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PERFORMANCE OF TURKEY POULTS FED GRADED LEVELS OF TIGERNUTS (*Cyperus Esculentus L*) offal meal

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Abstract
High cost of feeds due to high cost of some ingredients like maize is one of the greatest constraints to the expansion of the poultry industry in Nigeria. A feeding trial experiment was conducted to determine the growth performance and internal organ proportions of turkey poults fed graded levels of tiger nuts offal. The inclusion levels of tiger nut in the diets were 0, 10, 20, 30 and 40 percent respectively. A total of 150 turkey poults were used to conduct the experiment in a Completely Randomized Design. Feed and water were given *ad libitum*. Data were collected on initial weight, final weight, average daily feed intake, average daily weight gain, feed conversion ratio and internal organ proportions. The final weight of birds fed diet 3 (830g) was significantly higher ($P<0.05$) than others (760-800g). Similarly, the daily weight gain values of turkey fed diet 3(13.87g) was significantly higher ($P<0.05$) than others (12.64-13.39g). The gizzard of turkeys fed Treatment diets 1,3 and 5 were significantly higher ($P<0.05$) than diets 2 and 4 (3.75 and 3.81g) whereas the liver of turkey fed diet 5 (2.79g). The heart of turkeys fed diet 3 was significantly different from others. Turkeys fed diets 3 containing 20% tiger nut performed better than others and therefore can be recommended for improved turkey performance.
Keyword: Turkey poults, Tiger nut offal meal, Growth performance, Organ proportions

Introduction

Animal protein consumption in Nigeria has been reported to be very low as compared to developed countries. The average Nigerians consume about 8g/person/day animal protein as against the recommended of 35g/person/day (NRC, 1984). The problem has generally been attributed to low production level and high cost of animal protein occasioned by high cost of livestock feeds (Onunkwo and George, 2015). Feeding cost accounts for about 75% of the total animal production cost (Ogunfewara, 1984). The escalating cost of conventional feedstuffs for livestock especially poultry has immensely contributed to the low level of poultry production with the obvious consequence of high cost of animal protein making it unaffordable to average Nigerians (Olomu, 1995). The conventional feedstuffs such as maize have continually become scarce and expensive because there is competition between man and livestock (Tewe, 2003). Therefore, there is need to research into the potentials of unconventional but readily available feedstuffs.

Tiger nut (*Cyperus esculantus)* which is popularly called "Aki Hausa" by the Igbos and "Aya" by the Hausa and Ofio in Yorubais considered as one of the world weeds (Bayer, 1987). Tiger nut is not really a nut but a small tuber, firstly discovered some 4000 years ago. It has many other names like Zulu nut, yellow nut grass, ground almonds, edible rush nut (Bayer, 1987), while in Spain it is called chufa. Tiger nut has been cultivated both as livestock feed and for human consumption (eaten raw or baked). Tiger nut is produced in large quantities in Northern part of Nigeria. It is served as snack and also it is rich in oil

which can be extracted for cooking and for industrial uses. Tiger nut is sugary which suggests that it could be a good source of energy, high fibre and protein like palm kernel meal (PKM) and if fully utilized can be a substitute for maize. This has a correspondence with Ugwuene *et al*. 2005 who used full-flat palm kernel meal to efficiently replace up to 40 percent maize in broiler ration.

Materials and methods

The experiment was conducted at Poultry Unit of the Teaching and Research of Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria. The study lasted for eight weeks. The design of this study was Completely Randomized Design with five treatments, replicated thrice. A total of 150 turkey poults were procured from a reputable hatchery at Owerri, Imo State, Nigeria Five experimental treatment diets where tiger nut was added at 0, 10, 20, 30, 40% respectively were formulated for the study (Table 1). The diets were formulated to conform with the nutrient requirements of turkey poults. The 150 turkey poults were randomly allotted to the 5 treatment diets replicate thrice with each replicate hiving ten turkey poults and 30 turkey poults per treatment. Tiger nut offal was sourced from the local kunun Aya processors and sun- dried for 2-3 days under natural condition while other ingredients were purchased from a registered dealer of animal feed ingredients. The birds were fed the treatment diets and water supplied *ad libitum* using the appropriate feeding and watering troughs. The liter was replaced routinely with fresh wood shavings.

Table 1: Percentage composition of experimental diets

	Experimental diets				
Ingredients	1	2	3	4	5
Tiger nut offal	0	10	20	30	40
Maize	42	31	21.5	11.5	3
Soy bean	48	48.5	48.5	48	47.5
Fish meal	6.5	7.0	6.5	7.0	6.0
Bone meal	3.0	3.0	3.0	3.0	3.0
Salt	0.25	0.25	0.25	0.25	0.25
Vit/min Premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
ME (kcal/kg)	2810	2813	2826	2837	2846

The initial, weekly and final weight of the turkey were collected. The data collected were used to determine:

a. Av. Daily feed intake (g/bird) $= \frac{Quantity\ of\ feed\ given - leftover}{No.of\ birds\ X\ No.of\ days}$

b. Av. Daily wt. given (g/bird) $= \frac{Final\ weight - Initial\ weight}{No.of\ birds\ X\ No.of\ days}$

c. Feed conversion ratio (FRC) $= \frac{Quantity\ of\ feeds\ consumed/bird}{Weight\ gained/bird}$

The weight of each organ was measured and expressed as a percentage of the live weight of the birds. No mortality was recorded.

All data generated were subjected to analysis of variance (ANOVA) and treatment means that were significantly different were separated using Duncan's Multiple Range Test (Duncan, 1955) according to Steel and Torrie, 1980, using computer software IBM SPSS Statistic version 20 (SPSS, 2012).

Results and Discussion

The result of the growth parameters of turkey poults fed graded level of tiger nut offal meal is presented in Table 2. The final weight of turkeys fed the treatment diets shows no definite pattern as there were no significant difference in diets 1-4 but diet 1 was significantly different (P<0.05) from diet 5. There was no significant difference (P>0.05) in the daily weight gain values of turkeys fed diets 1 to 4 but that of diet 3 was significantly greater (P<0.05) than diet 5. There was no significant difference shown in daily feed intake and feed conversion ratio.

Table 2: Growth performance of turkeys fed graded level of tiger nut offal meal

Parameters	Treatment					
	1 (0%)	2 (10%)	3 (20%)	4 (30%)	5 (40%)	SEM
Initial weight (g/bird)	50.00	52.00	52.33	51.00	52.00	0.32
Final weight (g/bird)	80.00^{ab}	790.00^{ab}	830.00^{a}	790.00^{ab}	760.00^{b}	8.77
Av. Daily weight gain (g/bird)	13.39^{ab}	13.17^{ab}	13.87^{a}	13.19^{ab}	12.64^{b}	-.16
Av. Daily feed intake (g/bird)	50.44	50.59	50.42	50.16	49.96	0.13
Feed conversion ratio	3.77	3.80	3.64	3.81	3.97	0.05
Mortality	-	-	-	-	-	-

Means with different superscripts are significantly different at P<0.05; SEM-Standard error of the mean

The result of internal organ proportions of turkeys fed graded level of tiger nut offal meal. Except for kidney, spleen and total intestine, significant differences (P<0.05) existed in the other internal organs. There were no significant differences in the gizzard of the birds fed diets 1, 3 and 5. The liver of turkey fed diet 3 was significantly higher (P<0.05) than that of diets 1, 2 and 4 but not different (P>0.05) from that of diet 5. Some metabolic activities occur more in the liver (Ugwuene *et al*. 2005) the increase means an additional pressure on the organ in terms of detoxification. The heart of turkey fed diet 3 was significantly higher (P<0.05) than those of diets 1, 2 and 4 which are not significantly different (P>0.05) from each other. The result of the lungs of turkey fed diet 1 was scientifically similar with (P>0.05) to that of diet 2 and 5. It could be concluded from the above result of the internal organs that higher metabolic activities took place in turkeys fed tiger nut probably due to the dietary fat and fibre content (Ugwuene *et al*. 2005).

Table 3: Internal organ proportions of turkeys fed graded levels of tiger nut offal meal

Parameters	1 (0%)	2 (10%)	3 (20%)	4 (30%)	5 (40%)	SEM
Gizzard + Proventriculus (%)	4.35^{a}	3.75^{c}	4.46^{a}	3.81^{bc}	4.36^{ab}	0.12
Kidney (%)	0.94	0.93	1.04	1.06	1.01	0.03
Liver (%)	2.50^{bc}	2.51^{bc}	2.94^{a}	2.40^{c}	2.79^{ab}	0.06
Spleen (%)	0.15	0.12	0.18	0.13	0.13	0.01
Heart (%)	0.56^{b}	0.54^{b}	0.64^{a}	0.58^{b}	0.59^{ab}	0.01
Lungs (%)	1.11^{a}	1.02^{ab}	0.75^{b}	0.82^{b}	0.92^{ab}	0.05
Total intestine (%)	9.36	8.84	10.03	9.39	8.42	0.31

a,b,c means in the same row with different superscripts are significantly different (P<0.05); SEM=standard error of the mean

Conclusion and Application

There was no adverse effect on growth parameters and internal organ proportions. Turkeys fed diets 3 containing 20% tiger nut offal meal performed better than others and therefore can be recommended for improved turkey performance.

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