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Growth Performance of Finisher Broilers on Livingstone-Potato (*Plectranthus esculentus*) Tubers Meal

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Abstract: A feeding trial lasting 42 days was conducted using seventy two (72) 4-weeks old Anak broiler chicks with an average initial live weight of 4.40 kg to determine the growth performance of finisher broilers fed diet containing Livingstone-potato tubers meal. The animals were assigned to four treatment based on their initial live weight. The diets were formulated to be isonitrogenous (20% CP). The control diet was based on maize and soybean meal without Livingstone-potato tubers meal. Feed and water were offered *ad libitum*. The growth performance of broilers fed on various levels of meals in which Livingstone-potato (Rizga) meal substituted maize at 10%, 20% and 30% showed that there were no significant differences ($p < 0.05$) in final body weight, average daily weight gain, average daily feed intake and feed conversion ratio among the treatments. The implication of these result is that those parameters measured were not significantly ($p > 0.05$) influenced by the dietary levels of Livingstone-potato (*Plectranthus esculentus*) meal. The results suggest that 30% replacement of maize with Livingstone-potato (*Plectranthus esculentus*) meal produced no negative effect on the production performance of finisher broilers.

Key words: *Plectranthus esculentus* meal, growth performance, Anak broiler chicks

INTRODUCTION

Livingstone potato (*Plectranthus esculentus*) is a dicotyledonous perennial shrub belonging to the family Lamiaceae. It is known locally as *Rizga*, *Mvat*, *Vu*, *Sima* or *Rungwabi* and is popular amongst the middle belt region of Nigeria as energy source (Demissie, 1997; Schipper, 2000; Olojede *et al.*, 2005).

The high cost of conventional feed ingredients has been the prime stimulant for the continuing search for alternative feedstuff to reduce cost of feed and animal production (Onifade *et al.*, 1998). A typical Nigerian consumes about 15 g of animal protein per day as against 54 g per caput per day by Americans (FAO, 1989). This is grossly inadequate and poses a serious threat of malnutrition. Recent high cost of livestock products makes it impossible for the average Nigerian to consume adequate quantity of animal protein. Consequently, a great number of the livestock farmers located all over the country are not producing to capacity as a result of high cost of maize. In a situation as this, animal nutritionist have been embarking on research works in an attempt to search for various materials hitherto considered as neglected or un-utilizable with a view to finding those that could be used as feedstuffs.

Several agricultural product and agro-industrial by-products have been evaluated for this purpose in Nigeria. Livingstone-potato tubers are agricultural product whose nutritional importance in poultry/livestock is not known.

The Livingstone-potato is considered an untapped indigenous tuber crop. No attention has been paid to this crop which contributes significantly to nutritional

security in some rural communities. There is paucity of information in the use of this crop in poultry/livestock nutrition in Africa.

Therefore the objectives of this study are to determine the chemical composition of Livingstone-potato tubers meal, to evaluate growth performances and economics of Livingstone-potato tubers meal in the diet of finisher broilers.

MATERIALS AND METHODS

The experiment was carried out in the Poultry Unit of National Root Crops Research Institute, Umudike, and Abia State, Nigeria.

Preparation of experimental material: The Livingstone-potato tubers used for this study were harvested from the experimental farms of NRCRI Umudike. Livingstone-potato were washed; soaked in boiling water for five minutes; dried, chipped with chipping machine and sun-dried for several days to constant moisture content. The resulting chips were milled and bagged for the feeding trials, some of the sample was collected and analyzed for its chemical composition as per AOAC (1990).

Experimental diets: Four experimental diets were formulated. The diets were Isonitrogenous diets containing 20% crude protein and caloric densities of 2898.63 to 2797.89 were formulated in Table 1. Livingstone-potato meal replaced maize in the diet while soybean meal, Groundnut cake and foreign fish meal were used as the major protein sources. The control diet (Diet I) contained no Livingstone-potato meal, while

Table 1: Composition of experimental diets

Ingredient	I	II	III	IV
Maize	55.61	45.71	35.82	25.92
Livingstone-potato meal	-	10.00	20.00	30.00
Soybean meal	10.69	10.59	10.48	10.38
Groundnut cake	12.00	12.00	12.00	12.00
Fish meal	3.00	3.00	3.00	3.00
Wheat offal	10.00	10.00	10.00	10.00
Palm kernel cake	5.00	5.00	5.00	5.00
Bone meal	3.00	3.00	3.00	3.00
Common salt	0.25	0.25	0.25	0.25
Vitamin premix	0.25	0.25	0.25	0.25
Lysine	0.10	0.10	0.10	0.10
Methionine	0.10	0.10	0.10	0.10
Totals	100.00	100.00	100.00	100.00
Calculated values				
CP%	20.00	20.00	20.00	20.00
CF%	4.10	4.96	5.81	6.68
ME (kcal/kg)	2896.63	2870.95	2845.21	2819.62

Table 2: Proximate composition of test ingredient

Composition (g/100 gdm)	Livingstone-potato (Rizga) meal
Moisture	7.85
Crude protein	10.34
Crude fibre	14.12
Lipids/fat	0.12
Total ash	4.47
NFE	63.10
Ca	0.34
pH	0.37

Table 3: Performance of finisher broilers fed Livingstone-potato tuber meal based diets

Parameters	I	II	III	IV	SEM
Initial body weight (kg)	4.40	4.40	4.40	4.40	-
Final body weight (kg)	13.50	14.90	14.70	14.20	0.50
Average daily gain (kg)	0.25	0.29	0.28	0.27	0.01
Average daily feed intake (g)	107.44	108.13	109.18	109.25	0.58
Feed conversion ratio	2.35	2.71	2.57	2.47	0.12
Cost of feed production (Naira/kg)	69.04	66.31	63.73	61.39	-
Cost of feed consumed (Naira)	3831.25	3467.95	3449.17	3394.55	-

SEM: Standard Error of Mean

Diet II, III and IV respectively contained 10, 20 and 30% level of Livingstone-potato meal in replacement of maize in the respective diet.

Feeding trials: A total of seventy two (72) 4-weeks old Anak broiler chicks were divided into four treatment groups of 18 birds each and randomly assigned to the four experimental diets. Each group was subdivided into 3 replicates of six (6) birds. The birds were weighed at the beginning of the experiment and weekly thereafter. Feed and water were also given to them *ad libitum*. The experiment lasted for 6 weeks.

Statistical analysis: Data collected from the experiment (feed intake, growth rates and feed conversion ratio) were subjected to analysis of variance (ANOVA) in completely randomized design experiment Snedecor and Cochran (1967). While differences in the treatment means were separated using the Duncan's Multiple Range test as outlined by Steel and Torrie (1980).

RESULTS AND DISCUSSION

The compositions of the diets are presented in Table 1. The diets had similar protein levels of 20% but the energy content differed. As Livingstone-potato meal increased in the diet, caloric values of the diet decreased across the treatments. The crude fiber content increased with increase in the inclusion levels of Livingstone-potato (Rizga) meal in the diet.

The proximate composition of Livingstone-potato (*Plectranthus esculentus*) meal is presented in Table 2. The moisture (7.85%), crude protein (10.34), crude fibre (14.12%), Ether extract (0.12%), ash (4.47) and NFE (63.10%) are comparable to those of Olojede *et al.* (2005).

The growth performance of broilers fed on various levels of meals in which Livingstone-potato (Rizga) meal substituted maize at 10%, 20% and 30% showed that there were no significant differences ($p < 0.05$) in final body weight, average daily weight gain, average daily feed intake and feed conversion ratio among the

treatments (Table 3). The implication of these result is that those parameters measured were not significantly ($p>0.05$) influenced by the dietary levels of Livingstone-potato (*Plectranthus esculentus*) meal.

Decreasing feed production cost (Naira/kg) (69.04, 66.31, 63.73 and 61.39 naira) was observed as inclusion level of Livingstone-potato (*Plectranthus esculentus*) meal increased from 0 to 30%. Similarly, cost of feed consumed by each test group followed the same decreasing trend (Naira3831.25, Naira3467.95, Naira3449.17 and Naira3394.55) for 0, 10, 20 and 30% inclusion levels respectively as shown in Table 3.

Conclusion and recommendation: Livingstone-potato (*Plectranthus esculentus*) meal can be included up to 30% in finisher broilers. In the next trial, higher levels will be included to determine the optimum substitution level. Feed production cost decreases as the inclusion level of Livingstone-potato (*Plectranthus esculentus*) meal increases. Areas which have economics of production of Livingstone-potato (*Plectranthus esculentus*) over maize should use up to 30% in finisher broilers diet.

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