



Performance, Carcass Characteristics, Organ Weight, Haematological and Biochemical Indices and Feed-cost Benefits of Broiler Chickens Fed Guava (*Psidium guajava* L.) Leaf Meal Diet

By

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Abstract

A 49 day experiment was conducted to evaluate the response, carcass, organ and haematological characteristics, feed-cost-benefits of broiler birds fed Guava (*Psidium guajava* L.) leaf meal as partial substitution for maize. A total of 120 day old broiler chickens of Abor Acre Strain were randomly assigned to four (4) treatment diets having three replicates consisting of 10 birds each in a Completely Randomized Design. The dietary treatments were formulated such that Diets 1(Control), 2, 3, and 4 contained 0%, 7.5%, 15% and 22.5% Guava (*Psidium guajava* L.) leaf meal in broiler chicken diets respectively. They were fed and watered ad-libitum on a wood-shaving litter. Growth parameters such as feed intake, weight changes, feed-to-gain ratio were obtained while other parameters such as blood were determined in the laboratory according to the procedure. Body weight results differed ($P>0.05$) among treatment groups respectively. The results obtained were 1750.26g, 1700.07g, 1589.78g and 1539.76g ($P>0.05$), but birds fed Guava (*Psidium guajava* L.) leaf meal diet at 7.5% showed a better FCR 2.49 among the treatment groups. Carcass characteristics were significantly different ($P<0.05$) among the treatment groups with drumstick having highest values 18.30% and 18.10% at 0% and 7.5% respectively. All the carcass parameters had highest values at 0% followed by 7.5% inclusion level. Relative organ weights did not differ significantly ($P>0.05$). Haematological parameters differed significantly ($P<0.05$) except MCV, MCH and MCHC, but RBC values were highest in T_2 (7.5%) 2.97 μ l, WBC highest at T_2 (7.5%) 2.90 μ l, and Hb values highest at T_2 (7.5%) 11.12g/dl. Serum biochemical indices of broilers fed (*Psidium guajava* L.) leaf meal differed significantly ($P<0.05$) on all the parameters with protein having the highest values of 4.42g/dl at T_2 (7.5%), creatinine T^4 (22.5%) 0.74mg/dl. Feed-cost-benefit analysis showed that birds fed guava leaf meal at T_2 (7.5%) has the same cost-benefit-ratio of 3.51 in T_1 (0% control diet). It was concluded that Guava (*Psidium guajava* L.) leaf meal can partially substitute broiler chicken diets at 7.5%-15% inclusion level without adverse effects on growth performance, carcass characteristics, haematological and biochemical parameters.

Keywords: Broilers, Guava (*Psidium guajava* L.) Leaf meal, Carcass Characteristics, Haematology, Serum Biochemistry, Feed-Cost-Benefits.

Target Audience: Poultry Farmers, Animal Nutritionists

INTRODUCTION

The poultry sector is one of the most rapidly expanding areas of livestock production worldwide, playing a vital role in supplying animal protein, creating jobs, and generating income. Broiler farming, in particular, is recognized for its fast growth and efficient feed utilization. However, the

industry faces sustainability challenges due to the rising prices of conventional feed ingredients such as maize and soybean meal. Since feed expenses typically represent 60–70% of total production costs, there is growing interest in identifying alternative, affordable, and nutritionally valuable feed options.

In recent years, researchers have increasingly focused on phytogetic additives and unconventional feed sources,

especially leaf meals from tropical plants. Guava (*Psidium guajava*) leaf meal has attracted attention because it is inexpensive, widely available, and rich in bioactive compounds like flavonoids, tannins, saponins, and essential oils. These natural substances exhibit antimicrobial, antioxidant, and digestion-enhancing properties, which can improve nutrient absorption and overall bird performance (Abdelghani, 2023).

Evidence suggests that incorporating guava leaf meal (GLM) into broiler diets at moderate levels (1–4.5%) can enhance growth rate, feed intake, and feed conversion efficiency Morsy (2019) These benefits are linked to improved gut health, better digestion, and reduced harmful microbial activity in the digestive tract. GLM has also been associated with lower mortality rates and improved fat metabolism, without negatively affecting growth (Researchgate, 2023)

Carcass traits are key indicators of meat yield and quality in broiler production. Supplementation with guava leaf meal has been reported to increase protein deposition and reduce fat accumulation, likely due to its fiber content and bioactive compounds (Martinez, 2023) Similarly, haematological and serum biochemical parameters provide insights into bird health and metabolism. Studies show that guava leaf inclusion can raise haemoglobin levels, packed cell volume, and total protein, while lowering cholesterol, triglycerides, and glucose concentrations. These changes point to enhanced metabolic efficiency and stronger immune function (Researchgate, 2025).

From an economic perspective, guava leaf meal offers a cost-effective alternative to expensive feed ingredients, helping reduce production costs and improve profitability. Nevertheless, excessive inclusion may impair performance because of its high fiber content and potential anti-nutritional factors (Butt, 2025).

Although current findings are promising, comprehensive studies examining the combined effects of guava leaf meal on growth performance, carcass yield, blood parameters, and economic returns remain limited. This highlights the need for further research to fully understand its potential in broiler production.

Statement of the Problem

The rising cost and scarcity of conventional feed ingredients like maize and soybean meal hinder profitable broiler production, reducing productivity and increasing poultry product prices. This limits access to affordable animal protein in developing countries. Although alternative feed resources such as leaf meals have been studied, their use is constrained by limited data on nutritional value, inclusion levels, and health impacts. Guava leaf meal, despite its abundance and beneficial phytochemical properties, remains underutilized in poultry nutrition.

Justification

Alternative feed resources like leaf meals show potential but lack sufficient data on nutritional value, inclusion levels, and health effects. Guava leaf meal, though abundant and rich in

phytochemical properties, remains underutilized in poultry nutrition.

Objectives

- To evaluate the nutritional composition of guava leaf meal.
- Anti nutritional composition of guava leaf
- To determine its optimal inclusion level in broiler diets.
- To assess its effects on growth performance and health of broilers.
- To assess carcass characteristics and relative organ weight of broilers.
- Haematological and Serum Biochemical Indices of broilers fed guava leaf meal diet
- Feed-cost benefits

MATERIALS AND METHODS

Experimental site

The experiment was conducted at the Poultry Unit of the Teaching and Research Farm, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria. The area falls within the tropical rain forest zone with an annual rainfall of 2177mm, temperature range between 20-30° C, with relative humidity of 50-59%, depending on season (NRCRI, 2025).

Source and processing of Guava (*Psidium guajava*) leaf

Guava leaves are readily available in rural areas where guava trees are abundant. Fresh, mature and disease-free, contaminated-free guava leaves are harvested from in Osusu and Abayi both in Isialangwa North LGA of Abia State. The leaves were separated from the stalk, sorted to remove dirt, debris and damaged leave. They were washed with clean water to remove contaminants and sundried 3-5 days to reduce anti-nutritional factors, preserve nutrients, improve palatability and prevent mold growth till they were crispy while still retaining the green color. The dried crispy leaves are milled into powder using a hammer mill and used for compounding the broiler diets while the leaf meal was used for the anti-nutrient and proximate compositions according to the method of A.O.A.C (2012). Proximate fractions such as dry matter, moisture, crude protein, crude fiber, ether extract and ash were obtained.

Experimental birds and management

A total of 120 day-old broilers chicks were used for the experiment. They were purchased from a reputable farm hatchery Chi® at Ibadan., Oyo State, Nigeria. The environment was cleaned and disinfected before the arrival of the chicks. Feeding and drinking troughs were washed, disinfected and sundried. Electrical appliances were properly installed, checked and switched on few hours before the chicks arrived. Lanterns and stoves were provided as heat source and wood shavings used as litter materials. The initial weight of the birds were taken and randomly divided into 4 treatment groups with 10 birds per replicate, comprising 30 birds in each group, and the birds were brooded together with a 60W bulb and temperature regulated by observing the chicks behavior to determine whether to adjust heat sources. The chicks were given glucose and anti-stress to recover from

transportation stress. Each group was raised in floor pens with wood shavings as litter materials, feeders and drinkers were respectively provided for the supply of *ad libitum* feed and water for a duration of seven weeks. Biosecurity measures were maintained and the birds were vaccinated against Gumboro disease at 10th and 18th days of life while Newcastle vaccine was administered at the 28th day while Coccidiostat was administered in drinking water within the second week and third week of the experiment as routine

management practices. Other medications such as vitamins and antibiotics were administered.

Experimental diet formulation

Five (4) experimental broiler diets were formulated for the experiment. Diet (T₁) served as the control and contained 0% *Psidium guajava* leaf meal, while Diets T₂-T₄ contained *Psidium guajava* leaf meal, at 7.5%, 15% and 22.5% inclusion levels of *Psidium guajava* leaf meal respectively. Other constituents of the diets are and calculated analyses are shown in table 1 below:

Table 1: Dietary Composition of Broiler Diets showing percent substitution of *Psidium guajava* leaf meal in broiler chicken diets (0-7 weeks)

Ingredients (%)	T ₁ (0%)	T ₂ (7.5%)	T ₃ (15%)	T ₄ (22.5%)
Maize	51.00	50.00	48.20	46.80
<i>Psidium guajava</i> leaf meal	0.00	3.00	5.00	8.00
Rice bran	3.00	3.00	3.00	3.00
Soyabean Meal	17.18	16.00	16.48	14.88
Groundnut Cake	14.00	13.18	12.50	12.50
Fish Meal (Foreign)	5.00	5.00	5.00	5.00
Palm Kernel Meal	6.00	6.00	6.00	6.00
Bone Meal	3.00	3.00	3.00	3.00
Vitamin-mineral Premix	0.27	0.27	0.27	0.27
Salt	0.25	0.25	0.25	0.25
Methionine DL	0.15	0.15	0.15	0.15
Lysine	0.15	0.15	0.15	0.15
Total	100.00	100.00	100.00	100.00
<u>Calculated Analysis</u>				
Crude protein %	21.89	21.37	21.16	21.00
ME Kcal/Kg	2900.00	2880.23	2837.50	2800.10
<u>Analyzed composition</u>				
Dry matter %	88.20	89.10	88.50	88.00
Crude protein %	22.50	22.31	22.18	21.90
Crude fibre %	6.30	6.68	7.71	8.09
Ether extract %	6.10	6.01	5.90	5.69
Moisture %	10.80	11.20	10.34	10.25
NFE %	51.09	50.00	49.61	48.91
Ash	6.00	6.40	6.10	6.04
ME Kcal/kg	2900.93	2850.00	2790.00	2739.16

Vitamin-mineral premix supplied the following: Vitamin A 8,000,000 iu, Vitamin D₃ 2,000,000, Vitamin E 5,000mg, Vitamin K₃ 2,000mg,

Folic acid 500mg, Niacin 15,000mg, Vitamin B₂ 8,000mg, Vitamin B₁₂ 10,000mg, Vitamin B₁ 1,500mg, B₆ 1,500mg, Biotin 20mg, Calpan 5,000mg.

Table 2: Determined Proximate composition of *Psidium guajava*

Parameters	% Composition
Dry matter	88.80
Crude protein	17.94
Crude fat (Ether extract)	1.37
Crude fibre	10.00
Ash	4.39
Moisture	10.50
Nitrogen free extract	53.61
Metabolizable energy (Kcal/kg)	2587.20

The proximate composition of *Psidium guajava* meal revealed that the test ingredient possesses appreciable nutritional value and could serve as a useful unconventional feed resource in animal nutrition, particularly in poultry diets. The determined values include dry matter (88.80%), crude protein (17.94%), crude fat or ether extract (1.37%), crude fibre (10.00%), ash (4.39%), moisture (10.50%), nitrogen free extract (53.61%), and metabolizable energy (2587.20 kcal/kg).

The dry matter value of 88.80% indicates a relatively low water content and suggests good keeping quality and reduced chances of microbial spoilage during storage. Feed ingredients with high dry matter are desirable because they contain more concentrated nutrients and have improved shelf stability. This value agrees with reports that guava leaf meal possesses high dry matter content suitable for feed formulation (Ojediran et al., 2020).

The crude protein value of 17.94% shows that *Psidium guajava* meal contains a moderate amount of protein which may contribute to growth, tissue repair, enzyme synthesis, and overall productivity in animals. Although the protein content is lower than that of conventional protein sources such as soybean meal, it is considerably higher than many fibrous feed resources and agro-industrial by-products. This suggests that guava meal can contribute meaningfully to dietary protein requirements when included at appropriate levels. Similar findings were reported by Eze et al. (2015) who observed that guava leaf meal contains moderate protein capable of supporting poultry performance.

The ether extract value of 1.37% indicates that the material is low in lipid content. Low fat levels are advantageous in minimizing rancidity during storage and may improve feed stability. However, because fats are concentrated sources of

energy, the low ether extract suggests that guava meal alone may not provide substantial lipid-derived energy. Nevertheless, the little fat present may still contribute essential fatty acids and aid absorption of fat-soluble vitamins.

The crude fibre content of 10.00% suggests that the material contains a moderate quantity of structural carbohydrates such as cellulose and hemicellulose. Fibre is important for proper gastrointestinal function and gut motility, especially in ruminants. However, excessive fibre may reduce nutrient digestibility and feed utilization in monogastric animals such as broilers. The observed fibre level indicates that guava meal should be included at moderate dietary levels to avoid depressing feed intake and nutrient utilization. Previous studies have similarly reported moderate fibre levels in guava leaf meal used in poultry feeding trials.

The ash content of 4.39% reflects the total mineral composition of the feed ingredient. Minerals are essential for bone formation, enzyme activation, osmotic balance, and metabolic activities. The ash value indicates that *Psidium guajava* meal may provide useful macro- and micro-minerals needed for animal growth and development.

The moisture content of 10.50% further confirms the good storage quality of the feed material because feed ingredients with moisture levels below 12% are less susceptible to fungal growth and mycotoxin contamination. Proper drying before storage is therefore important to maintain nutrient quality and prolong shelf life.

The nitrogen free extract (NFE) value of 53.61% indicates that the ingredient is rich in soluble carbohydrates, which serve as major energy sources for animals. High NFE values usually suggest the presence of digestible carbohydrates that can support energy metabolism and growth performance. This relatively high carbohydrate fraction may partly explain the favorable metabolizable energy value obtained.

The metabolizable energy value of 2587.20 kcal/kg shows that *Psidium guajava* meal can contribute substantially to the energy needs of livestock and poultry. Although lower than maize, which is a conventional energy feedstuff, the energy level is adequate enough to support partial replacement strategies in feed formulation. The combined presence of moderate protein, adequate carbohydrates, and acceptable energy value makes guava meal a potentially valuable unconventional feed ingredient.

Table 3: Determined anti-nutritional factors of *Psidium guajava*

Parameters	% Composition
Saponin	0.04
Tannins	0.33
Flavonoids	0.33
Cyaogenic glycosides	0.22
Oxalate	0.09

Alkaloids	0.33
Phytate	0.32

Data Collection**Growth performance**

Data on performance characteristics such as average initial weight, average weight, average feed intake, were collected while average weight gain, feed conversion ratio, daily protein intake and protein efficiency ratio calculated.

Carcass evaluation

At the end of the experiment, two (2) birds of similar body weight were selected from the treatment groups, fasted, weighed and slaughtered by severing the jugular vein. They were thoroughly bled and scalded by dipping in hot water of 60°C and defeathered. The carcass values from head, shank, neck and visceral were removed in order to determine the dressed weight as described by Ojewola and Longe (1999).

Dressing % = $\frac{\text{Dressed weight}}{\text{Live weight}} \times 100$

Live weight 1

Organs = $\frac{\text{Heart/liver/kidney/intestine/proventriculus}}{\text{Live weight}} \times 100$

Live weight 1

Haematological indices

Blood samples (10mls) were taken from the jugular vein of each of the birds under each of the treatment diets at the end of the experiments using sterile needle and syringe to withdraw the blood; from which 5mls each were kept in a sample containing Ethylene Diamine Tetra Acetic Acid (EDTA) (Alcorn, 2002) an anti-coagulant to prevent blood clotting. Each of the blood samples collected were put into properly labelled and sterilized tube and taken to the laboratory for haematological assessment. The following were determined; Packed Cell Volume (PCV), Red Blood Cells (RBC)- was determined using the methods as described by Sood, (2006). White Blood Cells (RBC), Haemoglobin (Hb), Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH), Mean Corpuscular Haemoglobin Concentration (MCHC) Baker and Silverton (1985).

Mean Corpuscular Haemoglobin (MCH)

$\frac{\text{Hb} \times 10}{\text{RBC}}$

RBC

Mean Corpuscular Volume (MCV)

$\frac{\text{PCV} \times 10}{\text{RBC}}$

RBC

Mean Corpuscular Haemoglobin Concentration (MCHC)

$\frac{\text{Hb} \times 100}{\text{PCV}}$

PCV

Serum Biochemical Indices

Total Protein = Biuret Method

Glucose = Glucose Oxidase Method

Albumin (g/dL) = $\frac{A_{\text{sample}}}{A_{\text{standard}}} \times \text{Albumin Standard}$

Creatine = (mg/dL) = $\frac{A_{\text{sample}}}{A_{\text{standard}}} \times \text{Creatinine Standard}$

Cholesterol = (mg/dL) = $\frac{A_{\text{sample}}}{A_{\text{standard}}} \times 200$

Urea (mg/dL) = $\frac{A_{\text{sample}}}{A_{\text{standard}}} \times \text{Urea Standard}$

Total Bilirubin (mg/dL) = $\frac{A_{\text{sample}}}{A_{\text{standard}}} \times \text{Bilirubin Standard}$

Globulin (g/dL) = Total Protein- Albumin

***Where**

A_{sample} = Absorbance(optical density) of the sample

A_{standard} = Absorbance of the standard

Feed-cost Benefits

The following parameters were determined:

Feed Cost/kg (#kg) = Total cost of ingredients used to formulate 1kg of feed

Total Feed Intake (kg/bird) = Total quantity of feed consumed by each bird during the experimental period

Total Feed Cost per/bird = Feed Intake (kg) x Cost of Feed (#kg)

Selling Price = The market price of live broilers

Feed Cost per Kilogram Weight Gain (#kg gain) = $\frac{\text{Total Feed Cost per bird}}{\text{Weight Gain (kg)}}$

Gross Return (#/bird) = Income obtained from selling each bird

Benefit-Cost-Ratio (BCR) = $\frac{\text{Gross Return}}{\text{Total Feed Cost}}$

Statistical Analysis

All data generated were statistically analysed using the Analysis of Variance (ANOVA) procedure described by Steel and Torrie (1980) in a Completely Randomized Design (CRD), and significant means were separated using Duncan Multiple Range Test (Duncan, 1995) taking P<0.05 as significance level.

Results and Discussions

Table 4: Growth Performance of broiler chickens fed (*Psidium guajava* L.) leaf meal for in broiler chicken diets

Parameter (g)	T ₁ (0%)	T ₂ (7.5%)	T ₃ (15%)	T ₄ (22.5%)	SEM
Initial W	39.98	40.31	40.48	40.35	0.16
Final W	1790.24 ^a	1740.38 ^a	1630.26 ^b	1580.11 ^c	17.84
Total W	1750.26 ^a	1700.07 ^a	1589.78 ^b	1539.76 ^c	17.86
ADW	35.72 ^a	34.70 ^a	32.44 ^b	31.42 ^c	0.36
TFI	4311.22 ^b	4228.10 ^b	4400.02 ^{ab}	4510.34 ^a	42.15
ADFI	87.98 ^b	86.29 ^b	89.80 ^{ab}	92.05 ^a	0.86
FCR	2.46 ^c	2.49 ^c	2.77 ^b	2.93 ^a	0.05
DPI	19.26 ^a	18.44 ^b	19.00 ^{ab}	19.33 ^a	0.18
PER	1.85 ^a	1.89 ^a	1.70 ^b	1.62 ^c	0.03

^{a,b,c} Means within the rows with different superscripts are significantly different ($P < 0.05$); SEM=Standard error of mean. FW:Final Weight; TW: Total Weight ; ADW: Average Daily Weight; ADFI: Average Daily

Discussion of Growth Performance of Broiler Chickens Fed Graded Levels of Guava (*Psidium guajava*) Seed Meal

The results showed that dietary inclusion of guava seed meal had a significant influence on the growth performance of broiler chickens. Birds fed the control diet containing 0% guava seed meal (T₁) recorded the highest final body weight (1790.24 g) and total weight gain (1750.26 g), although these values were statistically similar to those obtained from birds fed 7.5% guava seed meal (T₂), which attained a final body weight of 1740.38 g and total weight gain of 1700.07 g. However, increasing the inclusion level to 15% (T₃) and 22.5% (T₄) significantly reduced final body weight to 1630.26 g and 1580.11 g, respectively. Likewise, total weight gain declined to 1589.78 g and 1539.76 g in T₃ and T₄. These findings suggest that guava seed meal can be included at moderate levels without adversely affecting growth, whereas higher inclusion levels may reduce nutrient utilization due to increased fibre content and the presence of residual anti-nutritional factors. Similar observations have been reported by Marchal *et al.* (2024), who noted that excessive replacement of conventional protein sources with alternative plant ingredients may reduce growth performance if nutrient digestibility is compromised.

Average daily weight gain followed the same trend observed for final body weight. Birds fed the control diet and those receiving 7.5% guava seed meal recorded average daily gains of 35.72 g and 34.70 g, respectively, while birds fed 15% and 22.5% guava seed meal recorded significantly lower values of 32.44 g and 31.42 g, respectively. The reduction in daily weight gain at higher inclusion levels indicates that increasing dietary guava seed meal beyond the optimum level may reduce nutrient availability for tissue growth. According to Blandon Martínez *et al.* (2025), moderate dietary incorporation of guava-derived feed ingredients supports normal broiler growth, whereas excessive inclusion may limit metabolizable energy utilization because of increased structural carbohydrates.

Feed intake showed an increasing trend with increasing dietary guava seed meal. Birds fed 22.5% guava seed meal (T₄) consumed the highest quantity of feed (4510.34 g or 92.05 g/day), whereas birds fed 7.5% guava seed meal (T₂) consumed the least (4228.10 g or 86.29 g/day). Despite consuming more feed, birds receiving the highest inclusion level produced the lowest body weight. This suggests that the additional feed consumed was not efficiently converted into body tissue, possibly because of reduced nutrient digestibility or lower dietary energy availability. Anand (2025) reported that increased feed consumption accompanied by reduced weight gain is often an indication of poor feed utilization when unconventional plant feed resources are incorporated beyond their optimum inclusion levels.

Feed conversion ratio (FCR) deteriorated as the inclusion level of guava seed meal increased. Birds fed the control diet recorded the best FCR (2.46), closely followed by birds fed 7.5% guava seed meal (2.49). In contrast, FCR increased to 2.77 and 2.93 in birds fed 15% and 22.5% guava seed meal, respectively. Since lower FCR values indicate superior feed utilization, the results demonstrate that birds receiving 0% and 7.5% guava seed meal converted feed into body weight more efficiently than birds fed the higher inclusion levels. Similar findings were reported by Marchal *et al.* (2024), who observed that excessive substitution of soybean meal with alternative plant protein sources reduced feed efficiency because of lower nutrient digestibility.

Daily protein intake ranged from 18.44 g/day in birds fed 7.5% guava seed meal to 19.33 g/day in birds fed 22.5% guava seed meal. However, despite consuming slightly more protein, birds fed 22.5% guava seed meal recorded the lowest protein efficiency ratio (1.62), while birds fed 7.5% guava seed meal achieved the highest value (1.89). Similarly, birds fed the control diet recorded a protein efficiency ratio of 1.85, whereas those fed 15% guava seed meal recorded 1.70. These findings indicate that increasing protein intake alone does not guarantee improved growth unless the dietary protein is

efficiently digested and utilized. Efficient protein utilization depends on amino acid availability, nutrient balance and digestibility of the diet (Kperun *et al.*, 2025). Overall, the results demonstrate that dietary inclusion of guava seed meal up to 7.5% supported growth performance comparable to the control diet, while higher inclusion levels of 15% and 22.5%

progressively reduced weight gain, feed efficiency and protein utilization. Therefore, 7.5% guava seed meal appears to be the optimum inclusion level for broiler chickens under the conditions of this study because it maintained satisfactory growth performance without the adverse effects associated with higher dietary inclusion levels.

Table 5: Carcass Characteristics and Relative Organ Weight of Broiler Chickens fed (*Psidium guajava*) leaf meal diets

Parameters (%)	T ₁ (0%)	T ₂ (7.5%)	T ₃ (15%)	T ₄ (22.5%)	SEM
Live Weight (g/b)	1790.24 ^a	1740.38 ^a	1630.26 ^b	1580.11 ^c	18.42
Defeathered Weight (g/b)	1642.83 ^a	1598.50 ^a	1495.40 ^b	1448.22 ^c	16.35
Dressed Weight (g/b)	1298.60 ^a	1264.20 ^a	1179.10 ^b	1138.40 ^c	14.12
Dressing %	72.54 ^a	72.64 ^a	72.33 ^a	72.05 ^a	0.34
Back cut	28.20 ^a	28.00 ^{ab}	27.60 ^b	27.20 ^b	0.21
Thigh	20.10 ^a	19.90 ^a	19.40 ^b	19.00 ^b	0.18
Drumstick	18.30 ^a	18.10 ^a	17.70 ^b	17.30 ^b	0.16
Wings	15.00 ^a	14.80 ^a	14.40 ^b	14.10 ^b	0.14
Breast	31.40 ^a	31.10 ^a	30.40 ^b	29.80 ^c	0.27
Liver	2.30	2.34	2.39	2.45	0.04
Lungs	0.63	0.64	0.65	0.66	0.02
Kidney	0.58	0.59	0.60	0.61	0.01
Pancreas	0.29	0.30	0.31	0.32	0.01
Spleen	0.14	0.14	0.15	0.15	0.01

^{a,b,c}, Means within the rows with different superscripts are significantly different ($P < 0.05$); SEM-Standard Error of mean.

Discussion of Carcass and Organ Characteristics of Broiler Chickens Fed Graded Levels of *Psidium guajava* Leaf Meal

The carcass characteristics of broiler chickens were influenced by the dietary inclusion of *Psidium guajava* leaf meal. Birds fed the control diet containing 0% guava leaf meal (T₁) recorded the highest live weight (1790.24 g), although this value was statistically comparable to birds fed 7.5% guava leaf meal (T₂) with a live weight of 1740.38 g. However, increasing the inclusion level to 15% (T₃) and 22.5% (T₄) significantly reduced live weight to 1630.26 g and 1580.11 g, respectively. This trend reflects the reduction in growth performance observed at the higher inclusion levels and suggests that excessive dietary guava leaf meal may reduce nutrient utilization because of its fibre content and other phytochemical constituents. Similar reductions in body weight have been reported when conventional protein sources were extensively replaced with alternative plant materials in broiler diets (Marchal *et al.*, 2024).

Defeathered weight and dressed weight followed the same pattern as live weight. Birds fed 0% and 7.5% guava leaf meal produced the highest defeathered weights (1642.83 g and 1598.50 g) and dressed weights (1298.60 g and 1264.20 g), whereas birds fed 22.5% guava leaf meal recorded the lowest defeathered (1448.22 g) and dressed (1138.40 g) weights. Since dressed weight is an important indicator of edible meat yield, the reduction observed at 15% and 22.5% inclusion

suggests that higher dietary levels of guava leaf meal reduced muscle deposition. This observation is consistent with reports that high inclusion of fibrous plant ingredients may reduce carcass weight through lower nutrient digestibility and amino acid availability (Marchal *et al.*, 2024).

Dressing percentage remained relatively stable, varying only from 72.05% to 72.64%, and did not differ significantly among the dietary treatments. This indicates that although absolute carcass weight declined with increasing guava leaf meal inclusion, the proportion of dressed carcass relative to live weight remained relatively constant. Comparable findings were reported by Abang *et al.* (2025), who observed that supplementation with dried guava leaf meal did not significantly affect dressing percentage or overall carcass yield in broiler chickens.

The major commercial carcass cuts showed a gradual decline as the inclusion level increased. Birds fed the control diet recorded the highest back cut (28.20%), thigh (20.10%), drumstick (18.30%), wing (15.00%) and breast (31.40%) yields, while birds fed 22.5% guava leaf meal recorded the lowest values of 27.20%, 19.00%, 17.30%, 14.10% and 29.80%, respectively. The reduced values agree with the reports of Isaac (2022) in his research who reported reduced values on drumstick, wings when maize stover and mycotoxin binder (Toxidex®) were fed to broiler chickens. The reduction in breast yield is particularly important because breast meat is the most valuable portion of the broiler carcass. The relatively similar values observed in birds fed 7.5% guava leaf meal indicate that moderate inclusion did not adversely affect carcass quality, whereas higher inclusion levels reduced muscle deposition. Recent investigations involving guava leaf

meal have similarly shown that moderate supplementation maintains acceptable carcass characteristics without detrimental effects on commercially valuable cuts.

The relative weights of the liver, lungs, kidneys, pancreas and spleen were not significantly affected by dietary treatment. Liver values ranged from 2.30% in the control birds to 2.45% in birds fed 22.5% guava leaf meal, while the lungs, kidneys, pancreas and spleen showed only slight numerical variations across treatments. The absence of significant differences in these visceral organs indicates that dietary guava leaf meal did not induce enlargement or shrinkage of metabolically active organs, suggesting that the diets were physiologically safe for the birds. Stable organ weights generally indicate that dietary ingredients do not exert toxic effects or impose excessive metabolic stress on internal organs. Similar findings have been reported for broilers receiving dietary guava leaf meal, where organ characteristics remained unaffected despite dietary supplementation.

Overall, the present study demonstrates that inclusion of 7.5% *Psidium guajava* leaf meal maintained carcass yield and organ development comparable to the control diet, whereas increasing the inclusion level to 15% and 22.5% reduced live weight, dressed weight and the yields of economically important carcass cuts. Nevertheless, the absence of significant changes in the internal organs suggests that guava leaf meal did not adversely affect the physiological health of the broiler chickens.

Table 6: Haematological indices of Broiler Chickens fed Guava (*Psidium guajava*) leaf meal

Parameters	T ₁ (0%)	T ₂ (7.5%)	T ₃ (15%)	T ₄ (22.5%)	SE M
RBC ($\times 10^6/\mu\text{l}$)	2.93 ^a	2.97 ^a	2.84 ^b	2.75 ^c	0.03
WBC ($\times 10^3/\mu\text{l}$)	2.70 ^{ab}	2.90 ^a	2.60 ^b	2.40 ^c	0.07
Hb (g/dl)	10.90 ^a	11.12 ^a	10.55 ^b	10.22 ^c	0.11
MCV (fl)	115.40	115.82	114.79	114.18	0.58
MCH (pg)	37.20	37.41	37.30	36.98	0.19
MCHC (g/dl)	32.25	32.33	37.15	32.55	0.17
PCV (%)	33.80 ^a	34.40 ^a	32.60 ^b	31.40 ^c	0.36

^{a,b,c} Means within the rows with different superscripts are significantly different ($P < 0.05$); SEM-Standard Error of the mean. PCV: Packed Cell Volume; Hb: Haemoglobin; RBC: Red Blood Cell; WBC: White Blood Cell; MCV: Mean Cell Volume; MCH: Mean Cell Haemoglobin; MCHC: Mean Cellular Haemoglobin Concentration.

Discussion of Haematological Indices of Broiler Chickens Fed Graded Levels of *Psidium guajava* Leaf Meal

The haematological profile of broiler chickens provides valuable information on the physiological, nutritional and health status of birds in response to dietary treatments. In the present study, dietary inclusion of *Psidium guajava* leaf meal significantly influenced red blood cell (RBC), white blood cell (WBC), haemoglobin (Hb) and packed cell volume (PCV), whereas mean corpuscular volume (MCV), mean

corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were not significantly affected.

Red blood cell count increased slightly from $2.93 \times 10^6/\mu\text{L}$ in birds fed the control diet (0% guava leaf meal) to $2.97 \times 10^6/\mu\text{L}$ in birds fed 7.5% guava leaf meal, before declining to $2.84 \times 10^6/\mu\text{L}$ and $2.75 \times 10^6/\mu\text{L}$ at 15% and 22.5% inclusion levels, respectively. The higher RBC value obtained at 7.5% inclusion suggests improved erythropoiesis and oxygen transport, which may have contributed to the better growth performance observed in this treatment. The subsequent decline at higher inclusion levels may be associated with reduced nutrient utilization resulting from increased dietary fibre and other phytochemical constituents present in guava leaves. Nevertheless, all RBC values remained within the normal physiological range for healthy broiler chickens, indicating that the diets did not induce anaemia or adversely affect blood formation (Marchal *et al.*, 2024; Blandon Martínez *et al.*, 2025).

White blood cell count also differed significantly among the dietary treatments. Birds fed 7.5% guava leaf meal recorded the highest WBC value ($2.9 \times 10^4/\mu\text{L}$), followed by the control diet ($2.7 \times 10^4/\mu\text{L}$), whereas birds receiving 22.5% guava leaf meal recorded the lowest value ($2.4 \times 10^4/\mu\text{L}$). White blood cells are essential components of the immune system, and moderate increases in WBC generally indicate enhanced immune responsiveness. The relatively higher WBC observed at 7.5% inclusion may be attributed to the antioxidant and bioactive compounds naturally present in guava leaves, including flavonoids and phenolic compounds, which have been reported to support immune function. The lower values recorded at higher inclusion levels may indicate that excessive dietary inclusion did not provide additional physiological benefits. However, all values remained within acceptable physiological limits, suggesting that the birds maintained normal immune status throughout the experiment (Kperun *et al.*, 2025; Alshammari *et al.*, 2025).

Haemoglobin concentration followed the same pattern as RBC. Birds fed 7.5% guava leaf meal had the highest haemoglobin concentration (11.12 g/dL), while those fed 22.5% guava leaf meal recorded the lowest value (10.22 g/dL). Similar trends were observed for packed cell volume, which ranged from 34.40% in birds fed 7.5% guava leaf meal to 31.40% in birds receiving 22.5% inclusion. Since haemoglobin concentration and packed cell volume are closely associated with oxygen transport and tissue metabolism, the higher values recorded at 7.5% inclusion indicate improved physiological status and efficient nutrient utilization. The slight reductions observed at higher inclusion levels are likely attributable to reduced digestibility associated with increasing fibre content rather than any pathological condition, because the values remained within normal reference ranges for broiler chickens (Blandon Martínez *et al.*, 2025).

The erythrocyte indices (MCV, MCH and MCHC) were not significantly influenced by dietary guava leaf meal. MCV

varied only slightly from 115.40 fL in the control birds to 114.18 fL at 22.5% inclusion, while MCH ranged from 36.98 to 37.41 pg and MCHC from 32.25 to 32.55 g/dL. The stability of these indices indicates that dietary guava leaf meal did not alter red blood cell size, haemoglobin content or haemoglobin concentration within erythrocytes. This finding suggests that the diets supported normal erythrocyte morphology and did not induce macrocytic or microcytic changes. Similar observations have been reported in broiler chickens receiving phytogetic leaf meals, where erythrocyte indices remained stable despite dietary supplementation (Alshammari *et al.*, 2025; Marchal *et al.*, 2024).

Overall, the haematological results demonstrate that dietary inclusion of *Psidium guajava* leaf meal up to 7.5% improved blood quality and supported normal physiological function, as evidenced by the highest RBC ($2.97 \times 10^6/\mu\text{L}$), WBC ($2.9 \times 10^4/\mu\text{L}$), haemoglobin (11.12 g/dL) and packed cell volume (34.40%). Although slight reductions occurred at 15% and 22.5% inclusion levels, all haematological values remained within normal physiological ranges, indicating that guava leaf meal did not adversely affect the health status of the broiler chickens.

Table 7: Serum biochemical indices of Broiler Chickens fed Guava (*Psidium guajava*) leaf meal diets

Parameters	T ₁ (0%)	T ₂ (7.5%)	T ₃ (15%)	T ₄ (22.5%)	SEM
Pro (g/dl)	4.18 ^B	4.42 ^a	4.08 ^b	3.92 ^c	0.07
Glu (mg/dl)	219.40 ^a	214.82 ^a	206.31 ^b	198.26 ^c	3.12
Alb (g/dl)	2.31 ^{ab}	2.42 ^a	2.24 ^b	2.10 ^c	0.04
Glo (g/dl)	1.87 ^B	2.00 ^a	1.84 ^b	1.82 ^b	0.05
Cre (mg/dl)	0.64 ^B	0.62 ^b	0.69 ^a	0.74 ^a	0.02
Chol (mg/dl)	146.32 ^a	138.15 ^b	131.44 ^c	126.80 ^d	2.21
Ur (mg/dl)	5.62 ^b	5.48 ^b	5.91 ^a	6.23 ^a	0.10
Bil (mg/dl)	0.36	0.35	0.37	0.38	0.01

^{a,b,c,d} Means within the rows with different superscripts are significantly different ($P < 0.05$); SEM-Standard Error of the mean. Pro=Protein, Glu=Glucose, Alb=Albumin; Glo=Globulin; Cre=Creatinine; Chol=Cholesterol; Ur=Urea, Bil=Bilirubin

Discussion of Serum Biochemical Indices of Broiler Chickens Fed Graded Levels of *Psidium guajava* Leaf Meal

The serum biochemical profile of broiler chickens is a reliable indicator of nutrient metabolism, liver function, kidney function and the overall physiological status of birds. In the present study, dietary inclusion of *Psidium guajava* leaf meal significantly affected total protein, glucose, albumin, globulin, creatinine, cholesterol and urea concentrations, whereas bilirubin was not significantly influenced by the dietary treatments.

Serum total protein increased from 4.18 g/dL in birds fed the control diet (0% guava leaf meal) to 4.42 g/dL in birds receiving 7.5% guava leaf meal, after which it declined to

4.08 g/dL and 3.92 g/dL at 15% and 22.5% inclusion levels, respectively. The higher total protein concentration observed at 7.5% inclusion suggests improved protein digestion, absorption and utilization, which agrees with the superior growth performance and protein efficiency ratio recorded for this treatment. The decline observed at the higher inclusion levels may be associated with increasing dietary fibre and phytochemical concentrations, which could reduce nutrient availability when included above the optimum level. Similar responses have been reported in broilers fed phytogetic leaf meals, where moderate supplementation enhanced protein metabolism without causing adverse physiological effects (Chidi *et al.*, 2024; Blandon Martínez *et al.*, 2025).

Albumin followed a similar trend, increasing from 2.31 g/dL in the control birds to 2.42 g/dL at 7.5% guava leaf meal, before declining to 2.24 g/dL and 2.10 g/dL at 15% and 22.5%, respectively. Globulin also reached its highest value (2.00 g/dL) in birds fed 7.5% guava leaf meal. Albumin reflects the protein-synthesizing capacity of the liver, while globulin is closely associated with immune function. Therefore, the higher values recorded at 7.5% inclusion indicate that moderate supplementation with guava leaf meal supported normal liver activity and immune competence. The slight reduction at higher inclusion levels may reflect lower dietary protein utilization rather than pathological changes because the values remained within the normal physiological range for broiler chickens (Blandon Martínez *et al.*, 2025; Olayinka *et al.*, 2025).

Serum glucose decreased progressively as the inclusion level of guava leaf meal increased. Birds fed the control diet recorded the highest glucose concentration (219.40 mg/dL), while birds fed 22.5% guava leaf meal recorded the lowest value (198.26 mg/dL). This gradual reduction may be attributed to the hypoglycaemic properties of guava leaves, which contain flavonoids, tannins and other bioactive compounds capable of improving glucose metabolism. The reduction observed in the present study suggests that dietary guava leaf meal may contribute to better regulation of carbohydrate metabolism without causing hypoglycaemia. Similar glucose-lowering effects of phytogetic leaf meals have been reported in recent poultry nutrition studies (Blandon Martínez *et al.*, 2025; Safiyu *et al.*, 2025).

A notable finding of the present study was the progressive reduction in serum cholesterol from 146.32 mg/dL in the control treatment to 138.15 mg/dL, 131.44 mg/dL and 126.80 mg/dL in birds fed 7.5%, 15% and 22.5% guava leaf meal, respectively. This indicates that increasing dietary guava leaf meal reduced circulating cholesterol concentrations. Guava leaves are rich in polyphenols, flavonoids and dietary fibre, which are known to influence lipid metabolism by reducing cholesterol synthesis and enhancing lipid utilization. Lower serum cholesterol is generally considered beneficial because it reflects improved lipid metabolism and may contribute to healthier poultry meat. Similar cholesterol-lowering effects have been reported in broilers receiving phytogetic leaf meals and herbal feed additives (Blandon Martínez *et al.*, 2025; Chidi *et al.*, 2024).

Serum creatinine increased slightly from 0.64 mg/dL in the control treatment to 0.74 mg/dL at 22.5% inclusion, while urea increased from 5.62 mg/dL to 6.23 mg/dL over the same dietary range. Although these increases were statistically significant, the values remained within the normal physiological limits reported for healthy broiler chickens. This indicates that dietary guava leaf meal did not impair renal function. Slight elevations in creatinine and urea at higher dietary inclusion levels may simply reflect differences in protein metabolism rather than kidney dysfunction. Similar observations have been reported in studies involving phytogetic leaf meals where serum metabolites remained within acceptable physiological ranges despite significant dietary effects (Olayinka *et al.*, 2025; Aka-Tanimo *et al.*, 2024).

Serum bilirubin showed no significant differences among treatments, varying only from 0.35 to 0.38 mg/dL. Bilirubin is commonly used as an indicator of liver integrity and red blood cell breakdown. The absence of significant variation suggests that dietary guava leaf meal did not adversely affect hepatic function or erythrocyte stability. This observation further supports the safety of guava leaf meal as a feed ingredient for broiler chickens when incorporated at the inclusion levels used in this study (Safiyu *et al.*, 2025). Isaac *et al.* (2026) in his experiment with *Dacryodes edulis* seed meal fed to broiler chickens also reported no significant differences in bilirubin among treatments groups showing no adverse effects on liver function or red blood cell of the birds to *Dacryodes edulis* seed meal.

Overall, the serum biochemical profile demonstrates that 7.5% dietary inclusion of *Psidium guajava* leaf meal produced the most favourable metabolic response, as evidenced by the highest total protein (4.42 g/dL), albumin (2.42 g/dL) and globulin (2.00 g/dL) concentrations while maintaining lower serum glucose and cholesterol levels than the control diet. Increasing the inclusion level beyond 7.5% gradually reduced protein-related metabolites and slightly increased creatinine and urea, although all values remained within normal physiological limits. These findings indicate that moderate dietary inclusion of guava leaf meal improves protein metabolism and lipid utilization without compromising liver or kidney function, whereas higher inclusion levels may reduce nutrient utilization because of increased dietary fibre and phytochemical concentrations.

Table 7: Feed-Cost-Benefits of Broiler Chickens fed *Psidium guajava* leaf meal diet

Parameters	T ₁ (0%)	T ₂ (7.5%)	T ₃ (15%)	T ₄ (22.5%)	SEM
Feed Cost /kg feed (₹/kg)	825.00 ^a	808.00 ^b	790.00 ^c	772.00 ^d	4.82
Total Feed Intake (kg/bird)	4.311	4.228	4.400	4.510	0.06
Total Feed Cost/bird (₹)	3,556.74 ^a	3,416.25 ^b	3,476.02 ^b	3,481.98 ^b	38.44
Selling Price/bird (₹)	12,500.00 ^a	12,000.00 ^a	11,000.00 ^b	10,500.00 ^c	185.30
Net Revenue over feed cost (₹/bird)	8,943.26 ^a	8,583.75 ^a	7,523.98 ^b	7,018.02 ^c	163.74
Feed Cost/kg Weight	2,032.42 ^b	2,009.56 ^b	2,186.18 ^a	2,261.03 ^a	30.52
Benefit-Cost-Ratio	3.51 ^a	3.51 ^a	3.16 ^b	3.02 ^c	0.05

^{a,b,c,d,e} Means within the rows with different superscripts are significantly different ($P < 0.05$); SEM-Standard Error of the mean. Feed Cost(FC), Total Feed Intake (TFI), Total Feed Cost (TFC), Selling Price (SP), Gross Profit (GP), Cost-Benefit Ratio (CBR)

Discussion of Feed Cost-Benefit Analysis of Broiler Chickens Fed Graded Levels of *Psidium guajava* Leaf Meal

Feed cost constitutes the largest proportion of the total cost of broiler production; therefore, the economic value of any alternative feed ingredient depends on its ability to reduce production cost without adversely affecting bird performance. In the present study, dietary inclusion of *Psidium guajava* leaf meal significantly influenced most of the economic indices evaluated.

The cost of feed per kilogram decreased progressively from ₹825.00/kg in the control diet (0% guava leaf meal) to ₹808.00/kg, ₹790.00/kg and ₹772.00/kg in birds fed 7.5%, 15% and 22.5% guava leaf meal, respectively. This reduction reflects the replacement of relatively expensive conventional feed ingredients with the less costly guava leaf meal. The findings indicate that increasing the inclusion level of guava leaf meal can lower feed manufacturing costs, thereby improving the affordability of broiler production. Similar reductions in feed cost have been reported for broiler diets containing guava-based feed resources and other unconventional leaf meals used as partial replacements for conventional ingredients (Daing *et al.*, 2020; Ogbuewu & Mbajorgu, 2024).

Although feed cost per kilogram declined with increasing dietary guava leaf meal, total feed intake was not significantly different among treatments, varying from 4.228 kg/bird in birds fed 7.5% guava leaf meal to 4.510 kg/bird in birds fed 22.5% inclusion. The absence of significant differences in feed intake suggests that the inclusion of guava leaf meal did not adversely affect diet acceptability or palatability. This agrees with reports that moderate inclusion of guava-derived feed ingredients generally maintains normal feed consumption in broiler chickens (Ogbuewu & Mbajorgu, 2024).

Total feed cost per bird was highest in the control treatment

(₦3,556.74) and lowest in birds fed 7.5% guava leaf meal (₦3,416.25). Although birds receiving 15% and 22.5% guava leaf meal consumed diets with lower unit cost, their total feed costs remained comparable because they consumed slightly more feed than birds in the lower inclusion levels. This observation demonstrates that reducing feed cost alone may not necessarily produce maximum economic returns unless growth performance is simultaneously maintained.

Feed cost per kilogram of weight gain is one of the most reliable indicators of production efficiency. Birds fed 7.5% guava leaf meal recorded the lowest feed cost per kilogram of weight gain (₦2,009.56), followed closely by the control birds (₦2,032.42). In contrast, birds fed 15% and 22.5% guava leaf meal recorded significantly higher values of ₦2,186.18 and ₦2,261.03, respectively. These results indicate that although higher dietary inclusion reduced feed price, poorer growth performance reduced feed-use efficiency and increased the cost of producing one kilogram of live weight. Similar observations have been reported in studies evaluating guava leaf meal and other tropical leaf meals, where excessive inclusion reduced biological efficiency despite lowering feed cost (Daing *et al.*, 2020; Ogbuewu & Mbajorgu, 2024).

Estimated selling price reflected the live weights obtained in the present study. Birds fed the control diet and 7.5% guava leaf meal attracted higher market values of ₦12,500.00 and ₦12,000.00 per bird, respectively, whereas birds fed 15% and 22.5% inclusion were valued at ₦11,000.00 and ₦10,500.00, respectively. Since broiler chickens are commonly sold on the basis of live weight, heavier birds generally command higher market prices. Consequently, the superior body weights obtained at 0% and 7.5% inclusion translated directly into higher gross revenue.

Net revenue over feed cost followed a similar pattern. Birds fed the control diet generated the highest return (₦8,943.26/bird), although this was statistically comparable to birds fed 7.5% guava leaf meal, which returned ₦8,583.75/bird. However, net revenue declined significantly to ₦7,523.98 and ₦7,018.02 in birds fed 15% and 22.5% guava leaf meal, respectively. This reduction demonstrates that the savings achieved through lower feed cost at higher inclusion levels were offset by reduced weight gain and lower market value of the birds. The benefit-cost ratio further confirmed the economic advantage of moderate dietary inclusion. Birds fed 7.5% guava leaf meal recorded the highest benefit-cost ratio (3.51), which was comparable with the control treatment (3.51) but significantly higher than birds fed 15% (3.16) and 22.5% (3.02) guava leaf meal. A higher benefit-cost ratio indicates greater financial return for every naira invested in feed. Therefore, the present findings demonstrate that inclusion of 7.5% *Psidium guajava* leaf meal provided the most favourable balance between feed cost reduction and productive performance. Beyond this level, reductions in growth performance outweighed the economic advantage gained from cheaper diets.

Overall, the economic evaluation indicates that while increasing dietary guava leaf meal reduced feed

manufacturing cost, the optimum economic return was achieved at 7.5% inclusion, where birds maintained satisfactory growth performance, efficient feed utilization and high market value. Inclusion levels of 15% and 22.5%, although less expensive to formulate, reduced profitability because of lower body weight and poorer feed conversion efficiency. Therefore, based on both biological performance and economic returns, 7.5% *Psidium guajava* leaf meal is recommended as the optimum inclusion level for broiler chicken production under the conditions of this study.

CONCLUSION

The findings of this study demonstrated that dietary inclusion of *Psidium guajava* (guava) leaf meal had significant effects on the growth performance, carcass characteristics, haematological indices, serum biochemical parameters and economic performance of broiler chickens. Birds fed 7.5% guava leaf meal (T₂) consistently produced results comparable to, and in some cases better than, the control diet. This treatment recorded favourable body weight gain, feed conversion ratio, protein utilization, carcass yield, haematological profile and serum biochemical characteristics while also achieving the highest economic return in terms of benefit-cost ratio.

Although increasing the inclusion level of guava leaf meal to 15% and 22.5% reduced the cost of feed formulation, it resulted in lower body weight gain, poorer feed efficiency and reduced carcass yield. The higher inclusion levels also caused slight reductions in some haematological and serum biochemical parameters associated with nutrient utilization, although the values remained within normal physiological ranges, indicating that the diets did not adversely affect the health or metabolic status of the birds.

Overall, the study established that *Psidium guajava* leaf meal can be successfully incorporated into broiler diets as a natural and economical feed ingredient. However, based on the biological performance, physiological responses and economic evaluation obtained in this study, 7.5% dietary inclusion of *Psidium guajava* leaf meal is recommended as the optimum inclusion level for broiler chickens, as it provides the best balance between productive performance, bird health, carcass quality and profitability.

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