			
	T_1: Control	T_2: 1 g kg^{-1}	T_3: 2 g kg^{-1}	T_4: 3 g kg^{-1}
1st week	155.95±7.97	157.96±6.05	162.56±6.52	162.76±5.19
2nd week	204.48±2.93	198.48±5.62	213.24±6.32	217.16±2.65
3rd week	374±2.91	400.84±4.46	381.16±5.48	389.4±6.18
4th week	401.12±5.65	407.88±4.64	392.36±4.77	370.44±5.81
5th week	385.24±6.11	401.32±5.97	398.68±5.85	362.48±5.09
6th week	377.56±4.61	394.28±5.16	386.2±5.49	356.48±6.28

Body weight gain of chicks on the 1stweek is significantly different (p<0.01) under different treatment groups. The average weekly body weight gain of chicks on the 2nd week is 204.48±2.93 g, 198.48±5.62 g, 213.29±6.32 g and 217.16±2.65 g in T_1, T_2, T_3 and T_4, respectively. Body weight gain of chicks on the 2nd week is significantly different (p<0.01) under different treatment groups. The average weekly body weight gain of chicks on the 3rd week is 374±2.91 g, 400.84±54.46 g, 381.16±5.48 g and 389.4±6.18 g in T_1, T_2, T_3 and T_4, respectively. Body weight gain of chicks on the 3rd week is significantly different (p<0.01) under different treatment groups. The average weekly body gain weight of chicks on the 4th week is 401.12±5.65 g, 407.88±4.64 g, 392.36±4.77 g and 370.44±5.81 g in T_1, T_2, T_3 and T_4, respectively. Body weight gain of chicks on the 4thweek is significantly different (p<0.01) under different treatment groups. The average weekly body weight gain of chicks on the 5th week is 385.24±6.11 g, 401.32±5.97 g, 398.68±5.85 g and 362.48±5.09g in T_1, T_2, T_3 and T_4, respectively. Body weight gain of chicks on the 5th week is significantly different (p<0.01) under different treatment groups. The average weekly body weight gain of chicks on the 6th week is 377.56±4.61 g, 394.28±5.16 g, 386.2±5.49 g and 356.48±6.28 g in T_1, T_2, T_3 and T_4, respectively. Body weight gain of chicks on the 6th week is significantly different (p<0.01) under different treatment groups. In this nutritional trial highest body weight gain has been achieved in T_2 group, which were fed with 1% neem leaves powder supplemented diet. When neem as an herbal drug is incorporated in feed mixture, it promotes growth and improves feed efficiency and live body weight due to its antibacterial and hepatoprotective properties.

3.3. Feed consumption (FC)

The effect of dietary supplementation of neem leaves powder on the cumulative feed consumption by the broiler birds up to the 6th week was presented in Table 3. The cumulative feed consumption of broiler birds up to the end of the 6th week was 700.76±6.04 g, 700.76±6.04 g, 700.76±6.04 g, and 700.76±6.04 g in T_1, T_2, T_3 and T_4 groups, respectively. No significant difference was found between the treatment groups and the basal diet. Wankar et al. (2009) also reported that there was no significant difference among the treatment groups where various levels of neem leaves powder were supplemented.

3.4. Feed conversion ratio (FCR)

Effect of dietary supplementation of neem leaves powder on the feed conversion ratio (FCR) was presented up to 6th

Table 3: Effect of dietary supplementation of neem leaves powder on the cumulative feed consumption

Age of bird	Treatments			
	T_1: Control	T_2: 1 g kg^{-1}	T_3: 2 g kg^{-1}	T_4: 3 g kg^{-1}
1st week	183.84±5.72	181.84±5.74	181.84±5.74	181.84±5.74
2nd week	278±6.24	283.44±5.34	283.44±5.34	243.44±5.34
3rd week	502.36±6.69	501.08±5.94	501.08±5.94	501.08±5.94
4th week	700.76±6.04	701.84±5.01	701.84±5.01	701.84±5.01
5th week	700.76±6.04	701.84±5.01	701.84±5.01	701.84±5.01
6th week	700.76±6.04	701.84±5.01	701.84±5.01	701.84±5.01

week in Table 4. The average weekly FCR on 1st week is 1.15±0.03, 1.16±0.05, 1.01±0.05 and 1.01±0.05 in T_1, T_2, T_3 and T_4 groups, respectively. The average weekly FCR on 2nd week is 1.38±0.03, 1.42±0.03, 1.32±0.03 and 1.30±0.03 in T_1, T_2, T_3 and T_4 groups, respectively. The average weekly FCR on the 3rd week is 1.34±0.05, 1.20±0.03, 1.31±0.02 and 1.29±0.03, in T_1, T_2, T_3 and T_4 groups, respectively. The average weekly FCR on the 4th week is 1.74±0.03, 1.72±0.03, 1.77±0.03 and 1.90±0.03, in T_1, T_2, T_3 and T_4 groups, respectively. The average weekly FCR on the 5th week is 1.81±0.03, 1.75±0.05, 1.81±0.05 and 1.93±0.11 in T1, T2, T_3 and T_4 groups, respectively. The average weekly FCR on the 6th week is 1.85±0.05, 1.78±0.03, 1.82±0.03 and 1.98±0.04 in T_1, T_2, T_3 and T_4 groups, respectively. From 3rd week onwards significantly better FCR was observed in T_2 (1% neem supplemented group) than the control group. (Alam et al., 2015) found identical non-significant FCR in all neem treated groups compared to that of control group of broilers. (Zanu et al., 2011) also observed no significant effect of neem decoctions on feed conversion efficiency. Contrary to these reports, (Ansari et al., 2012) reported that at 28 days birds fed diets supplemented with 2.5 g kg^{-1} of leaf meal had significantly greater better FCR than those fed diets with 1.25, 5.0 g kg^{-1} of neem leaf meal and controls, which is in agreement to our present finding.

3.5. Carcass characteristics

Effect of dietary supplementation of neem leaves powder on the carcass characteristic of broiler birds was presented in Table 5. The average live body weight of chicks on the 6th week was 1941.92±5.85, 2024±5.30, 1984.96±6.12 and 1903.72±5.89 g in T_1, T_2, T_3 and T_4 groups, respectively. Though live bodyweight was found to be highest in T_2 group, followed by T_3 group and least in T_4 group, there was no significant difference among different treatment groups. The average Neck weight of chicks on the 6th week is 102.4±6.02 g, 101.04±4.62 g, 75.12±5.41 g and 84.96±5.47 g, in T_1, T_2, T_3 and T_4 groups, respectively. Though neck weight was found to be highest in T_1 group, followed by T_2 group and least in T_3 group, there is no significant difference among different treatment groups. The average Wings weight of chicks on the 6th week is 84.96±5.47 g, 84.92±5.13 g, 72.24±5.76 g and 76.16±5.35 g, in T_1, T_2, T_3 and T_4 groups, respectively. Wings weight was found to be highest and similar in T_2 and T_1 groups and least in T_3 group, there is a significant difference (p<0.01) in wings weight between T_3 and T_1 was 72.24± 5.76 and 89.96±5.47 respectively. The average Breast weight of chicks on the 6th week is 509.28±5.97 g, 511.6±6.18 g, 497.4±6.55 g and 480.88±6.55 g, in T_1, T_2, T_3 and T_4 groups, respectively. Breast weight was found to be highest in T_2 group, followed by T_1 group and least in T_4 group, there is a significant difference (p<0.01) between T_4 and T_2 was 480.88±6.55 and 511.6±6.18 respectively. The average Back weight of chicks on the 6th week is 338.56±8.12 g, 392.04±6.13 g, 306.48±6.39 g and 292.32±6.12 g, in T_1, T_2, T_3 and T_4 groups, respectively. Back's weight was found to be highest

Table 4: Effect of dietary supplementation of neem leaves powder on the feed conversion ratio

Age of bird	Treatments			
	T_1: Control	T_2: 1 g kg^{-1}	T_3: 2 g kg^{-1}	T_4: 3 g kg^{-1}
1st week	1.15±0.03	1.16±0.05	1.01±0.05	1.01±0.05
2nd week	1.38±0.03	1.42±0.03	1.32±0.03	1.32±0.03
3rd week	1.34±0.05	1.20±0.03	1.31±0.02	1.29±0.03
4th week	1.74±0.03	1.72±0.03	1.77±0.03	1.90±0.03
5th week	1.81±0.03	1.75±0.05	1.81±0.05	1.93±0.11
6th week	1.85±0.05	1.78±0.03	1.82±0.03	1.98±0.04

Table 5: Effect of dietary supplementation of neem leaves powder on the carcass characteristics of broiler birds

Parameter	Treatments			
	T_1: Control	T_2: 1 g neem kg^{-1}	T_3: 2 g neem kg^{-1}	T_4: 3 g neem kg^{-1}
Live weight (g)	1941.92±5.85	2024.52± 5.30	1984.96±6.12	1903.72±5.89
Neck yield (g)	102.4±6.20	101.04± 4.62	75.12±5.41	84.96±5.47
Wings yield (g)	89.96±5.47	84.92± 5.13	72.24±5.76	76.16±5.35
Back yield (g)	338.56±8.12	392.04±6.13	306.48±6.39	292.32±6.12
Breast yield (g)	509.28±5.97	511.6±6.18	497.4±6.55	480.88±6.55
Thighs yield (g)	95.48±5.81	109.92±5.26	111.6±5.54	100.92±6.23
Drumsticks yield (g)	96.4±9.83	98.16±10.13	97.24±5.65	88.72±4.76

in T_2 group, followed by T_1 group and least in T_4 group, there is a significant difference (p<0.01) between T_4 and T_2 was 292.32±6.12 and 392.04±6.13 respectively. The average Thighs weight of chicks on the 6th week is 95.48±5.81 g, 109.92±5.26 g, 111.6±5.54 g and 100.92±6.23 g, in T_1, T_2, T_3 and T_4 groups, respectively. Though thighs weight was found to be highest in T_3 group, followed by T_3 group and least in T_1 group, there is no significant difference among different treatment groups. The average drumsticks weight of chicks on the 6th week is 96.4±9.83 g, 98.16±10.13 g, 97.24±5.65 g and 88.72±4.76 g, in T_1, T_2, T_3 and T_4 groups, respectively. Though drum sticks weight was found to be highest in T_2 group, followed by T_3 group and least in T_4 group, there is no significant difference among different treatment groups.

It was observed that significantly higher weight was achieved in the T_2 (1% neem supplemented) group compared to basal diets and other treatment groups. Neem leaf powder at 1% increased the bioavailability of nutrients in the birds' bodies, which significantly increased the breast weight, an indicator of good health and better nutrient bioavailability. Bharathidhasan et al. (2009) found that when broilers were supplemented with extracellular enzyme at 0, 250, 500, 750, and 1000 g t^{-1} of feed, there was no significant difference in carcass yield, carcass weight, and meat characteristics.

3.6. Giblet weight

Effect of dietary supplementation of neem leaves powder on the organ weights, i.e., liver, heart and gizzard, of broiler birds was presented in Table 6. The average liver weight of chicks on the 6th week is 59.91±0.37 g, 36.94±0.70 g, 51.22±0.12 g and 47.05±0.37 g, in T_1, T_2, T_3 and T_4 groups, respectively. Liver weight was found to be highest in T_1 group and least in T_2 group, there was a significant difference (p<0.01) between T_2 and T_1 groups. The heart weight of chicks on the 6th week is 9.41±0.43 g, 10.38±0.73 g, 9.71±0.32 g and 7.00±0.90 g, in T_1, T_2, T_3 and T_4 groups, respectively. Heart weight was found to be highest and in T_2 group and least in T_4 group, there was a significant difference (p<0.01) between T_4 and T_2 groups.

Table 6: Effect of dietary supplementation of neem leaves powder on the giblet weights of broiler birds

Parameter	Treatments			
	T_1: Control	T_2: 1 g neem kg^{-1}	T_3: 2 g neem kg^{-1}	T_4: 3 g neem kg^{-1}
Liver	59.91±0.37	36.94±0.70	51.22±0.18	47.05±0.37
Heart	9.41±0.43	10.38±0.73	9.71±0.32	7.90±0.90
Gizzard	49.19±0.71	45.14±0.38	39.82±0.75	37.54±0.22

The gizzard weight of chicks on the 6th week is 49.19±0.71 g, 45.14±0.38 g, 39.82±0.75 g and 37.54±0.22 g, in T_1, T_2, T_3 and T_4 groups, respectively. Gizzard weight was found to be highest and in T_1 group and least in T_4 group, there is a significant difference (p<0.01) between T_4 and T_1 group. (Steel et al., 1980) stated that liver weights significantly increased with the inclusion of neem decoction in broiler diets. (Tiwari et al., 2010) found no significant (p>0.05) difference in liver weight fed by the Dioscorea bulbifera polysaccharide (DBLP).

Antibiotics at low doses were commonly used as growth promoters in broiler feed. However, the use of antibiotics came under severe criticism due to the development of antibiotic resistance and residual effects in humans. The study was conducted to evaluate the effect of dietary supplementation of neem leaves powder on broiler birds. From the results, it was observed that the production performance, feed conversion ratio (FCR), and carcass traits were better in the birds fed with a diet supplemented with 1% neem leaves powder, with 0% mortality. Thus, neem leaves powder supplementation was found to be a viable alternative to antibiotics in broiler meals.

4. CONCLUSION

Dietary supplementation of 1% neem leaves powder demonstrated superior results in broiler birds, as it showcased enhanced body weight, improved growth

performance, and a better feed conversion ratio (FCR) compared to other treatment groups. This natural feed additive not only supported sustainable poultry farming but also highlighted its potential as an eco-friendly alternative to synthetic growth promoters. These findings underscored the benefits of neem leaves powder in promoting overall productivity and efficiency in broiler production.

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