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Effect of feeding neem (*Azadirachta indica*) leaf powder on growth performance of broiler's

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Abstract
The experimental trial of five weeks was undertaken for Total 120-day old Broiler chicks were randomly distributed into four experimental diets. Each treatment group was replicated into five with 06 birds per replicate. The control (T_1) group was fed standard ration and T_2, T_3 and T_4 group were provided same standard ration supplemented with 2 gm, 3 gm and 4 gm Neem leaf powder, respectively. Result of experiment showed that supplementation of Neem leaf powder was significantly highest live body weight in treatment T_4 (1504.6 g/bird) as well as average live weight gain (253.36 g/bird). it is concluded that, 4 gm of Neem leaf powder significantly improved growth performance and economical returns than other treatments groups.

Keywords: Neem leaves, broiler chicks, growth performance

Introduction
Over the last two decades, the Indian Broiler Industry has experienced remarkable growth, emerging as a highly sought-after and profitable venture for educated unemployed individuals in India. Chicken meat production has seen a significant surge in recent years, primarily due to research and educational initiatives aimed at improving feed intake and growth rates. A substantial portion of the production expenses is attributed to the cost of feed, and in a developing country like India, the supply of quality and affordable feed has been inconsistent. To enhance the overall productivity of poultry birds, it is imperative to maintain a reliable source of low-cost feed. Ongoing endeavors are focused on identifying alternative and cost-effective feed ingredients to meet the needs of farmers.

In recent times, researchers have shifted their focus towards utilizing locally available natural feed resources as additives to enhance the performance of broilers. Additionally, the indiscriminate use of antimicrobials and other drugs to boost growth rates can have adverse effects on both the birds' health and the consumers. As a result, poultry scientists are once again turning their attention to our traditional medicinal system to identify beneficial herbs and plants that can be safely incorporated to increase production. The use of herbs and extracts from medicinal plants in poultry nutrition could prove more advantageous as growth promoters and for the prevention of common poultry diseases. Furthermore, these herbs are easily accessible, well-known to the general public, and can be effectively integrated into poultry diets.

Due to above reasons efforts are being made to identify the potent new feed additives in poultry feeds that do not show adverse effects. As an alternative to, Various additives such as probiotics, prebiotics, antibacterials, antivirals and hepatoprotectives are introduced as a feed supplement to attain rapid development in broilers. Such synthetic medicinal preparations, various plants having above mentioned properties being identified in our country. Among these Neem (*Azadirachta indica*) has attracted worldwide prominence in recent years. Neem leaves contain crude protein 15.8%, crude fiber 14.6%, Ether Extract 8.5%, Ash 4.5%, Moisture 13.0%, NFE 56.6% (Bonsu *et al*., 2012) [5]. The neem leaf exhibits a wide range of pharmacological activities *viz*., anti-inflammatory, anti-hyperglycemic, anti-ulcer, anti-malarial, anti-fungal, antibacterial, anti-viral, anti-oxidant, antimutagenic, immunomodulatory and various others properties without showing any adverse effects (Supriya and Nagini, 2005) [6]. Due to its antibacterial and hepatoprotective properties, the herbal drug neem promotes growth and improves feed efficiency as well as live body weight (Padalwar, 1994) [7].

Material and Methods

Treatments and Experimental design

The trial was conducted on Total 120, day old broiler chicks, obtained from Isha Poultry services Chiplun, District Ratnagiri. The chicks were from the same hatch and were reared under uniform management condition up to fifth weeks of age. On arrival, the chicks were weighed individually and randomly divided into four treatments including control were formulated. The experiment was conducted in a Randomized Block Design with following dietary treatments. The control (T_1) group was fed standard ration and T_2, T_3 and T_4 group were provided same standard ration supplemented with 2 gm, 3 gm and 4 gm Neem leaf powder, respectively. The experiment is conducted at poultry unit of instructional farm department of Animal Husbandry and Dairy Science, College of Agriculture, Dapoli. District – Ratnagiri, Maharashtra.

Result and Discussion

Growth Performance

1. Feed Consumption (gm)

Throughout the five-week trial, the average feed intake of the broiler chicks was noted at weekly intervals. The average weekly feed consumption of broiler chicks is presented in Table 1. In the present study, the total amount of feed consumed by all treatments throughout the course of five weeks was 2782.6, 2747.4, 2750.2 and 2770.8 g/bird/week for treatments T_1, T_2, T_3, and T_4, respectively. Higher feed intake was noted in T_1, but treatments T_2, T_3, and T_4 showed a decreasing trend in feed consumption. In treatments T_1, T_2, T_3 and T_4, the average feed consumption (g/bird) at the end of the fifth week was 556.52, 549.48, 550.04 and 554.16.

A similar finding was reported by Khan *et al*. (2014) [3] studied the effect of neem seed cake (NSC) in ration on the growth, carcass and feed efficiency of broilers. Birds were divided into four groups, group A was kept as control (without NSC) and broilers in groups B, C and D were fed on ration with NSC at level of 0.5, 1.0 and 1.5% per kg of feed, of NSC in broiler ration. The results showed that all the parameters were significantly (p<0.01) different due to inclusion of NSC in broiler ration. Broiler in group A consumed high feed quantity and it was decreased significantly in group C when birds were fed to 1% level of neem seed cake. Better weight gain (1940 g/bird) and Feed Conversion Ratio (1.94) was recorded group C, fed on ration containing neem seed cake at 1%.

Table 1: Total weekly feed consumption (gm/bird) of broiler from different group in 35 days

Treatment	Week 1	Week 2	Week 3	Week 4	Week 5	Total	Mean
T1	155.4	305.4	492.4	834.4	995.0	2782.6	556.52^{a}
T2	155.8	306.4	492.6	819.8	972.8	2747.4	549.48^{bc}
T3	155.8	305.8	493.4	823.6	971.6	2750.2	550.04^{b}
T4	155.6	309.0	496.0	831.0	979.2	2770.8	554.16^{ab}
S.Em	0.67	0.99	1.02	1.49	1.91	6.162	1.23
CD	NS	3.06	3.14	4.60	6.10	16.91	4.22

2. Water Consumption (ml)

The weekly water intake of broilers in various groups is presented in Table 2. Total water consumption during the five weeks of the experiment was as follows: T_1 (5835.23), T_2 (5849.98), T_3 (5859.96) and T_4 (5885.24) ml/bird/week, respectively. In treatments T_1, T_2, T_3 and T_4, the average weekly water intake (ml/bird) was 1167.04, 1169.99, 1171.99 and 1177.04 ml/bird/week, respectively. The average minimum water consumption was 1167.048 ml/bird/week in treatment T_1, which was substantially less (p<0.05) than the minimum water consumption of 1169.99, 1171.99, and 1177.04 ml/bird/week in treatments T_2, T_3 and T_4, respectively. When compared to the other treatments, treatment T_4 -1177.04 ml/bird/week had the highest maximum water intake.

Similar finding was reported by Samale (2004) [1] reported that water consumption of the birds depends on environment stress, quality of feed, quality of water and management factors and found that water consumption under stress of overcrowding was significantly lower as that of control. It may happen due to reduced feed intake. This indicates that water requirement increases with the increase in the intake of feed.

Table 2: Total weekly water consumption (ml/bird) of broiler from different group in 35 days

Treatment	Week 1	Week 2	Week 3	Week 4	Week 5	Total	Mean
T1	201.6	529.44	1345.19	1755.4	2003.6	5835.23	1167.04^{c}
T2	203.4	532.75	1344.02	1759.0	2010.8	5849.98	1169.99^{bc}
T3	202.0	531.2	1344.36	1767.0	2015.4	5859.96	1171.99^{b}
T4	201.6	529.4	1349.84	1785.0	2019.4	5885.24	1177.04^{a}
S.Em	0.73	0.79	1.38	1.90	2.60	7.42	1.48
C.D.	2.26	2.44	4.28	5.85	8.03	22.87	4.57

3. Body Weight (gm)

Throughout the duration of the trial, the experimental birds were weighed once a week. From birth to five weeks of age, each treatment group weekly live weight measurements were taken shown in Table 3. The day-old experimental chicks average starting body weights for the four different treatments T_1, T_2, T_3, and T_4 were 46.8, 46, 47 and 45.6 g, respectively. experimental chicks at the fifth week had an average body weight of 1410.8, 1445.4, 1466.4 and 1504.6 g, respectively. Up to the first two weeks of the trial, there was no discernible difference between the treatment groups based on the weekly body weight variations of the chicks. However, beginning in the third week, there was a significant (p<0.05) difference. The treatment T_4 was considerably (p<0.05) greater than the control group in the third week. However, the treatments T_1, T_2, T_3 were comparable to one another. In the fourth week of taking T_4, the birds average body weight was higher. Treatments T_1, T_2 and T_3 were comparable to one another, nevertheless. At the conclusion of the fifth week, the T_4 group had substantially (p<0.05%) greater body weight growth.

The findings are consistent with the Wanker *et al*. (2009) [2] conducted experiment on 120-day old broiler chicks divided into four groups, T_0, T_1, T_2 and T_3 which were supplemented with neem leaf powder @ 0 gm, 1 gm, 2 gm and 3 gm/kg of broiler ration, respectively. All the treatment groups T_1 (813.03), T_2 (855.07) and T_3 (834.21) recorded significantly (p<0.01) higher means for live body weight than that of control T0 (768.69) group. All the treatment groups showed non-significant increase in weekly gain in weight, feed consumption and feed efficiency as compared to that of control group.

Table 3: Total weekly live body wight (gm/bird) of broiler from different group in 35 days

Treatment	Initial	Week 1	Week 2	Week 3	Week 4	Week 5	Mean
T1	46.8	143.6	318	695.8	1089.2	1410.8	617.36^{bc}
T2	46.0	144.2	317.8	704.2	1095.2	1445.4	625.46^{b}
T3	47.0	144.6	317.0	718.2	1100.2	1466.4	632.23^{ab}
T4	45.6	143.2	323.2	728.2	1128.6	1504.6	645.56^{a}
S.Em	0.72	1.46	3.32	4.63	5.40	6.02	3.59
C.D.	NS	NS	NS	14.28	16.65	18.55	16.49

4. Body Weight Gain

The body weight gain of broiler chicks at different weekly intervals on inclusion of neem leaf powder in feed has been presented in Table 4. The results showed that the day-old chicks in the treatment groups had average initial live weights of 46.8, 46, 47 and 45.6 (g) for T_1, T_2, T_3 and T_4, respectively. The average weekly body weight gain for each bird was 234.63, 240.93, 247.03 and 253.36 during the first two weeks of the trial, the weekly live body weight growth of chicks showed no discernible difference between each of the treatment groups. From the third weeks, there is a significant (p<0.05) difference between the treatments. The most substantial weight gain was seen in treatment T_4 during the third week. In the fourth week, the T_4 treatment saw a substantially (p<0.05%) larger body weight growth than the other treatments. In the fifth week, the T_4 registered substantially (p<0.05%) greater body weight growth.

Similar finding was reported by Sarkar *et al*. (2014) [4] they reported 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 colibacillosis induction.

Table 4: Total weekly live body wight gain (gm/Bird) of broiler from different group in 35 days

Treatment	Initial	Week 1	Week 2	Week 3	Week 4	Week 5	Mean
T1	46.8	96.8	174.4	377.8	390.4	321.6	234.63[b]
T2	46.0	98.2	173.6	386.4	391.2	350.2	240.93[ab]
T3	47.0	97.6	172.4	401.2	397.8	366.2	247.03[ab]
T4	45.6	97.6	180.0	405.0	416.0	376.0	253.36[a]
S.Em	0.72	1.26	2.81	5.09	5.60	6.57	3.68
C.D.	NS	NS	NS	15.69	17.27	20.25	17.74

Conclusion

In comparison to controls and other treatments, it was shown that adding 4 gm/kg of neem leaf powder to the feed considerably enhanced growth performance in terms of feed intake, body weight, body weight gain. Hence, it can be concluded that commercial broiler feed can be successfully added neem leaf powder up to level of 4 gm/kg of neem leaf powder without affecting productive performance of broiler birds that results in good health and better economic returns.

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