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GROWTH PERFORMANCE OF BROILER FINISHER CHICKENS FED DIETS CONTAINING GRADED LEVELS OF *MORINGA OLEIFERA* LEAF MEAL

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ABSTRACT

This study was conducted to determine the growth performance of Broiler finisher chickens fed diets containing graded levels of Moringa oleifera leaf meal (MOLM). A total of 120 day-old broiler chicks were weighed and brooded for four weeks and allotted to four (4) experimental groups in a Completely Randomized Designed at finisher phase and fed graded levels (0.0%, 1.50%, 3.00% and 4.50%) of Moringa oleifera leaf meal for four weeks. The experimental treatments were replicated three times with 10 birds per replicate so that each group had a total of 30 birds. Treatment one (T_1), which contained 0.0% Moringa oleifera leaf meal served as the control. Growth parameters determined were average initial weight and average final weight gain, feed intake and feed conversion ratio. Phytochemical and proximate composition of Moringa oleifera leaf meal, broiler finisher diets were done and the results were tabulated. No significant differences ($P>0.05$) were noted in the amount of feed taken by the birds under different treatments of Moringa oleifera leaf meal. However, significant differences ($P<0.05$) in final weight gain, the mean value obtained were 2313.33g for T_1 as the control, 2456.67g for T_2, 2406.67g for T_3 and 2426.67g for T_4 respectively. The highest value of the final weight gain is 2456.67g was noted in T_2, (1.50%) inclusion of Moringa oleifera leaf meal and the lowest fed conversion ratio were noted in treatment two (T_2) which is the best feed conversion ratio. It was therefore concluded that inclusion of Moringa oleifera leaf meal up to 1.50% in the broiler diets gave the highest weight and also the best feed conversion ratio.

Key words: Growth performance, weight gain, feed intake, broiler finisher

INTRODUCTION

The importance of poultry to national economy cannot be over emphasized as it has become popular for small holders that have contributed to the economy of the country (Ologbon and Ambali, 2012). The poultry industry has assumed greater importance in improving employment opportunities and animal food production in Nigeria. An earlier report by Mbanasor (2000) showed that about 10% of Nigeria's population is engaged in poultry production mostly at subsistence and small or medium sized farms.

Moringa oleifera (Drumstick tree) which belongs to the family *Moringaceae* is widespread throughout the tropics. It is a small graceful tree with sparse foliage, white flowers and pods. Often, parts of the tree (leaves, fruits, immature pods and flowers) are edible and utilized in traditional diets in many tropical and sub-tropical countries. Olugbemi *et al.,* (2010) reported that *Moringa oleifera* leaf has antimicrobial effects and are a good source of fat, protein and minerals. According to Ravindra (2007), *Moringa oleifera* leaf meal does not only serve as protein source, but also provides some necessary vitamins, minerals and also oxycarotenoids which cause the yellow colour of broiler skin, shank and egg yolk. Feed is the major component of input for up to 70% (The Poultry Site, 2007) and 86-87% (Hassan *et al.,* 2006) of the total variable cost of production. Recent research trends have been directed towards investigating novel and alternative plant protein sources available in rural communities to replace conventional feedstuff such as soya bean, groundnut and cowpea (Imoru and Abu, 2014).

MATERIALS AND METHODS

The study was carried out at the Teaching and Research Farm of Federal College of Animal Health and Production Technology, National Veterinary Research Institute (NVRI). Vom is located in the Guinea Savannah zone of Nigeria, on longitude 8^0 45' E and latitude 9^0 44' N on an altitude of 1280m above sea level. Relative humidity ranges from 22% in January to 78% July/August. The daily average environmental temperature ranges between 17^0C – 28.6^0C with a mean monthly sunshine hours range of 177-288.30 (NVRI, 2018).

A total of 120day-old broiler birds were purchased from a reputable hatchery and allocated to four treatment groups of thirty birds per treatment with three replicates of 10 birds each in a Completely Randomized Design (CRD). The birds were fed commercial broiler starter diets for the first four weeks, while four diets were formulated to contain *Moringa oleifera* leaf meal at 0%, 1.50%, 3.00% and 4.50%, for the finisher phase (5-8 weeks).

The diets and water were provided *ad libitum* during the four weeks experimental period. Feed consumption was recorded daily, while body weights were recorded weekly, while feed intake, and body weight gain, and feed conversion ratio were calculated. The composition of experimental diets containing varying levels of MOLM fed to broiler chickens is presented in Table 3.1. *Moringa oleifera* leaf meal was added to the feed at 0% (control diet), 1.50%, 3.00% and 4.50% level of inclusion. The formulation was done such that all rations had similar caloric value. The experimental diets are presented in Table 1.

The phytochemical and proximate analysis were conducted at the Nutritional Biochemistry Laboratory of National Veterinary Research Institute, Vom to evaluate the phytochemical properties and nutritional potentials (AOAC, 2005) of the *Moringa oleifera* leaf meal.

Data Collection

The feed intake was determined by the difference between the feed supplied and the left over in the feeding trough after 24hours. Initial body weights of the birds were taken at the start of the study and thereafter at the end of each week. Feed conversion (feed to gain ratio) was subsequently calculated.

Table 1: Composition of experimental diets

	Dietary levels of *Moringa* Leaf Meal (%)			
Ingredients	**0**	**1.50**	**3.00**	**4.50**
Maize	57.00	57.00	57.00	57.00
Wheat offal	8.00	8.00	8.00	8.00
P.K.C	4.80	4.00	3.80	3.30
Fish mea l	2.00	2.00	2.00	2.00
G.N.C	15.00	14.30	13.00	12.00
S.B.C	9.00	9.00	9.00	9.00
MOLM	-	1.50	3.00	4.50
Limestone	1.00	1.00	1.00	1.00
Bone meal	2.50	2.50	2.50	2.50
Salt	0.25	2.50	0.25	0.25
Premix	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Methoinine	0.10	0.10	0.10	0.10
Total	**100**	**100**	**100**	**100**
Calculated analysis				
Crude protein	19.4	19.3	18.9	19.0
ME: Kcal/kg	2885	2895	2900	2900
Ether extract %	5.11	5.12	5.08	5.11
Crude Fibre %	4.13	4.15	4.28	4.27
Calcium %	1.42	1.52	1.50	1.50
Avail Phosphorus %	0.57	0.57	0.80	0.80
Calcium phosphorus ratio	2	3	2	2
Lysine %	0.83	0.84	0.83	0.85
Trptophan	0.18	0.18	0.17	0.17
Threonine	-	-	0.23	0.22
Methionine (Insitu)	0.30	0.30	0.30	0.30
Methionine (Insitu)+sulphur	0.40	0.40	0.40	0.40
Total sulphur	0.67	0.67	0.67	0.67
Glycine	0.78	0.75	0.70	0.68
Arginine	1.20	1.20	1.26	1.22

Key: PKC – Palm Kennel Cake
G.N.C – Groundnut Cake
S.B.C – Soyabean Cake
MOLM – *Moringa oleifera* Leaf Meal

Data Analysis

Data obtained were subjected to one way analysis of variance (ANOVA), (Steel and Torrie, 1980) and where significant differences were indicated, the means were separated using Duncan's Multiple Range Test (Duncan, 1955).

Results and Discussion

Phytochemical Composition of *Moringa oleifera* Leaf meal

Data on the phytochemical composition of *Moringa oleifera* leave meal are presented in Table 2. The result indicates the presence of saponins, tannins, steroids, and cardiac glycosides,and also, the presence of alkaloids, flavonoids and anthraquinone.

Table 2. Phytochemical Composition of *Moringa oleifera leaf* meal

Parameters	
Saponins	+
Tannins	+
Steroids	+
Cardiac glycoside	+
Alkaloids	+
Flavonoids	+
Anthraquinone	+

+ve detected
-ve not detected.

Proximate composition of Moringa oleifera Leaf Meal

The data obtained from the optimum proximate screening of *Moringa oleifera* leaf meal show that it contains 27.18% crude protein, 3.12% moisture content, 4.75% fat, 10.53% ash and 11.18% crude protein respectively. The high crude protein differs from the report of Nuhu, (2010) on shade dried *Moringa oleifera* leaf meal. The crude protein in this study is higher than the amount obtained in *Moringa* seed by Moreki and Gabanakgosi, (2014) but lower than those of leucena and gliricidia leaf meal (Aye and Adegun, 2013).

The Metabolizable Energy (ME) sample was calculated from proximate composition data using the formular described by Pauzenga (1985).

Table 3: Proximate Composition of *Moringa oleifera* leaf meal

Growth performance of broiler finisher chicken fed diets containing graded levels of *Moringa oleifera*.

Data on the growth performance of broiler finisher chicken fed diet containing graded levels of *Moringa oleifera* leaf meal are presented in Table 4

Initial Weight

The values for initial weight of the birds were 1618.33g for T_1, 1452.33g for T_2, 1500.00g for T_3 and 1466.67g for T_4 respectively. The differences between these treatment means were not significant ($p>0.05$). .

Final Weight Gain

The mean values obtained were 2313.33g for T_1, 2456.67g for T_2. 2406.67gT_3, and 2426.67g for T_4 respectively. The result shows that 1.50% MOLM gave the highest value of final weight (2456.67g) followed by 4.50% MOLM with 2426.67g and 3.00% MOLM with 2406.27g. The lowest mean value was obtained in the group of 0% MOLM which had 2313.33g.

Feed Conversion Ratio

The mean values obtained were 1.96 for 0% MOLM, 1.05 for 1.50% MOLM, 1.17 for 3.00% MOLM, and 1.09 for 4.50% MOLM respectively ($P<0.05$).

Price per kg Feed Consumed

Results obtained for feed consumption indicated that at the finisher phase, birds in 0% MOLM consumed 1050.00g of feed, 1.50% MOLM consumed 1050.00g of feed, 3.00% MOLM consumed 1050.00g of feed and 4.50% MOLM also consumed 1050.00g of feed respectively. The cost of finisher ratio was 1028. The highest feed cost per kg was observed in 4.50% MOLM (N274.25) followed by 3.00% MOLM (N252.77), while the least was observed in 0% MOLM (N243.35).

Table 4 Growth performance of broiler finisher chicken fed diets containing graded levels of *Moringa oleifera leaf meal*

Parameters	Dietary levels of *Moringa* Leaf Meal (%)				
	0.00	2.5	5.0	7.5	SEM
Initial Weight (g)	1618.33	1452.33	1500.00	1466.67	57.15
Final weight (g)	2313.33[b]	2456.67[a]	2406.67[ab]	2426.67[ab]	23.37
Total weight gain (g)	685.00	100.33	903.67	960.00	58.67
Total feed intake (g)	1050.00	1050.00	1050.00	1050.00	-
Feed conversion ratio	0.45	0.43	0.44	0.43	0.20
Cost per/kg feed	243.35	252.77	263.05	274.25	-

Key:

[ab] Means in the same row with different subscript are significantly different ($P < 0.05$)

SEM= Standard Error of the mean.

MOLM = *Moringa oleifera* leaf meal

Birds fed diet with 1.50% *Moringa oleifera* leaf meal gained significantly (P<0.05) in final weight gain but its value decreased as inclusion of *Moringa oleifera* leaf meal increased. This confirms the observation made by Ash and pataia (1992) and (Olugbemi *et al.,* 2010),that inclusion levels of *Moringa oleifera* leaf meal in broiler diets results in depressed growth performance. This observation could be generally traced to increasing fiber content of the diet which may have impaired nutrient digestibility and absorption (Ige *et al.,* 2006 and Onu, 2010).
Data obtained on the feed conversion ratio showed that 1.50% MOLM had the lowest value feed conversion ratio than other treatment though there is significant (P<0.05) different among the final weight of the bird. However, the feed conversion ratio (FCR) is an important index of performance which is direct indication of how best feed offered to birds was utilized for meat production. The lower the feed value, the better the feed utilization of meat production.
The trial aimed at investigating the growth performance of broiler finisher chicken fed diets containing graded levels of *Moringa oleifera* leaf meal in broiler chicken diets. It was observed that diet 2 (containing 1.50% MOLM) gave the best feed conversion ratio and final weight gain..

Recommendation

It is recommended that the inclusion of *Moringa oleifera* should not exceed 1.5% in the diets of broiler finisher chickens.

Authors Contributions

UAD and MBY conceived the project, BIS and AIP designed the project, ADU and MBY executed the experiment, BIS and PAJ analyzed the data. All authors interpreted the data, critically reviewed and approved the final version.

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