# GROWTH PERFORMANCE AND ECONOMICS OF PRODUCTION OF BROILER CHICKENS FED VARIED INCLUSION LEVELS OF VELVET TAMARIND (*Dialium guineense*) LEAF MEAL IN THE DIET

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**ABSTRACT**
*The research was designed to determine the Performance and Economics of production of broiler chickens fed varied inclusion levels of velvet tamarind (Dialium guineense) leaf meal (VTLM) in the diet. Ninety-six (96) 28-day old broiler chicks (Arbor acre) purchased from CHI Ibadan were used in this trial. The birds were fed with standard commercial broiler starter for the first four weeks and broiler finisher at the finisher phase (5-8 weeks). At four weeks of age, the birds were randomly assigned to four dietary treatments (T1, T2, T3, T4) each with twenty- four (24) birds divided into 3 replicates such that each replicate had 8 birds in a completely randomized design. The velvet tamarind leaf meal was included in the diet at 0.0g, 2.5g, 5.0g, and 7.5g per kg of feed corresponding to T1, T2, T3, and T4 respectively. All the Performance and Economics of production parameters measured were significantly ($p<0.05$) affected by treatments. It was concluded that higher doses (7.5g/kg feed) had positive effect on the broilers' final weight and feed conversion ratio. It was therefore recommended that velvet tamarind leaf meal be used in broiler chickens' diets as a sustainable alternative to synthetic antibiotics.*
**Keywords: Velvet, Broilers, Growth, Weight, Revenue**

## INTRODUCTION

The broiler chicken plays a significant economic role in most developing countries and is essential for the rapidly growing populations' food security. However, the gradual increment of the human population resulted in an increased demand for animal protein in developing countries (Lagua and Ampode, 2021). In order to meet the demand for poultry meat products, synthetic antibiotic growth promoters (AGPs) are usually added to animal feed to stimulate growth, minimize mortality by preventing infections, improved gut function, antimicrobial activity, and antioxidative actions (Windisch *et al.,* 2008). However, synthetic antibiotics had indirect adverse effects on human health because of residues in chicken meat and the increased resistance of certain microbes (WHO, 2012). The resistant cells survive and grow in low levels of antibiotics, resulting in an antibiotic-resistant population in the final products. Therefore, it is a constant challenge for animal nutritionists and health experts to use various medicinal plants as antibiotic substitutes in broiler diets (Zhang *et al*., 2009. Due to the high cost of feeds and the scarcity of essential raw materials, poultry farmers are searching for systems that can identify feed ingredients with lower costs and high biological values that can supplement conventional energyand protein sources (Laing and Wongtangtintharn, 2013). Velvet tamarind is a medium sized tree in the *Caesalpinaceae* family. It has been used as a medicinal plant for centuriesv and has been reported as curative in several pharmacopeias (Gumgumjee *et al.,* 2012). Tamarind leaves also contain crude protein, fat, fibre and vitamins such as riboflavin, thiamine, ascorbic acid, niacin, and β-carotene (ElSiddig *et al.,*2006. This study was therefore designed to determine the growth performance and economics of production of broiler chickens fed varied inclusion levels of velvet tamarind leaf meaf meal in the diet.

## MATERIALS AND METHODS

### Experimental Site

The study was carried out at the poultry unit of the Teaching and Research Farm of the Department of Animal Production, Prince Abubakar Audu University, Anyigba in Dekina Local Government Area of Kogi State The study area falls within tropical wet and dry climate region of the Guinea savanna, with average annual rainfall of 1600mm and daily temperature ranging between 25°C- 35°C (Aderibigbe *et al.,* 2022).

### Sources and Preparation of Materials

Fresh velvet tamarind leaves were harvested from Agbeji in Dekina local Govvernment Kogi state. The leaves were dried under shade while retaining the greenish colouration and then, ground into meal. The dried leaves were milled using milling machine at the Department of Crop Science Analytical Laboratory to produce velvet tamarind leaf meal

### Experimental Birds and Management

Ninety-six 28 day- old broiler chicks purchased from CHI Ibadan, were used for the study. The birds were fed with standard commercial broiler starter diet for the first four weeks, during this time, they were vaccinated against Newcastle disease with a Lentogenic strain of Newcastle disease vaccine (LaSota), Infectious bursal disease with

(Gumboro) Anti-stress (shrivite), Vitamins and Antibiotics were administered through the water to the birds upon arrival. The birds were dewormed and administered antibiotics before the commencement of the feeding trial. At four weeks of age, the birds were randomly assigned to four dietary treatments with each treatment having 24 birds. Each of the treatments was replicated three times with eight birds per replicate in a completely randomized design (CRD) experiment. The inclusion levels were 0.0g, 2.5g, 5.0g, and 7.5g per kg of diet for T1, T2, T3, and T4 respectively.

**Data collection**
**Performance parameters**
**Initial body weight**
This was determined by weighing the birds per replicate at the beginning of the experiment, Total weight of birds per replicate was divided by the number of birds to obtain the initial weight of each bird.

**Final body weight**
This was determined by weighing the birds per replicate at the end of the experiment. Total weight of birds per replicate was divided by the number of birds to obtain the final weight of a bird at the end of the experiment.

**Weight Gain**
Weight gain was determined by subtracting initial weight from the final weight, taking into account the number of birds.

**Average daily weight gain**
Average daily weight gain was determined by dividing weight gain by the number of birds and the number of days of the feeding trial.

**Daily feed Intake**
This was determined by subtracting the leftover feed from the quantity of feed offered

**Feed Conversion Ratio**
This was computed for each replicate during the feed trial as indicated below

$$\text{Feed conversion ratio (FCR)} = \frac{\text{Daily feed Intake (g)}}{\text{Average daily weight gain (g)}}$$

**Economics Parameters**
**Cost of production per bird** = Total cost of production/ Total number of birds produced

$$\textbf{Feed cost/bird (N)} = \frac{\text{Cost of feed consumed}}{\text{Number of birds}}$$

**Cost of feed/kg gain** = Feed cost/kg × FCR

**Total cost of production (N)** = cost of each diet consumed + cost of chick + miscellaneous expenses

**Gross margin** was obtained by subtracting the total production cost from total revenue.
Gross margin= Total revenue - total production cost.

$$\textbf{Benefit cost ratio (BCR)} = \frac{\text{Revenue}}{\text{Total cost}}$$

**Statistical Analysis**
Data collected were subjected to analysis of variance (ANOVA) using Statistical Package for Social Science (SPSS) version 20 and differences between treatment means were separated using Least Significant Difference (LSD).

**RESULTS AND DISCUSSION**
**Performance of broiler chicken fed varied inclusion levels of velvet tamarind leaf meal**
The effect of feeding velvet tamarind leaf meal on the growth performance of broilers chicken is presented in Table 1. There were significant treatment effects ($p < 0.05$) on the final weight, weight gain, average daily feed intake, and average daily weight gain. Birds fed 7.5g VTLM had the highest FW, WG, ADFI, ADWG and an improved FCR Results obtained were similar to the findings of Jha and Mishra (2021) that leaves of velvet tamarind are rich in carotenoids, vitamins, minerals, amino acids, alkaloids, and flavonoids. The combination of

these compounds is essential for growth and they reduce disease infection in the GIT. It is also corroborated by the report of Windisch *et al* (2008) that the use of phytogenic products increases the health status and productivity of broiler chickens. Birds fed with 7.5g VTLM has the lowest FCR which is the best. This implies that the birds were able to utilize and efficiently convert the feed they consumed to meat.

**Economics of production of broiler chickens fed varied inclusion levels of velvet tamarind leaf meal**

The effect of feeding velvet tamarind leaf meal on the economics of production of broiler chickens is presented in Table 2 below. There were significant differences ($p < 0.05$) among the treatments in the feed cost/kg, feed cost/kg gain, total cost of production, revenue, gross margin and benefit cost ratio.

The birds fed 7.5g VTLM had the best economic return with revenue of N7900.00, gross margin of N2419.40 and benefit cost ratio of 1.44. That is, for every investment in broiler chicken production with inclusion of velvet tamarind leaf meal, there is always a return. This corresponds to the report of Akbarian *et al*. (2012) who stated that the use of feed additives accounted for higher economic gain in addition to other numerous purposes in poultry production. In another study on the economic benefits of broiler chickens fed diets containing phytogenic feed additives, higher economic gain was reported (Maidala *et al.,* 2017).

**Table 1: Performance of finisher broiler chickens fed diet with varied inclusion levels of velvet tamarind leaf meal.**

| Parameters | 0.00VTLM (g) T1 | 2.5VTLM (g) T2 | 5.00VTLM (g) T3 | 7.5VTLM (g) T4 | SEM | LOS |
|---|---|---|---|---|---|---|
| Initial weight | 1220.83 | 1216.67 | 1241.67 | 1233.33 | 7.56 | NS |
| Final weight | 2568.75$^{b}$ | 2479.17$^{c}$ | 2572.08$^{ab}$ | 2633.33$^{a}$ | 28.89 | * |
| Weight Gain | 1347.92$^{b}$ | 1262.50$^{c}$ | 1330.41$^{b}$ | 1400.00$^{a}$ | 29.74 | * |
| Average Daily Feed Intake | 175.83$^{c}$ | 175.97$^{c}$ | 177.78$^{b}$ | 182.22$^{a}$ | 1.19 | * |
| Average Daily Weight Gai | 56.16$^{ab}$ | 52.60$^{c}$ | 55.44$^{b}$ | 58.34$^{a}$ | 1.24 | * |
| FCR | 3.21$^{ab}$ | 3.35$^{a}$ | 3.21$^{ab}$ | 3.13$^{b}$ | 0.06 | * |

*$^{a,b,c}$=Means with different superscript along the same rows shows significant different at p<0.05, SEM: standard error of mean; LOS: level of significance; * Significant difference; NS: Not significant; VTLM: velvet tamarind leaf meal.*

**Table 2. Economics of production of finisher broilers fed diet with various inclusion level of velvet tamarind leave meal.**

| PARAMETERS | 0.0gVTLM T1 | 2.5gVTLM T2 | 5.0gVTLM T3 | 7.5gVTLM T4 | SEM | LOS |
|---|---|---|---|---|---|---|
| Feed cost/kg | 3544.80$^{b}$ | 3547.60$^{b}$ | 3584.00$^{b}$ | 3673.60$^{a}$ | 24.04 | * |
| Feed cost/kg gain | 2653.65$^{bc}$ | 2812.14$^{a}$ | 2696.96$^{b}$ | 2629.05$^{c}$ | 46.49 | * |
| Total cost of production | 5351.80$^{b}$ | 5354.60$^{b}$ | 5391.00$^{b}$ | 5480.60$^{a}$ | 24.04 | * |
| Revenue | 7706.25$^{b}$ | 7437.50$^{c}$ | 7716.25$^{b}$ | 7900.00$^{a}$ | 86.69 | * |
| Gross Margin | 2354.45$^{a}$ | 2082.90$^{b}$ | 2325.25$^{a}$ | 2419.40$^{a}$ | 66.39 | * |
| Benefit Cost Ratio | 1.44$^{b}$ | 1.39$^{a}$ | 1.43$^{b}$ | 1.44$^{b}$ | 0.01 | * |

*$^{a,b,c}$=Means with different superscripts along the same row are significantly different at p<0.05, SEM: standard error of mean; LOS: level of significance; * Significant difference; NS: Not significant; VTLM: velvet tamarind leaf meal.*

## CONCLUSIONS

The study showed that the inclusion of leaves of velvet tamarind improves returns in poultry investment and increases overall productivity.

## RECOMMENDATION

It is hereby recommended that velnet tamarind leaf meal may be added to broiler chickens diet at 7.5g/kg of feed for optimum productivity.

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