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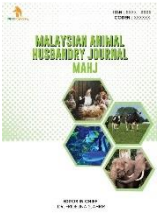

RESEARCH ARTICLE

EFFECT OF THE GUAVA AND SISSOO LEAF POWDER SUPPLEMENTATION ON THE GROWTH PERFORMANCE OF COMMERCIAL BROILERS (COBB-500), BAITADI, NEPAL

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ABSTRACT

The present work was conducted to study the effect of guava and sissoo leaf powder in growth performance of Cobb-500 broiler chickens. The experiment study was carried out in a Completely Randomized Design (CRD). A total of 144, day-old commercial broiler poultry chick was distributed randomly into four treatment groups T1, T2, T3, and T4 each having three replications. Group T1 was considered the control in the experiment and was fed commercial feed and fresh drinking water. While Group T1- Basal diet, T2- Basal diet plus guava and sissoo leaf powder @2%, T3- Basal diet plus guava and sissoo leaf powder @4%, T4- Basal diet plus guava and sissoo leaf powder @6% respectively. Average weight gain and feed intake from the 21 days of the birds were recorded. Data and treatments mean were analyzed using the analysis of variance technique (ANOVA) and were tested with the Least Significant Difference (LSD) at $P<0.05$. The result showed the higher body weight in T1 and T2 followed by T4 and T3. Feed intake was higher in control and in the 2% of the grass meal than the other group of the treatment. The weight of the broiler fed with the pellet feed and the 2% has the highest gain in weight than others. This research combination of the guava and sissoo leaf powder at 2% of adding grass meal showed better performance in feed intake and weight gain. The research show the reduction in the cost of the feed by adding the grass meal. So, the diet with pelleted feed along with adding 2% of grass meal is better in this area of study.

KEYWORDS

Broiler chicken, feed, leaf powder, pellet

1. INTRODUCTION

Agriculture is the major source of livelihood for Nepalese people and it is the mainstay of the Nepalese economy. According to Food and agricultural organizations (FAO), developed and developing livestock productions account for 20-24% of the Agricultural Gross Domestic Product (AGDP) as cited in (Poudel et al., 2020). Poultry is one of the emerging businesses of Nepal. Poultry is defined as any domestic bird raised specifically for meat and egg consumption. This definition can include chickens, turkeys, ducks, quail, and others. Poultry is the second most consumed meat in the world next to pork because of the increasing awareness about the nutritional value of meat among consumers, increase level of people, changes in food habits, populations growth, the inflow of tourists, and easy access to the market, the demand of poultry is increasing every year. A broiler is a young chicken of either sex below 8 to 10 weeks of age weighing 1.5 to 2.5 kg body weight with tender meat soft, pliable smooth textured (Kejela et al., 2019).

Feed plays a very important role in poultry. Feed is the major component of the total cost of the poultry venture as 80% of the total expenditure is on the procurement of the feed. The productions of commercial poultry feed were 6,46,845 tones in 2010/2011 which increased abruptly in the last years (FAOSTAT, 2014). The main aim of poultry is to attaining of the maximum live weight, especially in fast-growing broilers. The feed has been a major cost of raising the poultry, accounting for about 70% of the total cost production (Sugiharto, 2019). Attempt has also been taken for reducing the cost of feed and also for incorporations of agro-industrial by product in broiler feed as an energy source (Sugiharto et al., nd.).

It has been also known that the particular foliage contain a number of biologically active compounds which are much beneficial for chickens of growing ages. These compounds include the different types of vitamins, acids, tannins, and saponins (Vergara-Jimenez et al., 2017). The use of the grass meal not only reduces the cost of the feed but also improves the health performance of broiler chickens. Broiler shows a very low tolerance to dietary fiber and feeding of high levels of the feed containing leaf meal results in the growth performance and imposed in comprised digestibility of the nutrients (Buragohain, 2018).

Guava is a small tree of the tropical that grows mainly for fruit. It is a member of the Myrtaceae family including 133 genera and more than 3800 species (Morsy et al., 2019). Leaves and bark of the guava still have medicinal uses today (Nwinyi & Chinedu, 2008). The main chemical compound in guava is oils and among them too pinene content is very high (Ramadan et al., 2009). Guava is economically the plant with the high medicinal properties (Jimenez-Escrig et al., 2001). It is not only used as a food but also as anti-oxidant, anti-allergy, anti-inflammatory and anti-diabetic using the extracts of the different portion of the plants (Nair and Subramanian, 1964). Guava has very much beneficial effect on serum level cholesterol and high-density lipoprotein levels (Singh et al., 1992).

In the context of guava, it is more antioxidant in the broiler feed. It has a regular amount of sugars, acids, and pectins and presents tannins, flavonoids, and essential oils in combination in its constitutions can lower oxidations of lipids and the other molecules (Oliveira, et al., 2018). The plants have been effective in treating the large number of diseases like diarrhea, burns, stomach disorders, and other infectious diseases.

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Scientists have been continuously involved in the establishing of plants with anti-microbial activity and yielding the higher fruit content (Adedayo, et al., 2001).

Sissoo is a fast-growing tree that can grow up to the height of 25m, often with a crooked trunk. Often it is known as the Indian Rosewood which belongs to the family Papilionaceae. Sissoo is a legume that is rich in protein content and is beneficial to be fed to the broiler chicken. The focused study that many researchers and scientists have done before is improving production performance, increasing resistance and the meat quality of farm animals fed diets containing the guava. Positive results on the gain, feed conversion rates, and some of the carcass and meat quality parameters (reducing the fat and cholesterol) in broiler chickens were accomplished by most of the researchers who have studied the use of guava in the feed of poultry (Nwinyi and Chinedu, 2008; Rahman, et al., 2013). Positive results were obtained in the diet of broiler chicken in the concentration of 4.5% added guava powder which results no effect on the body weight and further increased in the guava powder from 8% results no significant differences as feeding up to the 2-4% in comparison with the control (El-Deek et al., 2009; Rahman et al., 2013). The present review provides a comprehensive view concerning the recent advances in the application of leaf meal in broiler rations. We hypothesized that the leaves of the plant may enhance the immunological parameters of the broiler chicken.

2. Materials and Method

2.1 Experimental Site and Duration

A feeding trial was conducted on a college farm, at the Gokuleshwor campus which is located in the Baitadi district, from April to May 2022.

2.2 Experimental Design

A total of 144, unsexed chicks of broiler will be randomly divided into four treatment groups with three replicate each having 12 chicks in a Completely Randomized Design (CRD). Chicks will be randomly assigned to the 12 pens and identified with marker and wing bands. The treatment combinations for this experiment are presented as follows:

T1- Basal diet (control diet)

T2- Basal diet plus sissoo and guava leaf powder in combination @ 2%/kg feed

T3- Basal diet plus sissoo and guava leaf powder in combination @ 4%/kg feed

T4- Basal diet plus sissoo and guava leaf powder in combination @ 6%/kg feed

All the treatment groups were subjected to the same management procedure including feed and they were kept in a pen having the facilities of a bulb, feeder, and drinker. Apart from this alternative to electricity, solar facilities were available.

2.3 Experimental Birds

A total of 144, day-old unsexed chicks of the broiler Cobb 500 were purchased from the local hatcheries for fed commercial. The chicks were kept in a group in a deep litter system for the first 18 days. After this, the birds were shifted to the deep litter housing system for rearing in the experimental trial.

2.4 General Management

2.4.1 Preparation of Brooder and Brooding House

The farm was initially cleaned and sprayed with 5 kg lime powder and kept for 3-4 days closed. The feeder, drinker, and all other equipment were cleaned, washed, and disinfected. During the initial stages, rick husk was used up to 2cm depth, and later it is increased up to 5-6 cm as the chicks grow old. The rick husk was mixed with the lime powder. A bulb with 100 watts was fitted at a height for maintaining the temperature.

2.4.2 Litter Management

Rice husk was used as litter. It was maintained at 5-6 cm thickness and was stirred at 2 days gap to reduce and prevent caking. Wet litter in the pen was immediately removed with the dry ones. Formalin and lime powder mixture was kept at the entrance of the poultry house to maintain security and to prevent other threats.

2.5 Procurement of Test Materials

Standard broiler starter feed was purchased from the local feed dealer. Required remaining starter and finisher feed will be prepared in the mixture. The starter ration will be fed up to the 4 weeks and later week it is replaced by the finisher ration for up to 7 weeks. Sissoo leaf was collected from the tree of the farm periphery and the Guava leaf from different areas. The mixture is purchased from the market.

2.6 Formulating and Mixing The Diet

Standard broiler and the finisher ratio were used in the experiment. Sissoo and Guava leaf powder along with the broiler feed is used in the experiment. All the ingredients along with the leaf meal are purchased and collected. Sissoo and Guava leaf is collected and kept in a shaded place to prevent them from the sunlight. After drying the leaf was ground in the mixture and the powder is obtained. Further, it is kept in an airtight plastic container till it is mixed with feed to feed the broiler chickens. Then it is mixed in feed along with the necessary proportion of (2%, 4%, and 6% kg of feed) for the different treatment groups. The standard broiler feed will be supplemented with different levels of leaf powder. Diet will be formulated in such a way that diet will contain at least the minimum recommended level of protein and energy, recommended for Cobb 500 broiler.

2.7 Experimental Diet

3 weeks-old broilers were transferred into the experimental pens having the standard space in the floor, feeder, drinker, and provision of the bulb. Birds were fed ad libitum in all treatments. Except, for the feed, all the treatment groups were subjected to the same management procedure for the rearing. The feed was brought from local dealers. The birds were reared from Day 1 to Day 42. The treatment was started from Day 21 to 42 days.

2.8 Data Collection

The following parameters were recorded during the experimental periods.

2.8.1 Body Weight Gain

The initial and weekly body weights of the bird reared were taken from the standard weighing machine. Body weight gain was obtained by subtracting the previous weight of the birds from their corresponding body weight from 3 weeks onwards.

Weight gain= Final weight- the initial weight of the bird

2.8.2 Feed Consumption

Feed intake was recorded by subtracting the weight of the leftover feed from the weight of the feed offered from the 3 weeks onwards.

Feed intake = feed offered- feed consumed

3. Result and Discussion

Table 1: Average Feed Consumption of the Cobb-500 Broiler Chicken Feed with the Guava and Sissoo leaf powder (gm)

Treatment	F21	F24	F27	F30	F33	F36	F39	F42
control	1297.33^{a}	1333.38	1816.66	1886.67	1496.66^{ab}	1318.33	1603.33	1978.33
Basal diet & 2%meal	1108.33^{a}	1321.66	1800	1843.33^{a}	1313.33^{b}	1306.66	1560	1981.66
Basal diet & 4% meal	1155^{a}	1248.33	1883.33	1858.33^{a}	1466.66^{ab}	1370	1688.33	1978.33
Basal die& 6% meal	1108.33^{a}	1381.66	1961.66	1948.33	1890^{a}	1435	1520	1993.33
Mean	1198.91	1321.25	1865.41	1884.17	1541.67	1357.75	1592.917	1982.97
Sem	36.28	38.14	47.97	24.36	84.52	53.06	56.82	3.28
Lsd	244.15	256.94	311.7	164.89	495.44	316.3	388.7	19.56
P-value	0.63	0.64	0.46	0.67	0.05	0.21	0.74	0.21

Analysis of the variance showed the non-significant effect of treatment on the feed consumption of the broiler (Cobb-500) supplemented with different treatments but showed a significant effect at the 33 days only. This shows the results related to the study by showed that the feeding of the guava up to 4.5% had a non-significant intake of feed and found that the higher content of fiber decreased the content of the feed (Rahman et al., 2013). The results were supported by (Abiola and Adekunle, 2002).

Analysis of the variance showed that the body weight of the Cobb-500 broiler in the earlier days of adding the grass meal was found to be non-significant in the feed but later it is found to be significant after the 37 days of feed intake. The results are related to the study by who reported improvement in broiler performance when the grass leaf powder was included in the diet (Wanker et al., 2009).

Analysis of the variance showed the non-significant effect of treatment on the water intake of the Cobb-500 broiler chicken but showed a significant effect at 39 days only.

Table 2: Average Body Weight of The Cobb-500 Broiler Chicken Supplemented by The Guava and Sissoo Leaf Powder (gm)

Treatment	wt21	wt24	wt27	wt30	wt33	wt36	wt39	wt42
control	904	1121	1414.33	1615.33	1731.33	1989.33	2214.67^{a}	2346^{a}
Basal feed & 2% meal	872.67	1076.33	1325.33	1576.33	1643.66	1915	2196^{ab}	2234.34^{a}
Basal feed & 4% meal	879.33	1148.67	1321.33	1532.33	1612.67	1868.33	2024^{b}	2137.33^{b}
Basal feed & 6% meal	892.67	1123.33	1362.67	1551	1673.33	1871.33	2043.33^{b}	2149.66^{b}
Grand mean	887.17	1117.33	1355.92	1568.75	1665.25	1911	2119.67	2241.83
Sem	12.64	24.49	22.12	20.72	25.46	27.8	33.11	37.99
Lsd	86.57	170.45	143.31	115.92	153.02	145.85	167.45	172.85
P-value	0.74	0.86	0.86	0.121	0.23	0.06	0.04	0.01

Table 3: Average Intake of Water of Cobb-500 Broiler Chicken Supplemented with Guava and Sissoo Leaf Powder (gm)

Treatment	w21	w24	w27	w30	w33	w36	w39	w42
control	2840	2908.33	2500	3790	3030^{ab}	3456.67	4295^{ab}	4975
Basal feed & 2%meal	2446.67	3223.33	2276.67	3230	2506.67^{b}	3276.67	3420^{b}	4623.33
Basal feed & 4%meal	2996.67	3180	2560	3736.67	3253.33^{ab}	4225	4695^{ab}	5280
Basal feed & 6%meal	2855	3755	2650	4173.33	3980^{a}	4630	4916.67^{a}	5360
Mean	2784.58	3266.67	2496.67	3732.5	3192.5	3897.08	4331.67	5059.58
Sem	85.65	186.83	93.14	212.46	213.03	249.37	236.66	136.91
Lsd	584.47	1012.227	635.06	1410.71	1204.215	1402.67	1359.26	853.85
P-value	0.7	0.09	0.71	0.56	0.05	0.12	0.05	0.32

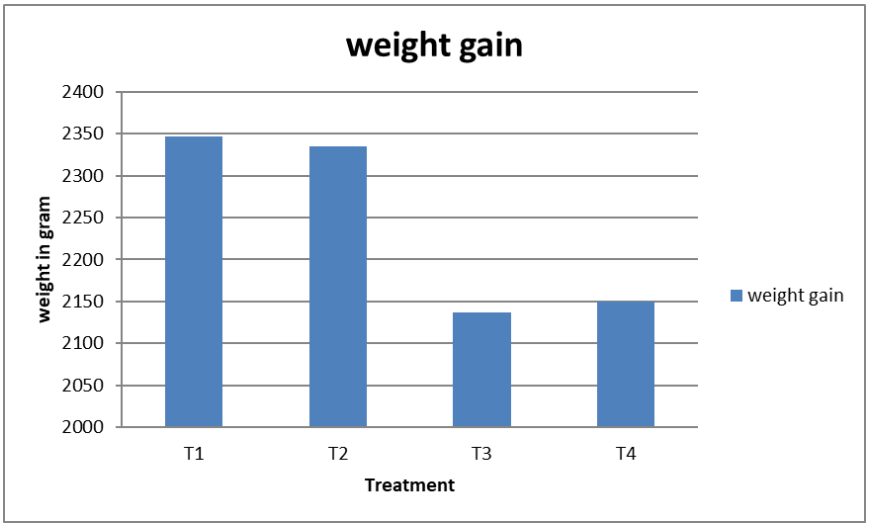

Figure 1: Weight Gain at 42 Days

3.1 Cost Calculation

During the experimental periods, the cost of feed after the adding of the grass meal powder is calculated. Feed intake of the control groups during the overall feeding time is (Rs.3400.50*3) = Rs. 10,201.5

Similarly, the feed intake of the 2nd treatment (feed +2 % of the grass meal combination) is Rs. 9997.14 which consists of the B1 and B2 pellet feed along with the grass meal powder.

The feed intake of the 3rd treatment is Rs.97903.34 (feed +4% of the grass meal combination) which consists of the B1and B2 pellet feed along with the grass meal powder.

The feed intake of the 4th treatment (feed +6% of the grass meal combination) is Rs.9589.11 which consists of the B1and B2 pellet feed along with the grass meal powder.

Thus, the research combination of the grass meal powder and pellet feed showed the better performance at the 2% on feed which reduce the cost of the production along with the better growth performance.

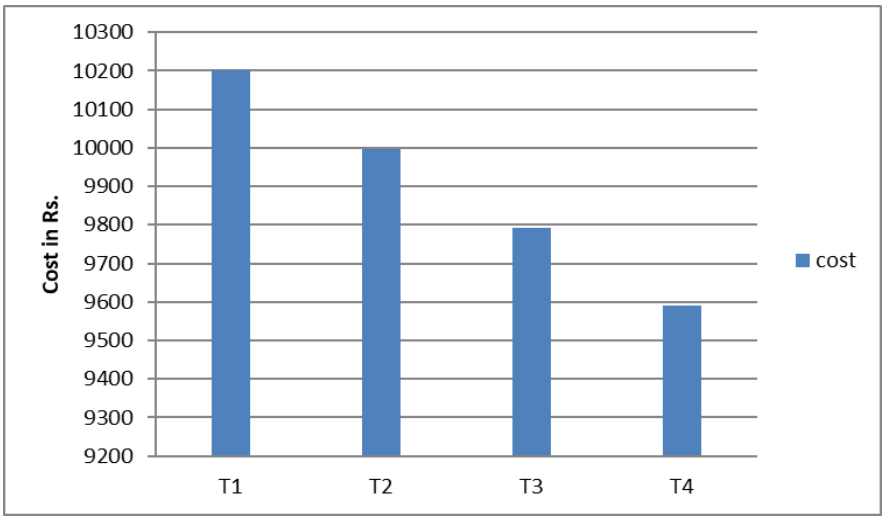

Figure 2: Cost of each treatment.

4. Conclusion

The weight of the broiler fed with the pellet feed and the 2%has the highest gain in weight during the growth period. The feeding of the basal diet and mix of the basal diet with the grass meal from the 21 days to the 36 days in weight is non- significant but significantly different during the later days. This research concludes that combination of the guava and sissoo leaf powder showed better performance in feed intake and weight gain at 2% also the cost of the feeding was reduced which suggest the use of the grass meal in the broiler feed is profitable.

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