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Growth Performance of Broiler Finisher Birds Fed Composite Cassava Meal (ccm)

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ABSTRACT

The growth performance of broiler finisher birds fed composite cassava meal (ccm) was determined with one hundred and fifty 4 week old Anak ® broiler strain. The experiment which lasted for eight weeks had five dietary treatments 1, 2, 3, 4, and 5 respectively. The experimental diet was formulated to contain 20% crude protein with composite cassava meal replacing 0%, 25%, 50%, 75%, and 100% of the maize in the diet. The birds were alloted to the dietary treatment groups in a completely randomize design. Each treatment had thirty birds each and the treatments were replicated two times with fifteen birds per replicate. Feed and water were given ad-libitum. Parameters considered were feed intake, weight gain, final weight gain, feed conversion ratio and protein efficiency ratio. Result obtained showed that dietary treatments significantly ($p<0.05$) affected daily feed intake, daily weight gain, final live body weight, feed conversion ratio and protein efficiency ratio.

Bird fed diets 2, 3 and 4 were similar in all performance parameters but were significantly ($p<0.05$) higher than birds fed diets 4 and 5. The higher feed intake of birds on high composite cassava meal could be attributed to the higher fibre content and lower energy levels of the diets. Despite the higher feed intake, the birds had significantly ($P<0.05$) lower final weight, daily weight gain, protein efficiency ratio. The poor performance could also be attributed to possibly higher levels of cyanide. The result obtained therefore indicated that composite cassava meal is a valuable non-conventional feedstuff that could be substituted quantitatively up to 50% for maize without any adverse effect on the performance of the broiler birds.

Keywords: *Growth performance, broiler finisher, composite cassava meal,*

INTRODUCTION

Poultry and other livestock feeding is expensive as it takes about 65 – 75% of the total cost of production [1]. This is so because of the high cost of conventional feed resources like maize, soyabean, groundnut that are used in producing animal feed [2]. Maize most often, constitutes the highest proportion of ingredient in diet formulation of any poultry ration [3]. This high inclusion rate translates into high cost of feed because of seasonality of maize production and competition for it by man and livestock [3]. Preston [4] reported that one of the major challenges to researchers in the tropic is providing alternative feed resources for monogastrics.

According to Okoye, [5], poultry production in Nigeria is affected by high cost of feedstuffs. Shittu et al, [6] stated that although some alternative feed resources have been discovered to be useful but that there is need to have adequate knowledge of them and their composition.

One of the potential alternative feedstuffs is cassava, a wonder plant with all its parts useful in feeding poultry and livestock [7]. A lot of research works have been done to define the optimum level of cassava in animal diet and to modify the plant's chemical and physical properties that restrict its use [8].Composite cassava meal, an alternative feed resource as energy source has potential that can be exploited. However, as cassava rations contains cyanide, the ccm has to be treated in order to enhance its utilization as a substitute for maize in feed formulation of poultry rations. Much of the research works done to date on the use of cassava and other agro-industrial by-products and their wastes for monogastrics have concentrated on their utilization in terms of growth and production levels [9] with limited data on the characterization of the energy values of these valuable ingredients. Agunbiade et al., [10] reported that in order for the unconventional feed resources to be utilized with great economic efficiency, knowledge of their dietary energy value must be obtained. Measurement of the dietary energy and other nutrient utilization of composite cassava meal is known to be influenced by many factors among which includes the rate of inclusion [11].

MATERIALS AND METHODS

Procurement of the Test Ingredient

Freshly harvested cassava roots were obtained from the University Demonstration farm (crop

section). The cassava leaves and tender stems were obtained from the harvested plants.

Experimental Location and Animals

The study was carried out in the university research and teaching farm. One hundred and fifty 4 week old Anak ® broiler Strain finisher were used for the experiment.

Experimental Diet

There were five experimental diets formulated with the same percentage of crude oil protein in all the different groups.

The diet being isonitrogenous had composite cassava meal replacing 0%, 25%, 50%, 75%, and 100% of the maize.

Preparation of the Test Ingredient

The cassava leaves harvested were sun-dried on a concrete floor until the leaves were crispy.

The harvested cassava stems were chopped into smaller sizes and sun-dried on a concrete floor. Both leaves and the stems were later milled separately. The cassava root tuber with the brown cover peeled was washed, chopped sun-dried also on a concrete floor to about 10% moisture content was also milled. The cassava root meal was mixed with stem and leaf meals at the ratio of 5:2:2.

Precautions in Using Cassava as Poultry Feedstuff:

Although there is presence of a cynogenicglucoside, which on hydrolysis yields the poisonous HCN, results from various studies have shown that this could be removed to tolerable levels by adopting different processing methods [12].[13] reported no deleterious effect utilizing sun-dried cassava tuber based ration for egg and broiler productions. Oke [14] and Nweke and Ezuma [15] reported that sun-drying, heating and or soaking in water for 3-5days eliminated 80-95% of cyanide in cassava tubers.

Experimental Design and Data Collection

The study was carried out for eight weeks in a completely randomized design experiment. One Hundred and Fifty (150) 4 week old broiler finisher birds were randomly assigned to the five dietary treatments with 30 birds per treatment, each treatment was replicated two times with fifteen birds per replicate. Parameters measured were feed intake, weight gain, final live weight, feed conversion ratio and protein efficiency ratio.

Chemical Analysis

The chemical analysis was done using AOAC [16] procedure, employing the Micro kyeldhal apparatus for nitrogen content and using the Soxhlet apparatus for ether extract.

Data Analysis

Data collected on growth performance were analyzed by the analysis of variance in completely randomized design as described by Steel and Torrie [17]. Significant means were separated using the Duncan's Multiple Range Test [18].

Table 1: Percentage Composition of Broiler Finisher Ration Containing Graded Levels of Composite Cassava Meal a Replacement for Maize.

Ingredients	T1	T2	T3	T4	T5
Maize	62.82	53.28	31.61	25.07	-
Composite cassava meal (ccm)	-	12.54	25.07	37.61	62.68
Groundnut cake	28.82	28.82	28.82	28.82	28.82
Fish meal	5.00	5.00	5.00	5.00	5.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Vit/min. premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
Calculated					
Crude protein	20	20	20	20	20
Metabolisable energy *(kcal/kg)*	*3068.08*	*2955.22*	*2842.45*	*2729.59*	*2161.82*

❖ *Vit/min premin providing 1kg diet vit. A 30769 i.u; vit D_3, 61541 i.u, vit. E; 115 i.u; Vit. K, 77mg, Thiamine 39mg Pyrodoxine, riboboflavin, 115mg, calcium pathothenate 173mg, Nicotinic acid, 346mg, 39mg, vit. B_{12}, 0.31mg folic acid 19mg, manganese 3g, zinc 2g, Iron 1g, copper 115mg, Iodine 38mg, cobalt 8mg, selenium 4mg, antioxidant 4g, chlorine 8mg.*

Table 2: Proixmate Composition of Composite Cassava Meal

Components	Percentage composition
Moisture	11.50
Crude protein	10.09
Crude fibre	23.00
Ether Extract	3.40
Ash	6.21
Nitrogen free extract	48.8

RESULTS AND DISCUSSION

The proximate composition of the composite cassava meal (ccm) is presented in table 2. The crude protein content is greatly increased compared to ordinary cassava root meal. This can be accounted for by the incorporation of cassava leaves and tender stems. Subsequently this will improve the lysine content of the composite cassava meal since cassava leaves have been reported to be high in lysine (7.2g/100g protein) [19]. The incorporation of stem may also have led to the increased crude fibre content of the ccm since stems are known to be high in crude fibre [20]. The fibre content may be of an advantage since it will lead to the production of a rather more coarse material, which is more desirable than ordinary fine textured root meal.

Table 3: Composition of the Experimental diet

Components %	T_1	T_2	T_3	T_4	T_5
Dry matter	90.70	90.26	90.59	90.62	90.24
Moisture	9.30	9.74	9.41	9.38	9.76
Crude protein	19.98	20.08	20.14	20.22	20.25
Crude fibre	5.60	6.85	7.05	7.70	8.60
Ash	5.70	5.75	5.80	5.80	6.30
Ether Extract	4.40	4.55	4.60	5.05	5.05
Nitrogen free extract	55.02	53.06	53.00	51.85	50.04

The proximate composition of the experiment diet presented in table 3 shows the dry matter yields of all the diets to be high (above 90%) and similar. As the level of composite cassava meal (ccm) increased, the nitrogen free extract of the diets tended to decrease. This may be as a result of the increase values of the other components. Also, the ccm is high in ash (6.21%). All may have accounted for the increasing value of all the food components.

The performance of the birds are shown in table 4, there were significant (0<0.05) effects on dietary treatments on daily feed intake, daily body weight, final body weight, feed conversion ratio and protein efficiency ratio. Birds fed diets 1, 2, 3 and 4 were similar but significantly (P<0.05) higher than those fed diets 5. The higher feed intake recorded for birds fed diets 5 containing 50.14 composite cassava meal could be attributed to the higher crude fibre content and lower energy levels of the diets. The birds therefore, ate to satisfy energy requirement. Despite the high feed intake of birds in treatment 5, they had significantly (P<0.05) lower daily weight gain, final live weight, protein efficiency ratio and higher feed conversion ratio (FCR). The poor performance of these birds fed diets 5 could also be attributed to possibly higher levels of cyanide in the two diets. High levels of fibre and cyanide adversely affect digestibility and utilization of nutrients by birds [21], hence, the observed poor feed conversion ratio,,, protein efficiency ratio and weight gain manifested generally in the final finishing weights of the broilers.

The results obtained correspond with the report of Igwebuike and Okonkwo [12], who recommended inclusion level of up to 60% cassava peel-leaf meal in poultry rations.

Also. Chukwu [22] indicated the incorporation of ccm up to 60% in broiler starter rations without any adverse effect.

Table 4: Performance Parameters of Broilers Fed Diets Containing Graded Levels of Composite Cassava Meal (ccm) as Replacement for Maize**.**

Parameters	Diets					
	T_1	T_2	T_3	T_4	T_5	SEM
Initial body weight (g)	591.00	579.00	518.00	580.00	582.00	3.75^{ns}
Final body weight (g)	2046.33^{a}	2021.00^{a}	2046.67^{a}	2014.67^{b}	2014.67^{b}	24.26^{*}
Daily weight gain (g)	51.98^{a}	59.48^{b}	52.34^{a}	51.24^{a}	47.86^{b}	0.76^{*}
Average daily feed intake(g/day)	119.64^{c}	119.09^{c}	127.82^{bc}	128.76^{bc}	134.05^{b}	4.00^{*}
Feed conversion ratio	2.30^{c}	2.31^{c}	2.44^{c}	2.51^{c}	2.80^{b}	0.093^{*}
Protein efficiency ratio	2.08^{a}	2.07^{a}	1.95^{a}	1.89^{ab}	1.70^{ab}	0.071^{*}

a, b, c = *Means is the same row and with different superscripts are significantly different (P<0.05). ns = Non Significant (P<0.05). SEM = standard error of mean.*

CONCLUSION

It was observed that birds fed diets 1, 2, 3 and 4 (containing 0, 25, 50, and 75%) composite cassava meal in replacement of maize) had lower average daily feed intake but performed significantly better in final body weight, daily weight gain, feed conversion ratio and protein efficiency ratio than the birds fed diets 5 (containing 100% composite cassava meal in replacement of maize). The results indicated that composite cassava meal (ccm) is a valuable non-conventional feed stuff that could be used in formulating finisher broiler diets. However, the inclusion levels of the composite cassava meal in the diets should not exceed 60% as higher levels of inclusion could adversely affect the performance of finisher broilers. It is therefore recommended that composite cassava meal (ccm) be substituted quantitatively for maize up to 75% level.

REFERENCES

1. Tewe, O. O and Kasali, O. O. (1986). Effect of Cassava peels processing on the performance, Utilization and Physiopathology of the African giant rat (cricrtomy gambianus). *Trop. Agric (Trinidad* 63 (**2**) : 125-`28
2. Amaefule, K. U and Obioha, F. C (2005). Performance of Pullets Chicks fed raw or processed pigeon pea *(Cajanus Cajan)* seed meal diets. LRRD 19, 33. htt://www.cipar.org.co /rrd/rrd17/03/amec17033htm.
3. Agbede, J. O., Ajaja, K and Aletor, V. A. (2002). Influence of roxazyme G. supplementation on the utilization of sorghum dust based diets for broiler chicks. Proceeding of 27th Annual Conference of *Nigerian Society for Animal Production*. 105-112
4. Preston, A, (1995). Topical Animal Feeding. A Manual for Research Workers pp 68-75.
5. Okoye, F. (2002). Substitution of cassava with Maize with cassava peel leaf meal as energy source in the diet of broiler finishers. Proc. 17th Annual Conference University of Agriculture, Abeokuta, Nigeria.
6. Slittu, A. M. Olayode, G. O. Bamiro, O. M. Aderemi, F. M. (2004). Effects of using non-conventional feedstuffs on the production and costs of egg farms in Ibadan, Nigeria. *Nigerian Journal of Animal Production* 31 (**1**) 65-78
7. Tewe, O. O and Manner, J. H. (1977). Cassava diets and implication of cyanide metabolism in the reproduction performance of pigs. *Journal of Animal Production*. 4(**1**) 261-263.
8. Montilla, J. J Verges, R and Montalds, A. 1976. Effects de various niveles de harina de foliage de ynca en raciones para pollos encored*. Rev fac. Agric Univ* 24:53-61
9. Agunbiade, J. A, Osiltu, A. A and Adeyemi, O. A, (2001). Fortification of Cassava Peel meals in balanced diets for rabbits. *Tropical J. Animal Science*. 4 (**1**), 77-84
10. Agunbiade, J. A, Odulate, O. A Adeyemi, O. A and Taiwo, A. (2002a). Energy values of some non-conventional feeding materials in Poultry diets. Proc. 7th Ann. Conference. Animal Science. Association of Nigeria. (ASAN), pp 134-136
11. Agunbiade, J. A, Adeyemi, O. A. Adepoju, O. A. and Lawal, O. A. (2002b). The use of whole cassava meal and leaf meal in broiler diets*. Tropical Journal Animal. Science* 161-173.
12. Igwebuike, J. U and Okonkwo, A. C. (1993). Cassava *(manihot esculenta)* as an alternative energy source for poultry. Proceeding of 18th Annual Conference, Nigerian Society for Animal Production, pp. 47-49.
13. Udedibie, A. B. I, Durunna, C. S. and Anyawu, G. A. (2000). Combination of maize/sorghum based fried brewer's grain, cocoyam, corn and cassava tuber meal as substitute for maize in the diets of laying hens. Proceedings of 25th Annual conference of the Nigerian society for Animal production 169-173

14. Oke, L. (1996). Chemical Studies on some Nigerian feedstuffs-"Garri" Nature (London) 212:1055-1056
15. Nweke, F. I. and Ezuma, H. C. (1998). Cassava in African farming and food system. Implication for use in livestock feeds to cassava as livestock feed in Africa. Proceeding of the IITA/ILCA/University of Ibadan, 14-18
16. A.O. A. C, (1990). Official Method of Analysis Association of Official Analytical Chemist 13th edition.
17. Steel, R. G. O and Torrie, J. H. (1980). Principles and Procedure of Statistics. 2nd Edition Megraw-Hill book, Coy New York, USA.
18. Duncan, D. B. (1955). Multiple Range and Multiple F-Tests. Biometrics 11:1-48
19. Mitaru, B. N. and Blaire, R. (1984). The influence of dietary fibre sources on growth, feed efficiency and digestibilities of dry matter and protein in rats. *Journal of Science and Food Agriculture* 33:625-631.
20. William, A. D. and Newbold, F. C. (2004). Response of weaner rabbits to dietary levels of processed pigeon pea meal, *Nigerian Journal of Animal Production*, 35 (1&2) 69-75.
21. Esonu, B. O. and Udedibie, A. B. I. (1993). The effect of replacing maize with cassava peel meal on the performance of weaner rabbits fed diets containing cassava root, peel and seviate. *Tropical Journal of Animal Science,* vol. 9 (**1**) 81-87.
22. Chukwu, C. (2004). Effect of composite cassava meal (ccm) in the performance of broiler starter chicks A.B. Science. Project Report Submitted to College of Animal Science and Health, Michael Okpara University of Agriculture. Umudike.