REPLACEMENT VALUE OF CASSAVA PEEL MEAL FOR MAIZE IN COCKEREL RATION

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ABSTRACT
The study was carried out to investigate the replacement value of cassava peel meal for maize in cockerel ration. Three hundred (300) commercial strain of white cockerel was used to determine the replacement value of maize with cassava peel meal (CPM) on the overall performance of cockerel birds. Five dietary treatments with CPM replacing maize at 0%, 25%, 50%, 75%, and 100% inclusion levels were formulated for the starter phase (2-8 weeks) and the grower phase (8-14 weeks) of the birds. A total of sixty (60) birds were assigned to each dietary group with three (3) replicates of twenty (20) birds each. Data on growth response was taken. Effects of the dietary treatments in all phases of the study were checked on the feed intake, body weight gain, feed conversion ratio and feed efficiency ratio. The feed intake was significantly affected by the dietary treatments at the starter phase of the experiment and the weight gain at the end of the starter phase was equally significantly affected by the dietary treatments. The feed intake was however not significantly affected ($P>0.05$) by dietary treatment in the grower phase of the study. The body weight gain and feed conversion ratio (FCR) were significantly affected ($P<0.05$) by the dietary treatment during the course of the study. The feed cost per kgand the cost of feed consumed per bird reduced as the level of CPM inclusion increased. Feed cost per kg weight gain was highest in diet T5 and least in T2. The results therefore suggests that inclusion level of up to 50% CPM for maize at the starter phase was optimum for growth and overall performance, and an inclusion level of up to 25% CPM in cockerel growers supported optimum growth without a negative effect on the performance.
Keywords: cockerel, cassava peel meal, maize, replacement, growth, starter, grower.

INTRODUCTION
The Poultry industry occupies a unique position in the livestock sector due to the fact that it has a quicker reproductive ability than other livestock species. They are highly prolific and good converters of feed (Obioha, 1992). Maize which is the main conventional source of energy accounted for about 45-65% in a balanced poultry ration depending on the other ingredients used for the feed formulation. Maize is keenly competed for in terms of consumption by humans, livestock and for use in the brewery industries, hence this has pushed its market price to an alarming height that has directly affected the cost of poultry production (Lala *et al.*, 2009). Poultry nutritionists have therefore tried to harness and improve the utilization of agro industrial by-products and wastes that are not directly used by man and are usually less expensive for the feeding of poultry birds (Lala *et al.*, 2009). A very important agro industrial by-product in this category includes the use of cassava peel in the diets of poultry birds. Tewe and Egbunike (1992) observed that cassava peelings can also be satisfactorily used up to 40 percent for pigs, 15 percent for broilers and 27 percent for layers. The envisaged reduction in cost per ton of finished cassava-based feeds will result in the production of cheaper animal products in Africa. The use of cassava peel as a part of livestock feed has been encouraged by researchers but the nutritional characteristics must be carefully balanced before use so as to compensate for the vital nutrients it lacks and also to ensure satisfactory performance of the livestock.

MATERIALS AND METHODS
Experimental birds and diets
Three hundred (300) day old commercial cockerel birds were used for the experiment which lasted for fourteen (14) weeks. The birds were raised on a deep litter system. Five experimental diets with CPM replacing maize at

0% (T1), 25% (T2), 50% (T3), 75% (T4) and 100% (T5) inclusion levels was formulated for both the starter phase (2-8 weeks) and the grower phase (8-14 weeks) and fed *ad-libitum*.The birds were weighed on weekly basis to determine growth parameters such as weight gain and feed to gain ratio.

Statistical Analysis: The data collected was subjected to analysis of variance (ANOVA) using statistical analysis software (SAS) package (2003). The means separation was done using the Duncan's New Multiple Range Test (DNMRT) at 5% significance level.

RESULTS AND DISCUSSION

The observed value of 90.00% dry matter for cassava peel meal was similar to the value (90.60%) reported by Akinfala *et al.* (2011) but higher than that reported by Ogbonna and Adebowale (1993). The same thing was applicable to Nitrogen free extract. However, the value for crude protein, crude fibre and ether extract were different to the values reported by Akinfala *et al.* (2011). The gross energy of 3.037kcal/g obtained for the sun-dried CPM used for this study was higher than the value of 2.86kcal/g reported by Akinfala *et al.* (2011) and the value of 2.16kcal/g reported by Tewe (1994). The high energy value reported in this study may be attributed to the presence of small tubers and edible pulps in the peels. Ogbonna *et al.* (1988) though reported that the gross energy contents of the diets increased with increasing dietary fibre levels. Although, cassava peel appeared to be similar to maize in proximate composition, it's inclusion to replace maize in this study did not justify this similarity. Statistical analyses in the present study indicated that there was no significant difference ($P>0.05$) between treatments in feed intake but weight gain for the different dietary treatments showed significant differences. The growth rate of the birds decreased and feed to gain ratio was negatively affected as the proportion of cassava plant meal increased in the diets. This was similar to the findings of Akinfala *et al* (2002) that the nutrients in whole cassava plant were apparently used less efficiently for growth than the nutrients in maize. This may be because the protein provided by cassava peel meal was of rather inferior quality compared to maize. Besides, the synthetic DL-methionine level in the CPM based diets might not be enough to bring about the desired growth in the animals, because part of it might have been used to detoxify the residual hydrogen cyanide to the more innocuous thiocyanate (Tewe and Egbunike 1992; Tewe 1994).

Cost Benefit Analysis

The cost implication of using cassava peal meal to replace maize in the diet of cockerel chicken was evaluated and as shown in Table 4, feed cost per kg of diet was highest in diet 1 (₦79.55) and lowest for diet 5 (₦60.35). Cost of production per bird was highest in diet 1 (₦331.45) and lowest for diet 5 (₦251.45).

CONCLUSION

The results of this study showed that sun-dried cassava peel meal can be included in the diets of cockerel chickens from the up till the grower phase to replace 25% of maize in their diets without health problem, but a reduced growth rate will occur. Thus, Cassava peel has considerably good attributes and it is suitable for use in livestock diet.The economy of production showed that when CPM replaced 25% of maize in the diet, more profit could be generated in the production system.

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Table 1: Gross composition of experimental diets at starter and finisher phases

	Starter					Finisher					
Ingr %	**0%**	**25%**	**50%**	**75%**	**100%**	**Ingr %**	**0%**	**25%**	**50%**	**75%**	**100%**
Maize	55	41.25	27.5	13.75	0	Maize	48	36	24	12	0
CPM	0	13.75	27.5	41.25	55	CPM	0	12	24	36	48
SBM	28	28	28	28	28	SBM	15	15	15	15	15
WO	10	10	10	10	10	WO	31.5	31.5	31.5	31.5	31.5
FM.72%	2.5	2.5	2.5	2.5	2.5	FM.72%	1	1	1	1	1
BM	2.5	2.5	2.5	2.5	2.5	BM	2.5	2.5	2.5	2.5	2.5
OS	1.2	1.2	1.2	1.2	1.2	OS	1.3	1.3	1.3	1.3	1.3
MET	0.2	0.2	0.2	0.2	0.2	MET	0.1	0.1	0.1	0.1	0.1
LYS	0.1	0.1	0.1	0.1	0.1	LYS	0.1	0.1	0.1	0.1	0.1
Vit/min	0.25	0.25	0.25	0.25	0.25	Vit/min	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25	Salt	0.25	0.25	0.25	0.25	0.25

Table 2: Calculated analysis of experimental diets at grower phase

	Inclusion level of CPM				
Data	0%	25%	50%	75%	100%
Crude protein	16.42	15.95	15.48	15.02	14.55
ME (kcal/kg)	2434.82	2267.3	2099.78	1932.26	1764.74

Table 3: Nutrient composition of cassava peel meal (CPM) and maize

Parameters	DM	CF	CP	EE	ASH(%)	NFE(%)	ME	CA(%)	P(%)
CPM	90	4.31	5.93	1.05	1.75	76.96	3037.38	0.61	0.32
Maize	90.6	1.92	9.25	2.98	2.54	73.91	3209.82	1.03	0.45

Table 4: Economy of production of birds fed experimental diets at the grower phase

Parameters	1	2	3	4	5	SEM
FC(#/kg)	79.55	74.75	69.95	65.15	60.35	3.04
TC/bird(#/kg)	331.45	311.45	296.39	271.45	251.45	12.68
FC/kgW/G(#/kg)	330.13	312.46	357.44	358.98	404.35	13.94

[a, b, c], Means along the same row having different superscripts differ significantly at 5% P.
FC= feed cost, TC/bird= total cost of feed per bird, FC/kg W/G= feed cost per kg weight gain