



## **RESPONSE OF GROWING TURKEYS TO DIETS CONTAINING VARYING LEVELS OF TOASTED BAMBARA NUT (*Voandzeia subterrenea* L) WASTE**

\*. **EDEH, H. O, ANI, A.O, OGWUEGBU, M.C and UGWU, K.E, ILO, S.U**

Department of Animal Science, University of Nigeria Nsukka, Nigeria

\*Corresponding author; Email:henry.edeh@unn.edu.ng . Phone no :( 08064645061)

### **Abstract**

*The study was conducted to investigate the response of growing turkeys to diets containing varying levels of toasted bambara nut (*Voandzeia subterrenea* L) waste. A total of 40 ten-week- old turkeys (*Meleagrisgallopavo*) were randomly divided into four groups of 10 birds each. The groups were randomly assigned to four treatments of diets involving four levels (0, 10, 20 and 30%) of toasted bambara nut waste for 56 days. Each treatment was replicated two times with 5 birds per replicate. The experimental model used was a completely randomize design (CRD). In the experiment, the daily feed intake increased as the level of inclusion of the toasted bambara nut waste in the diet increased. There were significant ( $p<0.05$ ) differences among treatments in the final body weight gain, total weight gain, average daily weight gain , feed conversion ratio, protein efficiency ratio and in feed cost per kg weight. Also there were significant ( $p<0.05$ ) differences in body length, shank length, neck length and thigh diameter of turkeys feed toasted bambara nut waste. It could be observed and concluded that the performance of turkeys on treatment 4 (30% TBNW diet) in terms of total body weight gain, daily weight gain, feed conversion ratio, protein efficiency ratio and feed cost per kg gain was superior to that of turkeys on the control diets.*

**Key words:** Bambaranut waste, growing turkey, growth performance, cost and body characteristics

### **INTRODUCTION**

The most pressing problem facing poultry industry in Nigeria is the high cost of feed ingredients. The cost of feed accounts for 70-75% of the total cost of production and this has invariably led to a high cost of production ( Esonu et al., 2006).This had led the animal nutritionist to search for alternative ways of inclusion using some of the affordable and available non-conventional waste ingredient, in order to minimize the cost of production. Bambara nut waste has been useful in this regards. According to Enwere (1998) Bambara nut has the following composition. Moisture content 9.7%, crude protein 16.0%, crude fat 5.9%, and ash 2.9% total carbohydrate 64.9%. It is fairly rich in calcium and iron but poor in phosphorus. It has been reported by Enwere (1998) that bambara nut is mainly processed into flour which is prepared and consumed in form of “okpa” popularly known among the Ibos of Nigeria. In the production of the flour, the seed coats are partially removed by splitting the seeds in mill, winnowing to remove loosened test and converting the cotyledon into fine flour by milling several times in a hammer mill followed by sieving, using sieves with 1mm pores. Processing of bambara nut result in fairly large edible protein called bambara nut waste. This study therefore aimed at evaluating the potency of the bambara nut waste as feed stuff in feeding growing turkeys.

### **MATERIALS AND METHODS**

**Location and duration of the study:** The experiment was carried out at the Poultry Teaching and Research Unit of the Department of Animal Science Research Farm, University of Nigeria, Nsukka. The study lasted for a period of seven weeks.

**Procurement and Processing of Bambara nut waste:** The bambara nut wastes were purchased from food grinding and processing plants in ObolloAfor Market and Ogige Market, Nsukka. Other feed materials and ingredients were sourced from chidera feed mill at onuiyi, Nsukka. The bambara nut wastes were heated while being stirred in a large frying pan over burning firewood for about 5 – 10 minutes until a toasting aroma was perceived consistently, in order to remove some anti-nutritional factors like tannin and cyanogenic glycosides.



**Experimental Animals and Management:** A total of forty 10 weeks old turkey were randomly divided into four groups of 10 birds each. The groups were randomly assigned to isocaloric (11.30 MJ /Kg ME) and isonitrogenous (20% crude protein) diets in a completely randomized design (CRD). Each treatment was replicated 2 times with 5 birds per replicate placed in 2.6m x 3m deep litter pens of fresh wood shavings. Feed and water were supplied *ad libitum* to the birds. Vaccinations and other management practices were strictly followed.

**Parameters Measured:** The following parameters were measured and determined: Average daily feed intake (g/bird/day), Average daily weight gain (g/bird/day), Feed conversion ratio and body characteristics.

**Statistical Analysis:** Data collected were subjected to analysis of variance using (ANOVA) of SPSS (version 20 of 2011).

**RESULTS AND DISCUSSIONS: The result of Performance of growing turkeys fed graded levels of toasted bambara nut waste is presented in table 1:** There were significant ( $p < 0.05$ ) differences among treatments in the daily feed intake of the birds. The daily feed intake for T<sub>4</sub> (3005g) was significantly ( $p < 0.05$ ) higher than T<sub>1</sub> (2609g), 2(2394g) and T<sub>3</sub> (2774g). T<sub>4</sub> (2394g) showed significant ( $p < 0.05$ ) increase in value of total weight gain than turkeys on T<sub>1</sub> (1915g), 2(1725g), and 3(2128g). Turkeys on treatment 4 also showed significant ( $p < 0.05$ ) increase in average daily weight gain compared to turkeys on treatments 1, 2 and 3. There were also significant ( $p < 0.05$ ) differences in the average daily weight gain. The results also showed that treatment 2(2.45) had a significant ( $p < 0.05$ ) higher value in food conversion ratio than treatments 1(2.05), 3(1.90) and 4(1.95). The result revealed that turkeys on treatments 1(2.45), 3(2.70), and 4(2.55) were significantly ( $p < 0.05$ ) higher in values in protein efficiency ratio than turkeys on treatment 2. Turkeys on treatment 4(243.36) showed significant ( $p > 0.05$ ) decrease in feed cost per kg than turkeys on treatments 1(295.71), 2(355.52), and 3(246.81).

**Table 1: Performance of growing turkeys fed graded levels of toasted bambara nut waste**

Parameters	Control	10%	20%	30%	SEM
	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	
Initial body wt(g)	693	668	664	671	11.9
Daily feed intake (g)	70.60 <sup>d</sup>	76.40 <sup>c</sup>	82.20 <sup>b</sup>	88.00 <sup>a</sup>	1.72
Final body wt (g)	2609 <sup>bc</sup>	2394 <sup>c</sup>	2774 <sup>ab</sup>	3005 <sup>a</sup>	67.37
Total wt gain (g)	1915 <sup>bc</sup>	1725 <sup>c</sup>	2128 <sup>b</sup>	2394 <sup>a</sup>	73.33
Av daily wt gain (g)	34.20 <sup>bc</sup>	30.80 <sup>c</sup>	38.00 <sup>b</sup>	42.75 <sup>a</sup>	1.31
Feed conversion ratio	2.05 <sup>b</sup>	2.45 <sup>a</sup>	1.90 <sup>b</sup>	1.95 <sup>b</sup>	0.26
Protein efficiency ratio	2.45 <sup>a</sup>	2.05 <sup>b</sup>	2.70 <sup>a</sup>	2.55 <sup>a</sup>	0.08
Feed cost per kg weight gain(N per kg)	295.71 <sup>b</sup>	355.52 <sup>a</sup>	246.81 <sup>c</sup>	243.36 <sup>d</sup>	17.20

Results from this study showed that turkeys fed the diets containing 30% of toasted bambara nut waste had the highest final body weight, total weight gain and average daily weight gain but had the least feed conversion ratio. The enhanced performance of the growing turkeys on treatment 4 with reference to those on the control diets might be as a result of the ability of the turkeys to efficiently digest, absorb and utilize their feed more than those on the control diets. It is also probable that the common processing techniques



for bambara nut such as grinding and heat treatment employed in this study have the ability to modify the nutritive availability to the turkey. This view is in harmony with the report of Onyimonyi and Okeke, (2007) that reported that common processing techniques such as grinding, heat treatment, pelleting etc could modify the nutritive value of diets. The better performance could also be attributed to high protein content of bambara nut. Enwere (1998) reported that dry bambara groundnut seeds contained 21.13% crude protein, while the raw bambara nut waste contained 16.19% crude protein (Okeke, 2000). This findings was in agreement with the finding of Ani and Nnamani (2013), Ani, *et al.*, (2012), who showed that the performance of cockerel growers on treatment 7 (30% raw bambara nut offal diets without enzyme) in terms of total body weight gain, daily weight gain, feed conversion ratio, protein intake, protein efficiency ratio and feed cost was superior to that of birds on the control diet and other treatments. The result contradicts that reported by Ngwu, (2010) which showed that the final body weight, feed conversion ratio and protein efficiency ratio of broiler finishers fed diets containing 10% toasted bambara nut waste were the best, although the differences among the results could be as a result of species differences, since different species of birds have different ability to digest, absorb and utilize their feed.

**Table 2** showed the body characteristics of turkeys fed graded levels of toasted bambara nut waste. The table revealed that the mean body length of turkey placed on treatments 3(43.10cm) showed significant ( $p<0.05$ ) increase in value than turkey placed on treatments 1(41.25cm) and 2(41.05cm).The table also showed that the mean value of shank length of turkeys on treatment 3(8.60cm) was significantly ( $p<0.05$ ) higher than turkey on treatment 2(7.85cm). Treatments 3(15.60cm) and 4(15.70cm) were significantly ( $p<0.05$ ) higher in value of mean neck length than treatment 2(15.05cm). Finally turkeys on treatment 3(8.85cm) was significantly ( $p<0.05$ ) higher than turkeys on treatments 1(8.45cm), 2(8.10cm) and 4(8.35cm) in thigh diameter.

**Table 2: Body characteristics of turkeys fed graded levels of toasted bambara nut waste**

Parameters	Control	10%	20%	30%	SEM
	T1	T2	T3	T4	
Body length(cm)	41.25 <sup>b</sup>	41.05 <sup>b</sup>	43.10 <sup>a</sup>	42.25 <sup>ab</sup>	0.27
Shank length(cm)	8.25 <sup>ab</sup>	7.85 <sup>c</sup>	8.60 <sup>a</sup>	8.20 <sup>bc</sup>	0.09
Neck length(cm)	15.25 <sup>ab</sup>	15.05 <sup>b</sup>	15.60 <sup>a</sup>	15.70 <sup>a</sup>	0.09
Keel length(cm)	7.95	8.10	7.90	7.95	0.06 <sup>NS</sup>
Thigh length(cm)	13.15	12.85	13.20	12.85	0.07 <sup>NS</sup>
Thigh diameter(cm)	8.45 <sup>b</sup>	8.10 <sup>c</sup>	8.85 <sup>a</sup>	8.35 <sup>b</sup>	0.08

The results from this study showed that turkeys on treatments 3 and 4 had a progressive increase in body characteristics. The progressive increase in their body characteristics were an indicative that the test diet at 20% and 30% inclusion level resulted in good performance of the turkey. This supports (Fetuga *et al.*, 1995) who proposed that Pig’s performance in terms of rate and efficiency of gains is closely related to the nutrient intake levels, especially protein and energy. This ability to utilize dietary nutrients resulted to increase in superior body characteristics of the turkeys.

**CONCLUSION:** It is very clear from the results obtained in this present study, that up to 30% levels of toasted bambara nut waste can be included in turkey diets for optimum performance, normal growth and cost effective of the production of turkey.

**REFERENCES**



Ani, A.O., Omeje, O.D. and Ugwuowo, L.C (2012). Effects of raw bambara nut (*Voandzeia subterranea* L) waste and enzyme complex on growth performance and apparent nutrient retention in broiler chickens *African Journal of Biotechnology*. 11(56):11991-11997.

Ani, A.O and Nnamani, M.E. (2013).Effect of raw Bambara nut offal (*Vignasubterranea* (L) Verde) and supplementary enzyme on growth performance of finisher cockerels. *Indian Journal of Animal Research. The Journal of Animal and Plant Sciences*. 23(5):1228-1235

Enwere, N.J. (1998). *Foods of Plant Origin*. Afro-Orbis Pub. Ltd. Nsukka, Nigeria.301Pp.

Esonu, B.O., M.N. Opara, I.C. Okoli, H.O. Obikaonu, C. Udedibie and O.O.M. Iheshiulor, 2006. Physiological responses of laying birds to Neem (*Azadirachta indica*) leaf meal based diets, body weight, organ characteristics and hematology. *Online J. Health Allied Sci.*, 2: 4-4.

FAO 2016.Review of the Livestock/Meat and Milk value chains and policy influencing them in Nigeria

Fetuga, B.L.,G.M.Babatunde and V.A.Oyenuga, 1995. Protein levels in diets for European Pigs in the Tropics,.I. The Effect of methionine supplementation on the protein requirements of growing pigs. *Anim. Prod.*,20: 133-146.

Ngwu, P.E. (2010). Comparative performance of broiler birds fed Graded levels of toasted Bambara nut waste and soybean hulls. Department of Animal science, university of Nigeria Nsukka

Onyimonyi, A. E and Okeke, G. C. 2007. Assessment of the practical potential of Bambara (*Vigna subterranea* Thouars) waste for weaner pig. *Pakistan Journal of Nutrition* 6(3): 264 – 266.

Okeke DP (2000). Replacement of soybean meal with bambara waste (*Voandzeia subterranea*) in broiler diets. M.Sc. Thesis Dept. Anim. Sci. Univ. Nigeria, Nsukka

SPSS.Com.(2011).IBM<sup>(R)</sup>SPSS<sup>(R)</sup> Advantage for Microsoft <sup>(R)</sup>IBM.Corporation 2010, IBM Corporation Route,100,Somers,N4. 10589.√