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Asian Journal of Animal and Veterinary Advances

Academic
Journals Inc.

www.academicjournals.com

Asian Journal of Animal and Veterinary Advances 2 (3): 162-165, 2007
ISSN 1683-9919

The Response of Weaner Pigs to the Replacement Value of Cassava Peel Meal for Maize

[1]G.S. Bawa and [2]M.A. Damisa
[1]Department of Animal Science,
[2]Department of Agricultural Economics and Rural Sociology,
Ahmadu Bello University, Zaria, Nigeria

Abstract: The excess demand on cereal grains has led to an unprecedented increase in the cost of livestock feeds. This has therefore necessitated the need to scout for cheaper and readily available sources. The study therefore examined the response of weaner pigs to diet levels in which Cassava Peel Meal (CPM) replaces maize up to 100% in the conventional livestock diet. A trial was carried out in which 20 weaner pigs were fed isonitrogenous diets that contained different levels of CPM. The study revealed that it is quite economical to substitute CPM for maize in pig diets.

Key words: Cassava peel meal, response, weaner pigs

INTRODUCTION

There is a rising cost of conventional livestock feeds in Nigeria. The fact that feed grains that form the basic constituent of livestock feed rations also constitute the major sources of food to a rising population led to a build up of excess demand for the food grains thereby leading to an unprecedented increase in the cost of livestock feeds. There is therefore an urgent need for livestock farmers to explore ways and means of utilizing cheaper and readily available feed sources that have little or no direct competition for human food.

Cassava (*Manihot esculentus*) peels is one of the feedstuff that can appropriately fit into this category especially in developing countries that can ill afford the luxury of feeding maize or sorghum to the monogastrics as the main source of energy. Unlike feeding of whole cassava root, the peels are not subject to any competition arising from demand for human consumption but rather complement human utilization of food cassava.

Earlier works on Cassava Peel Meal (CPM) utilization as feed advocate the use for DL-Methionine supplement in the diet (Aduku *et al*., 1991; Tegbe *et al*., 1992). DL-Methionine is however not only costly but also not readily available. The main objective of this study therefore was to assess the response of weaner pigs to diet levels in which CPM replaces maize up to 100% in the basal diet without DL-Methionine supplementation. This is with the view of determining the extent to which CPM can substitute for maize in weaner pig diets and also evaluate the cost implication.

MATERIALS AND METHODS

Source and Processing of Cassava Peel

This study was conducted at the Ahmadu Bello University Farm, Zaria-Kaduna State, Nigeria. The cassava peels used in this study were collected from garri grating depots and heavily sun dried to about 10% moisture content. The peels were then grounded in to meal before incorporation into the experimental diets.

Corresponding Author: M.A. Damisa, Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, Zaria, Nigeria Tel: +2348020658353

Experimental Animals

Twenty weaner pigs were used in this study. The experimental animals were obtained from 2 sows that farrowed about the same time and had the same level of management. The weaner pigs (Large White X Land race) were weaned the same day with an average initial live weight of 7.63±0.21 kg.

The pigs were randomly allotted to 5 dietary treatments on the basis of sex and initial live weights in a randomized block design. There were 4 pigs per treatment with each treatment comprising of 2 boars and 2 gilts. All the experimental animals were held individually in standard open sided concrete floor equipped with feeding and watering troughs. The composition and calculated analysis of the test diets are presented on Table 1.

CPM and maize were used as main energy sources in formulating 5 isonitrogenous test diets. The level of CPM and maize-soyabean were varied to determine the optimum level at which CPM could substitute for maize in weaner pig rations. The dietary treatments were:

Diet 1: A 20% CP basal maize-soyabean diet (control)
Diet 2: 14.22% CPM inclusion (replaces 25% of maize in the basal diet).
Diet 3: 28.44% CPM inclusion (replaces 50% of maize in the basal diet).
Diet 4: 42.65% CPM inclusion (replaces 75% of maize in the basal diet).
Diet 5: 56.87% CPM inclusion (replaces 100% of maize in the basal diet).

All the dietary treatments were balanced for minerals and vitamins as recommended by (AOAC., 1990).

Management of the Animals and Data Collection

The experimental animals were held in quarantine a week to the commencement of the experiment during which they were treated against intestinal and external parasite. The animals were all subjected to same feeding and management treatments and then allowed an adjustment period of seven days on their test diets. Thereafter they were weighed to mark the beginning of the experiment. Feed and water were provided *ad libitum*. Measures were also taken to prevent wastage. At the end of every week, performance data such as average daily gains and cost were computed.

Analytical Framework

At the end of the 42 days trial, the pigs from each treatment were evaluated on the basis of carcass and average live weight. Regression analysis was employed to analyze the effect of the various levels CPM on the performance parameters. The gross Margin analysis was employed to assess the profitability of the various dietary treatments. The Gross Margin analysis according to (Olukosi and Erhabour, 1988) is given by,

Table 1: Experimental diets compositions

	Diets				
Ingredients	1	2	3	4	5
Maize	56.87	40.69	25.20	9.37	0.00
Cassava peel meal	0.00	14.22	28.44	42.65	56.97
Soyabean	20.48	22.44	23.71	25.33	20.48
Blood meal	5.00	5.00	5.00	5.00	5.00
Wheat offal	10.00	10.00	10.00	10.00	10.00
Cotton seed meal	5.00	5.00	5.00	5.00	5.00
Bone meal	1.50	1.50	1.50	1.50	1.50
Limestone	0.50	0.50	0.50	0.50	0.50
Sodium chloride	0.50	0.50	0.50	0.50	0.50
Vitamin premix	0.15	0.15	0.15	0.15	0.15

$$GM = TR - TVC$$

where:
GM = Gross margin
TR = Total revenue
TVC = Total variance cost

RESULTS AND DISCUSSIONS

The regressions between levels of inclusion of CPM and feed intake, weight gain and crude fibre digestibility were statistically significant at the 5% level (Table 2). There was an observed depression in feed intake as the level of CPM increased in the diets (Table 3). This could be attributed to the poor palatability of cassava peels compared to maize, the dustiness associated with the use of CPM (Oke, 1978; Muller and Nah, 1974; Amaefule *et al*., 2006) and the increase in the level of dietary cyanide with increase in the amount of feed consumed.

The weight gain pattern obtained from this study closely followed that of the feed intake. The final and daily weight gain results indicated a linear decrease as the level of CPM in diets rises (Table 3). The net effect of reduced feed intake coupled with low energy density as the level of CPM increased in the diets might probably be responsible for the depressed weight gain observed in pigs fed high levels of CPM diets. It is also likely that the high fibre content associated with increased levels of CPM in the diets contributed to the depressed weight gains.

The gross margins for the dietary treatments are ₦1923.80, ₦1904.10, ₦1906.00, ₦1773.00 and ₦1623.90 for diets 1, 2, 3, 4 and 5, respectively. The maize-soyabean basal (control) diet has the highest gross margin of ₦1923.80. This was followed by diet 3, 1₦906.00 and diet 5 had the least gross margin of ₦1623.90 (Table 4).

Table 2: Regression equations relating the different CPM diets to the performance of the weaner pigs

Parameters	Equation	R^2
Feed intake (g day^{-1})	120.92-1.67X	0.71*
Weight gain (g day^{-1})	95.13-0.89X	0.89*
Feed/ gain ratio (%)	1.38-0-01X	0.23^{NS}
Crude fibre digestibility (%)	54.23+0.38X	0.90*

X denotes levels of CPM, *significant at 5%, ^{NS}not significant

Table 3: Performance of weaner pigs fed CPM supplemented diets

	Diets				
Parameters	1	2	3	4	5
Initial weight (kg)	7.93	7.43	7.45	7.42	7.90
Final weight (kg)	30.50	29.34	28.89	27.30	25.73
Feed intake (g day^{-1})	1108.00	1040.00	1003.00	968.00	918.00
Weight gain (g day^{-1})	470.00	425.60	372.00	351.50	322.00
Feed/ gain (g day^{-1})	2.36	2.44	2.70	2.75	2.85

Table 4: Estimated average costs and returns for the dietary treatments

	Diets				
Items	1	2	3	4	5
Variable cost					
Feed consumed (₦)	333.20	286.90	238.00	215.00	159.10
Returns					
Weight gain (kg)	22.57	21.91	21.44	19.88	17.83
Price (₦ kg^{-1})	100.00	100.00	100.00	100.00	100.00
Gross returns (₦/ kg^{-1})	2257.00	2191.00	2144.00	1988.00	1783.00
Gross margin (₦/ kg^{-1})	1923.80	1904.10	1906.00	1773.00	1623.90

CONCLUSION

Though the maize-soyabean basal diet gave the best result in terms of weight gains and total revenue accrued than the experimental dietary treatments, a complete (100%) substitution of CPM for maize in the diets would lower the cost from ₦333.20 to 159.10 and still reward the farmer with a gross margin of 1623.90 for his efforts (Table 4). Where CPM is to be incorporated in pig diets, diet 3 option could be adopted since it gave the best economic experimental dietary result. However in the face of excess demand for maize and the high cost of conventional feed, the substitution of CPM for maize could be considered as it is quite economical. It will afford the farmer to be in business and still earn a reasonable reward for his labour rather than go out to business due to high feed cost and feed scarcity. Furthermore, cassava peels as a waste product constitute environmental nuisance. The large scale utilization would therefore help in recycling the waste.

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