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## EFFECT OF *BAMBUSA VULGARIS* LEAF MEAL ON GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF BROILER CHICKENS

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### ABSTRACT

A feeding trial was conducted to evaluate the effect of *Bambusa vulgaris* leaf meal on growth performance and carcass characteristics of broiler chickens. Four experimental diets in form of mash were formulated to contain the *Bambusa vulgaris* leaf meal at (T1) 0%, (T2) 2.5%, (T3) 5% and (T4) 7.5% respectively, and were used to feed 120 day old Agrited breed of broilers. The day old chicks were randomly allotted to 4 treatment groups of 30 birds each. Each group was further divided into 3 replicate groups of 10 birds each and were assigned to the 4 treatment diets and water was given ad-libitum in a Completely Randomized Design (CRD). The experiment lasted 56 days. Data obtained in each measured parameter was subjected to analysis of variance. The results of the performance of broilers fed diet containing leaf meal revealed significant ( $p < 0.05$ ) differences and superiority over the control diets in the final weight and total weight gain. While T4 exhibited excellent performance in feed conversion ratio. The live weight, dressed weight, dressing percentage, back cut, breast muscle, thigh, wings and drumstick were significantly ( $p < 0.05$ ) influenced by BVLM inclusion levels of finisher broilers and were appreciably increased at 5% and 7.5% dietary level of BVLM. The result revealed that broiler chickens could tolerate 5% to 7.5% dietary levels of BVLM without deleterious effects on their performance and carcass characteristics. It was therefore recommended that broiler diets be supplemented with *Bambusa vulgaris* leaf meal at 5% to 7.5% to enhance growth performance and quality carcass yield.

**Keywords:** *Bambusa vulgaris* leaf meal, Broiler finisher, growth performance, carcass, inclusion level

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### INTRODUCTION

Economic recession in Nigeria has increased the burden of the prices of conventional feed ingredients shouldered by poultry farmers. Poultry farmers are now finding it difficult to maximize the economic performance of birds.

Olukotun et al. (2015) observed that conventional feed plant protein ingredients such as groundnut cake and soya bean meal are required to formulate rich diets for broiler birds. However, there is competition for conventional feed ingredients due to their multi-purpose usages as industrial crops, human food and feed for livestock. This has resulted in high cost of feed which invariably leads to increase in the cost of rearing livestock.

Onunkwo and George (2015) observed that hike in prices of conventional feed ingredients are a major factor affecting net return from poultry business. The high cost of feed impedes efficient poultry production. Many traditional ingredients in poultry diets are forecast to be in short supply mainly due to the increase in human population and unfavourable climate. Enwereum et al. (2017)

Therefore, there is need to seek alternative feed ingredients such as tree leaf meal for inclusion in the diets of monogastric animals. Bamboo (*Bambusa vulgaris*) leaf meal could serve as the non-conventional feed ingredients that can be incorporated into poultry diet as a source of protein.

*Bambusa vulgaris* leaf meal is a major non-timber forest product whose nutritional importance on monogastric feeding especially in poultry has not been exploited. There is rarity of information concerning its use in the feeding of birds in Nigeria and other developing countries. This work therefore intends to provide useful information about utilization of *Bambusa vulgaris* leaf meal and its effect on performance and carcass characteristics of broiler chicken.

### MATERIALS AND METHODS

The study was conducted at the poultry unit of Teaching and Research Farm, of Abia State University, Umuahia Campus, Nigeria.

### Collection and Processing of Test Ingredients

Fresh *Bambusa vulgaris* leaves were harvested by plucking the stalk separately from the bush around the University farm site. The leaves were chopped into smaller portions to facilitate air drying. Drying was done on a concrete floor covered with cardboard sheets in a well ventilated shade for 4 to 5 days before milling to obtain a product herein referred to as *Bambusa vulgaris* leaf meal (BVLM).

### Experimental Birds and Management

One hundred and twenty (120) day-old Agrited chicks were purchased from Ibadan, Oyo State, Nigeria and were randomly allotted to 4 treatment groups of 30 birds each in a Completely Randomized Design (CRD). Each group was further divided into 3 replicates of 10 birds each and housed in a pen measuring 2m<sup>2</sup> x 2m<sup>2</sup>. They were brooded together for 1 week before the commencement of the research.

A week before the arrival of the bird the poultry was washed, disinfected, fumigated and allowed to dry. The floor of the house was covered with litter material made up of wood shavings. Heat and light were supplied to the birds with the aid of kerosene stoves and lamps respectively. On arrival the birds were given anti-stress medications to enable the chicks recover from transportation stress from hatchery.

Antibiotics, anticoccidial drugs, vaccination and medication recommended by a veterinarian were administered to the birds as at when due. Feed and clean water were supplied to the birds between 7am and 6pm daily. The feeding trial lasted 8 weeks.

Body weight was taken on a weekly basis. Feed intake was taken daily by subtracting the weight of the left over feed from the weight of the feed given. Weight gain was calculated from body weight, while feed conversion was calculated from feed intake and weight gain. At the end of the experimental period, 3 birds from each replicate within each treatment were randomly selected from each dietary treatment. They were fasted for 12 hours and then weighed to obtain live body weight, before slaughtering with a sharp knife for complete bleeding and eviscerated for carcass evaluation.

### Experimental Diets

Four experimental diets in form of mash were formulated with *Bambusa vulgaris* leaf meal for broiler starter and finisher phases respectively, and designated T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub>.

T<sub>1</sub> = 0% served as the control and did not contain *Bambusa vulgaris* leaf meal (BVLM)

T<sub>2</sub> = 2.5% BVLM inclusion level

T<sub>3</sub> = 5% BVLM inclusion level

T<sub>4</sub> = 7.5% BVLM inclusion level

The experimental animals were fed with the formulated broiler starter diet for a period of 3 weeks before changing over to broiler finisher diet for the finisher phase till 8 weeks from the commencement of the experimental diet. The ingredient composition of finisher diet is shown in table 1.

Table 1: Ingredient composition of broiler finisher diets with BVLM

Ingredients	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Maize	63.10	61.10	59.10	57.25
Soybean meal	33.20	32.70	32.20	31.60
BVLM	0.00	2.50	5.00	7.50
Bone meal	2.50	2.50	2.50	2.50
Methionine	0.50	0.50	0.50	0.50
Lysine	0.35	0.35	0.35	0.35
Salt	0.35	0.35	0.35	0.35
Premix	0.20	0.20	0.20	0.20
<b>Total (%)</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
<b>Calculated Analysis</b>				
Crude protein %	21.00	21.02	21.03	21.01
Crude fibre (%)	3.46	3.59	3.72	3.84
Ether extract (%)	3.04	3.07	3.09	3.12
Methionine (%)	0.79	0.78	0.78	0.78
Lysine (%)	1.21	1.21	1.21	1.21
Calcium (%)	0.90	0.86	0.85	0.85
Phosphorus (%)	0.46	0.47	0.48	0.48
ME (kcal/kg)	3098.19	3051.69	3005.19	2959.39

**Proximate Analysis:** Proximate composition of BVLM was determined by the AOAC (2005)

**Table 2:** Proximate composition of dried *Bambusa vulgaris* leaf meal

Parameters	% DM Basis
Dry matter	93.22
Ash	8.76
Ether extract	1.23
Crude protein	18.40
Crude fibre	16.80
Moisture content	6.78
Nitrogen free extract	48.03

## RESULTS AND DISCUSSION

**Table 3:** Performance of finisher broilers fed diets containing different level of BVLM

Parameter	Levels of inclusion of BVLM (%)				SEM
	T1(0)	T2(2.5)	T3(5)	T4(7.5)	
Initial weight (g)	1059.52	1080.95	1078.23	1095.23	5.77
Final weight (g)	2400.00 <sup>d</sup>	2600.00 <sup>c</sup>	2816.67 <sup>b</sup>	3166.67 <sup>a</sup>	88.65
Total weight (g)	1340.48 <sup>d</sup>	1519.05 <sup>c</sup>	1738.44 <sup>b</sup>	2071.44 <sup>a</sup>	14.71
Daily weight gain (g/d/b)	23.94	27.12	31.04	36.99	0.80
Daily feed intake (g/d)	55.99	56.01	56.00	56.00	0.00
Feed Conversion Rate (FCR)	2.33	2.00	1.80	1.51	2.20

**ABC:** Means in the same row with different superscript are significant ( $p < 0.05$ ) different.

**SEM:** Standard Error Mean. **BVLM:** *Bambusa vulgaris* leaf meal

The finisher phase on performance showed that the total weight gain of broilers on T<sub>3</sub> and T<sub>4</sub> were significantly ( $p < 0.05$ ) better than the birds on the control (T<sub>1</sub>) group, and this could be attributed to increased feed consumption and utilization which were likely based on the rich phytochemicals and bioactive effects reported in Bamboo leaf. This finding compares favourably with Tanaka *et al* (2014) who asserted that bamboo leaf is a source of promising  $\beta$  c-glucosylap  $\beta$  c-glucosylaigenin and antioxidant that enhances better performance.

The result of the daily feed intake showed no significant ( $p > 0.05$ ) difference. This agreed with the findings of Gakuya *et al* (2014) who observed that there was no significant ( $p > 0.05$ ) difference in performance when up to 7.5% *Moringa oleifera* leaf meal was included in poultry diets.

BVLM significantly ( $p < 0.05$ ) influenced the Feed Conversion Ratio (FCR) better than the birds on control diet, with T<sub>4</sub> (7.5%) showing superiority over other treatments. Oluyemi and Robert (2000) stated that animals which consume relatively lower amount of feed to produce a unit weight gain are said to be efficient converter of feed fed.

**Table 4:** Effects of *Bambusa vulgaris* leaf meal on carcass characteristics of Broilers (Finisher phase)

Parameter	Levels of inclusion of BVLM (%)				SEM
	T1(0)	T2(2.5)	T3(5)	T4(7.5)	
Live weight (g)	2400.00 <sup>c</sup>	2600.00 <sup>bc</sup>	2816.60 <sup>b</sup>	3166.07 <sup>a</sup>	88.65
Dressed weight (g)	1895.00 <sup>d</sup>	2160.75 <sup>c</sup>	2505.00 <sup>a</sup>	2504.75 <sup>b</sup>	65.31
Dressing (%)	78.95 <sup>d</sup>	83.11 <sup>b</sup>	88.93 <sup>a</sup>	79.00 <sup>c</sup>	0.20
Backcut (%)	16.58 <sup>d</sup>	17.42 <sup>c</sup>	19.09 <sup>b</sup>	20.55 <sup>a</sup>	0.46
Breast muscle (%)	12.17 <sup>d</sup>	12.74 <sup>c</sup>	26.96 <sup>a</sup>	26.78 <sup>b</sup>	0.58
Thigh (%)	9.58 <sup>d</sup>	10.04 <sup>c</sup>	14.68 <sup>b</sup>	15.32 <sup>a</sup>	0.39
Wing (%)	9.58 <sup>d</sup>	10.04 <sup>c</sup>	10.72 <sup>b</sup>	10.86 <sup>a</sup>	0.16
Drum stick (%)	12.50 <sup>d</sup>	12.56 <sup>b</sup>	12.90 <sup>b</sup>	13.22 <sup>a</sup>	0.09

**ABC:** Means in the same row with different superscript are significant ( $p < 0.05$ ) different.

**SEM:** Standard Error Mean. **BVLM:** *Bambusa vulgaris* leaf meal

Result of carcass characteristics at the finisher phase shows that *Bambusa vulgaris* leaf meal significantly ( $p < 0.05$ ) influenced the live and dressed weights, dressing percentage, back cut, breast muscle, thigh, wing and the drumstick. There were significant ( $p < 0.05$ ) differences in carcass dressed weight between the birds fed control diet and those fed BVLM diet. The decrease in weight with increasing inclusion levels of BVLM could be ascribed to the effect of fibre which increased in the diets at higher inclusion levels of BVLM in the diet. The highest carcass dressing % was recorded in birds placed on T<sub>3</sub> (88.93%) followed by T<sub>2</sub> (83.11%) and T<sub>4</sub> (79.00%) respectively while the control (T<sub>1</sub>) had the lowest (78.95%). The dressing percentage were higher than the range reported by Omojola *et al.* (2007) and Abu *et al.* (2015). The significant effect ( $p < 0.05$ ) of feeding *Bambusa vulgaris* leaf meal was observed on the carcass characteristics of the broiler birds. The values of back cut, and thigh showed significant ( $p < 0.05$ ) among the treatments with T<sub>2</sub> showing the highest performance in back cut and thigh. While T<sub>3</sub> and T<sub>4</sub> showed the highest value in breast muscle. The proportions of wing and drumstick followed the same pattern of showing superior values ( $p < 0.05$ ) in T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> than the control diet (T<sub>1</sub>). This indicated that the birds fed BVLM diets were generally superior in carcass characteristics with the highest performance in T<sub>4</sub>. The highest percentage of the back cut, breast muscle, wings, ( $p < 0.05$ ) weight of the drumstick and thigh were recorded in the broilers placed on T<sub>4</sub> (7.5%) BVLM, which was a good indication that tissue synthesis for those parts were at the best at the particular dietary level. This result compared favourably with the findings of Abu *et al.* (2015) who reported similar results, that when primal cut up parts are highest; it is an indication that tissue synthesis for those parts were at the best at that particular dietary level.

## CONCLUSION

The result of this study revealed that the inclusion of *Bambusa vulgaris* leaf meal at 5% and 7.5% level, enhanced growth performance and quality carcass yield especially the premium parts. Therefore, inclusion of *Bambusa vulgaris* leaf meal at 5% to 7.5% in the diet of broiler chickens had no detrimental effect on their growth performance and carcass characteristics.

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