

REPLACEMENT VALUE OF SUN DRIED CASSAVA PEEL MEAL FOR MAIZE IN BROILER RATION

E.O. OYAWOYE, D. S. JOSEPH, AND A. M. OKURERIE

Department of Animal Science, Landmark University, Omu-Aran, Kwara State, Nigeria

Correspondence: oladejossy@yahoo.com, 07033678194

ABSTRACT

A research was conducted to determine the replacement value of cassava peel meal for maize as it affects the growth performance of broiler birds. One hundred and fifty (150) Abor - Acre strain of day old broiler chicks were subjected to five dietary treatments in which maize was replaced at different inclusion levels with sun dried cassava peel meal (CPM). The diets were T1 (100% maize, 0%CPM), T2 (75% maize, 25% CPM), T3 (50% maize, 50% CPM), T4 (25% maize, 75% CPM), T5 (0% maize, 100% CPM). Thirty birds were allotted to each dietary treatment and each treatment was replicated three times with each replicate having ten birds in a Completely Randomized Design (CRD). The overall performance characteristics of the birds throughout the 56 days of the experiment showed no significant ($P>0.05$) difference in the feed intake while significant ($P<0.05$) differences were observed in the weight gain, feed conversion ratio and feed efficiency ratio. The performance of birds on diet T1 was superior to birds on the other diets in weight gain, feed conversion ratio (FCR) and feed efficiency ratio (FER). The cost of feed per kg, cost reduction % and 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 T3 while diet T4 had the least. It was concluded that cassava peel meal can be included in broiler finisher diet to replace 50% of the maize without having a deleterious effect on growth performance while the cost of feed per kg was reduced by 9.86%. The use of cassava peel meal will improve the profit margins of broiler producers.

Keywords: broilers, carcass characteristics, cassava, cassava peel meal, maize.

INTRODUCTION

The major challenge of the poultry industry in Nigeria and other developing countries is the high cost of feed ingredients. Feed is a vital part of poultry production; it accounts for about 70-80% of the total cost of production. Some of the feed ingredients used in poultry feed production such as the cereals, oil seed cakes and other agro-industrial by-products are still being largely imported at high cost to sustain poultry and livestock industries in many developing countries (Dairo, 2011). The major energy source used in poultry feed formulation is maize. It takes up to 60% of the poultry diet. Maize is also a major staple food for the human population in developing countries such as Nigeria. Hence, there is high competition between the use of maize as livestock feed ingredient and as food by humans. This has consequently led to high cost of maize and thereby increasing the cost of producing animal feed. High cost of feed coupled with competition with humans by livestock for feed items such as maize necessitate that alternative energy sources

such as crop residues should be used in replacement for maize either partially or wholly in livestock feed in order to lessen the cost of meat production and also to make maize more available for human consumption. The need to source for locally available and cheap sources of feed ingredients especially those that are not consumed by humans has become an urgent priority. Cassava peels is one of such cheap source of energy which requires thorough study and probable utilization.

MATERIALS AND METHODS

Preparation of Cassava Peel Meal

Dried cassava peel was purchased from Ganmo which is few kilometers away from Omu-Aran along Ilorin Road, Kwara State. The cassava peels was air dried for a day in order to further reduce the moisture content so as to prevent mould growth and also to enhance milling. The cassava peels was then milled and mixed using hammer mill and mixer in the feed mill of Landmark University Teaching and Research Farm, Omu-Aran, Kwara State.

Experimental Design and Management of Experimental Birds.

One hundred and fifty (150) Abor acre strain of day old broiler chicks were subjected to five dietary treatments in which maize was replaced with sun dried cassava peel meal (CPM). Thirty birds were allotted to each dietary treatment and each treatment was replicated three times with each replicate having ten birds in a Completely Randomized Design (CRD). The birds were purchased from a reputable hatchery in Kwara State. Water and feed were provided to the birds ad libitum.

Experimental Diets

The different diets were T1 (100% maize, 0% CPM), T2 (75% maize, 25% CPM), T3 (50% maize, 50% CPM), T4 (25% maize, 75% CPM), T5 (0% maize, 100% CPM). T1 served as a control diet which contained 100% maize a major energy source in poultry feed. The cassava peel meal was used to replace varying proportions of maize.

Statistical Analysis

The data collected were 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 significance level of 5%.

RESULTS AND DISCUSSION

Performance Characteristics

The Table 2 below shows the general performance of the birds during the starter phase of the experiment. There was no significant ($P>0.05$) difference in the feed intake of the birds on the various experimental diets. The weight gain however, showed significant ($P<0.05$) differences among the birds with birds on diets T1 and T2 having the highest weight gain. The feed conversion ratio and the feed efficiency ratio followed the same pattern as the weight gain. The table 3 below shows the general performance of the birds throughout the finishing period of the experiment. The feed intake per bird showed no significant ($P>0.05$) difference among the birds on the various experimental diets. It was observed that the feed intake increased progressively from T1 to T3 and then beyond T3 there was a sharp reduction in the feed intake. This agrees with the observation of Salami and Odunsi (2003). The weight gain of

the birds showed a significant ($P<0.05$) difference among birds on the various diets. It reduced progressively as the level of inclusion of CPM increased from T2 to T5. This result agrees with the results of Abubakar and Ohiaage (2011), Onuh *et al.* (2010). The feed conversion ratio (FCR) of the birds also showed a significant ($P<0.05$) difference among birds on the various diets. Birds on Diet T1 had the highest FCR while birds on diet T5 had the least. This can be attributed to the high fibre content of the diet. This result tallies with the observation of Oyebimbe *et al.* (2006) cited in Abubakar and Ohiaage (2011), Ijaiya *et al.* (2002) cited in Salami and Odunsi (2003) also noted that a high dietary crude fibre level due to CPM reduced feed conversion efficiency. The feed efficiency ratio followed the same pattern as the feed conversion ratio. The FER decreased with increase in the level of CPM inclusion. This indicated that the birds utilized the maize meal better than the CPM. This result corresponds with the findings of (George & Sese, 2012).

The data on the economics of production are presented in Tables 4 and 5. The cost of feed per kg, cost reduction % and the cost of feed consumed per bird reduced as the level of CPM inclusion increased. This result agrees with the findings of Abubakar and Ohiaage (2011). The cost of feed per kg weight gain was highest in diet T3 followed by diet T5. This agrees with the result of Salami and Odunsi (2003).

CONCLUSION

Cassava peels has a considerably good nutritional attributes and it is suitable for use in livestock diet.

Cassava peel meal can be included in broiler ration to replace 50% of the maize without having deleterious effects on growth and general performance of the birds.

Inclusion of CPM in broiler ration to replace 50% of the maize led to reduction of feed cost by 7.61% for starter diet and 9.86% for finisher diet.

REFERENCES

- Abubakar, A., & Ohiaage, P.E. (2011). Replacement value of cassava peels for maize in the diets of broiler finisher chickens. *Sokoto Journal of Veterinary Sciences Vol(2)* pp. 16-19.

- Adeyemo, I.A., Sani A., & Aderibigbe T. A. (2013). Growth performance and nutrient retention of broiler chickens fed *Aspergillus niger* hydrolysed cassava peel based diet. *American Journal of Research Communication*, 1(7): 294-306 www.usa-journals.com, ISSN: 2325-4076.
- Aduku, A.O. Tropical Feedstuff Analysis Table.
- Akinfala, E.O., Aderibigbe A.O., & Matanmi O. (2002). Evaluation of the nutritive value of whole cassava plant as replacement for maize in the starter diets for broiler chicken. *Livestock Research for Rural Development* 14 (6).
- Akpabio, U.D., Akpakpan A.E., Udo I.E., & Nwokocha G.C. (2012). Comparative study on the physicochemical properties of two varieties of cassava peels (*Manihot utilissima* Pohl). *International Journal of Environment and Bioenergy*, 2(1): 19-32, ISSN: 2165-8951.
- Anaeto, M., & Adughibe L.C. (2011). Cassava root meal as substitute for maize in layers ration. *Revista Brasileira de Cienci Avicola*. vol.13(2).
- Dairo, F.A.S. (2011). Utilization of ensiled metabolizable mixture of cassava peel and caged layers' manure as energy source in broiler. *African Journal of Food, Agriculture, Nutrition and Development (AJFAND)* Vol. 11 No. 5.
- George, O.S., & Sese B.T. (2012). The effects of whole cassava meal on broiler carcass weight and the optimal inclusion rate of whole cassava meal in broiler production. *Advances in Agriculture, Sciences and Engineering Research*. Vol.2(6), pp184-189.
- International Institute of Tropical Agriculture. (2009). Roots and tubers systems: cassava. Retrieved from http://www.old.iita.org/cms/details/root_tuber_details.aspx.
- Ironkwe, M.O., & Ukanwoko A.I. (2012). Growth performance of broiler finisher birds fed composite cassava meal (ccm). *Bulletin of Environment, Pharmacology and Life Sciences*, vol.1 (6) pp. 30-34.
- Oluremi, O.I.A., & Nwosu A. (2002). The effect of soaked cassava peels on weaning rabbits. *The Journal of Food Technology in Africa*, vol.7(1) pp.12-15.
- Salami, R.I., & Odunsi A.A. (2003). Evaluation of processed cassava peel meals as substitutes for maize in diets of layers. *International Journal of Poultry Science* 2 (2): 112-116, 2003.

Table 1 Composition of the Finisher Diets.

Ingredient	Levels of replacement of maize by cassava peel meal (%)				
	0 (T1)	25 (T2)	50 (T3)	75 (T4)	100 (T5)
Maize	59.2	44.4	29.6	14.8	0
Cassava peel	0	14.8	29.6	44.4	59.2
Soybean meal	35	35	35	35	35
Fish meal	2	2	2	2	2
Bone meal	2	2	2	2	2
Oystershell	1	1	1	1	1
Methionine	0.2	0.2	0.2	0.2	0.2
Lysine	0.1	0.1	0.1	0.1	0.1
Premix	0.25	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25	0.25
Calculated analysis					
Crude protein %	22.11	21.53	20.95	20.38	19.8
M.E (Kcal/kg)	2936.38	2729.78	2523.17	2316.56	2109.95

Table 2. Performance Characteristics of broiler starter birds

	Levels of replacement of maize by cassava peel meal (%)				
	0(T1)	25(T2)	50(T3)	75(T4)	100(T4)
Initial weight	112.03	108.33	98.33	120.0	116.67
Final weight	921.48 ^a	890.0 ^a	753.33 ^b	720.0 ^b	740.0 ^b
Weight gain	809.44 ^a	781.67 ^a	655.0 ^b	600.0 ^b	623.33 ^b
Feed intake/bird	1711.11	1778.83	1592.27	1605.83	1712.33
FCR	2.13 ^b	2.29 ^b	2.44 ^{ab}	2.67 ^a	2.75 ^a
FER	0.47 ^a	0.44 ^a	0.41 ^{ab}	0.37 ^b	0.36 ^b

Table 3. Performance Characteristics of broiler finisher birds

Parameters	Levels of replacement of maize by cassava peel meal				
	0 (T1)	25 (T2)	50 (T3)	75 (T4)	100 (T5)
Initial weight	921.48 ^a	890.0 ^a	753.33 ^b	720.0 ^b	740.0 ^b
Final weight	2923.3 ^a	2833.3 ^{ab}	2596.7 ^{abc}	2500.0 ^{bc}	2383.3 ^c
Weight gain	2001.9 ^a	1943.3 ^{ab}	1843.3 ^{ab}	1780.0 ^{ab}	1643.3 ^b
Feed intake/bird	5030.0	5073.3	5216.7	5030.0	5206.7
FCR	2.53 ^c	2.62 ^{bc}	2.83 ^b	2.83 ^b	3.17 ^a
FER	0.40 ^a	0.38 ^{ab}	0.35 ^{bc}	0.35 ^b	0.31 ^c

^{a, b, c}, Means along the same row having different superscripts differ significantly at 5% P.

Cost Benefit Analysis

Table 4 Cost benefit analysis for Starter diet

Parameters	Levels of replacement of maize by cassava peel meal %				
	0(T1)	25(T2)	50(T3)	75(T4)	100(T5)
Cost of feed (₦/kg)	110.77	106.56	102.34	98.12	93.90
Cost reduction %	0.00	3.80	7.61	11.42	15.23
Cost of feed consumed/ bird (₦)	189.53	189.54	162.96	157.56	160.78
Feed cost/kg weight gain (₦/kg)	235.79	244.02	249.71	261.98	258.23

Table 5 Cost Benefit Analysis for finisher diet

Parameters	Levels of replacement of maize by cassava peel meal %				
	0(T1)	25(T2)	50(T3)	75(T4)	100(T5)
Cost of feed(₦/kg)	105.13	99.94	94.76	89.57	84.39
Cost reduction %	0.00	4.94	9.86	14.80	19.73
Cost of feed consumed/bird (₦)	528.80	507.03	494.33	450.54	439.39
Feed cost/kg weight gain (₦/Kg)	265.98	261.84	268.17	253.48	267.52