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An Appraisal of Weaner Pigs Fed Different Levels of Cassava Peal Meal Diets

[1]M.A. Damisa and [2]G.S. Bawa

Department of Agricultural Economics and Rural Sociology,
[2]Department of Animal Science Ahmadu Bello University. Zaria, Nigeria.

Abstract: Cereals have remained the major energy source in pig diets with maize being the most common and the major ingredient contributing about 60-80% of pig diets. The ban on the importation of maize coupled with the low level of local production has resulted in a built up of excess demand for maize both as food and as raw materials for industries. This has led to an unprecedented increase in the cost of pig feeds. It is therefore pertinent to scout for cheaper and readily available sources for compounding swine rations Available literatures indicate that cassava could have a substantial feed cost-saving if supplemented for cyanide detoxification. The high cost of supplementation poses a serious constraint to its use. This study therefore evaluates weaner pigs performance without the usual DL-Methionine supplementation in swine diets. The results reveal that a dietary inclusion of cassava peel meal up to 30% without the use of DL-Methionine could give a good performance of the animals.

Keywords: Cassava Peel Meal, Weaner Pigs

INTRODUCTION

In Nigeria, the single most important factor militating against rapid development of the swine industry has been the increasing unavailability and consequent high cost of the conventional feeds. Feed cost according to Sastry the Thomas (1976) accounts for 67.2% of the total pig production cost. It is therefore pertinent to scout for cheaper and readily available sources for compounding swine rations.

Cereals have remained the major energy sources in pig diets. Among the cereals produced in Nigeria, maize is the most common and the major ingredient contributing about 60% to 80% of the total diet for pigs. In the past most of the maize used by the feed millers was imported. The economy was then buoyant enough to sustain such importations. The decision of the Federal Government to ban the importation of maize in 1984, wheat and barley in 1986 coupled with the low level of local production of maize has resulted in a built up of excess demand for maize both as food and as raw materials for industries like feed mills, breweries, flour mills and confectionaries. Cognizant of this high demand for grains for human consumption and industrial uses, Fetuga and Tewe (1985) raised alarm on the possibility of not having enough surpluses form cereals to March their demand for live stock production. The high demand for maize has today resulted in the current prohibitive prices of maize leading to an unprecedented increase in the cost of pig feeds. It is in tackling this situation that cassava peel meal (CPM) and its cost implications is investigated by the study.

In their various researches, Tegbe*et al.,* (1992), Aduku *et al.,* (1991) and Obioha *et al.,* (1985) concluded that cassava peel feeding has substantial feed cost saving. Their experimental diets were however supplemented with al least synthetic DL- Methionine. However the present high cost of supplementation particularly in developing countries where crystalline DL- Methionine has to be imported and is not always readily available, pose a serious constraint to the use of DL- Methionine in cassava peel based diets for swine. The main objective of this study is therefore to investigate the effect and cost implication of dietary inclusion of cassava peel meal on performance of weaner pigs without DL- Methionine supplement in swine diets.

MATERIALS AND METHODS

Experimental Animals and Dietary Composition:

Twenty (20) weaner pigs were used in the experiment. They were obtained form two (2) sows that farrowed at about four (4) days interval. The experimental animals were weaned on the same day and were used for the study. The weaner pigs are a cross bred of Large White and Landrace with an average initial live weight of

Corresponding Authour: M.A. Damisa, Department of Agricultural Economics and Rural Sociology.
E-mail: ask4princedamisa@yahoo.com Tel: +2348020658353, +2348036069849

9.35 + 0.23kg. The pigs were weighed and randomly allotted on the basis of sex to the five (5) dietary treatments in a randomized block design. There were as a result four (4) pigs per treatment with each treatment comprising of two (2) boars and tow (2) gilts. The experimental diets are:

- Diet A: 20% basal maize-Soybean meal diet as control
- Diet B: 7.5% basal cassava peel meal inclusion of the diet
- Diet C: 15% cassava peel meal inclusion of the diet
- Diet D: 22.5% cassava peel meal inclusion of the diet
- Diet E: 30% cassava peel meal inclusion of the diet.

The diets stopped at 30% cassava peel meal inclusion because according to literatures (Tegbe *et al.,* 1992; Aduku *et al.,* 1991; Obioha *et al.,* 1985), even where synthesis DL – Methionine was added; cassava peel meal inclusion greater than 30% of the diet will become disastrous to the animals. The experimental diets were adequately fortified with minerals and vitamins. The composition and calculated analysis of the diets are presented in Table 1.

Table 1: Experimental Diets Composition

Ingredients	Diets				
	A	B	C	D	E
Maize	56.87	48.53	40.18	31.79	23.46
Cassava Peel Meal	0	7.5	15	22.5	30
Soybean (Full Flat	20.48	21.32	22.17	23.06	23.89
Blood Meal	5	5	5	5	5
Wheat Offal	10	10	10	10	10
Cotton Seed Cake	5	5	5	5	5
Bone Meal	1.5	1.5	1.5	1.5	1.5
Limestone	0.5	0.5	0.5	0.5	0.5
Sodium Chloride	0.5	0.5	0.5	0.5	0.5
Vitamin Premix	0.15	0.15	0.5	0.15	0.15

Management of Animals and Data Collection:

A week to the commencement of the experiment, the animals were held in quarantine during which they were also treated against intestinal and external parasites. All animals were subjected to same feeding and management treatments for a period of one week before the commencement of the experiment after which they were fed water and their respective experimental diets *ad libitum*. All necessary precautions were taken to avoid wastage.

The pigs were weighed at the beginning and end of the experiment as well as at weekly intervals. At the end of every week, performance data such as average daily gains and cost were computed.

Analysis:

At the end of the forty-two days trial, the pigs from each treatment were evaluated on the basis of carcass and average live weight. The carcass analysis was carried out as outlined by Argonosa (1972) and Eusebio (1980). Regression analysis was employed to analyze the effect of the various levels CPM diets to the performance parameters. The linear, semi-log and double log functional forms were tried and the best fit based on economic and statistical criteria was employed in the analysis. Efficiency ratio (*r*) was used to determine whether the CPM inclusion was efficiently utilized or not. The efficiency ratio was determined by calculating the ratio of the marginal value product (MPV) to the marginal factor cost (MFC). The gross margin analysis was employed to assess the profitability of the various dietary treatments observed. According to Olukosi and Erhabor (1988), gross margin analysis is expressed as

$$GM = TR - TVC$$

Where

GM = Gross Margin
TR = Total Revenue
TVC – Total Variable cost

RESULTS AND DISCUSSIONS

Regression results showing the relationship between levels of CPM dietary inclusion indicate that the double logarithmic function has the best goodness of fit. It has the highest adjusted coefficient of determination (R^2) for all the categories of parameters regressed and best fit apraori expectations.

Table 2 shows that only the relationship between the levels of inclusion of CPM and dressing percentage (chilled shoulder yields and warm carcass); and crude fiber variables were significant at $P < 0.05$. The feed intake, weight gain, dry matter digestibility and crude protein intake were all not significant at the 5% level. The daily weight gain was however significant at the 10% level of significance.

Table 3 shows that there was a trend of depressed weight gain as the level of CPM inclusion in the diet increased from 0 to 30%. The pigs on the control diet had the highest final and daily average weight gains although the difference with those of the dietary treatments was not statistically significant at $P < 0.05$. The control diet therefore had a slight but non statistically significant superiority over the CPM inclusion diets.

Table 2: Regression Equations Showing the Relationship between CPM Inclusions in the Various Diets and Weaner Pigs Performance Parameters

Parameters	Equation	R^2
Feed intake (g/ day)	105.41 - 1.52X	0.56
Weight gain(g/ day)	121.14 - 1.35X	0.78**
Dry matter digestibility (%)	53.12 + 0.87X	0.57
Crude protein intake (%)	41.44 – 0.58X	0.61
Crude fibre intake (%)	51.36 + 0.81X	0.62*
Dressing percentage (%)	1.02 - 0.89X	0.87*

* $P < 0.05$
**$P < 0.10$
X denotes levels of CPM inclusion

Table 3: Performance of Weaner Pigs Fed CPM Diets

Factor	Diets				
	A	B	C	D	E
Average initial weight (kg)	9.48	9.3	9.35	9.38	9.25
Average Final weight (kg)	33.1	32.7	32.7	32.3	32
Average daily weight gain (g/day)	562	557	555	553	547
Average daily energy intake (Mcal Me/day	3589	3500	3427	3359	3271
Average daily crude fibre intake (g/day)	56	63	71	78	88
Efficiency ratio (*r*)		1.32	0.99	0.76	0.54

Table 4: Estimated Average Costs and Returns for the Dietary Treatments

Items	Diets				
	A	B	C	D	E
		Variable Cost			
Feed consumed (₦)	317.44	309.36	303.69	296.7	288.08
		Returns			
Weight gain (kg)	23.62	23.4	23.35	22.92	22.75
Price (₦/ kg)	100	100	100	100	100
Gross Returns (₦/ kg)	2362	2340	2335	2292	2275
Gross Margin (₦/ kg)	2044.56	2030.64	2031.31	1995.3	1986.91

In this study, the energy intake is also recorded to have decreased with increasing level of CPM inclusion in the diets and dietary fiber level increased with the level of CPM in the diets. These may be responsible for the slight depression reported in the average weight gains. According to Davies and Lucas (1972) and Lioyd *et al.,* (1978), energy restriction from growing pigs results in reduction in daily weight gains. Also Kornegay (1978), Kennelly and Aherne (1980) and Frank *et al.,* (1983) opined that relatively higher fiber levels of diets are responsible for depression in the growth rate of pigs.

The pigs' dietary treatment B and C recorded the best carcass performance with diet E recording the least. The least dressing percentage (meat yield) recorded by diet E may be attributed to the dietary fibre level which Merkel *et al.,* (1985) reported to have reduced the dressing percentages of carcasses. The similarity in weight gain values across the treatments (562 Vs 557 Vs 555 Vs 553 Vs 547) is also an indication that the residual cyanide

had no depressing effect on weight gain (Obioha *et al.,* 1985). The uniformity in initial live weight of the animals also suggests that the experimental animals were adequately balanced for age, sex and size. The absence of statistically differences in any of the performance characteristics and the absence of deficiency symptoms or mortality further suggest that the five (5) treatments had equivalent nutritional attributes and were adequately balanced and supplemented.

The efficiency ratio for diet B is more than 1, indicating an under utilization of CPM. The efficiency ratios for diet C, D and E are less than 1 implying an over utilization of CPM; however, the efficiency ratio of C is very close to unity, indicating CPM utilization in the diet is close to being efficiently utilized.

The gross margin recoded for the various dietary treatments are N2044.56, ₦2030.64, 2031.3, ₦1995.30 and ₦19186.91 for diets A, B, C, D and E respectively. Though the control diet (diet A) gave the best result in terms of revenue, the reduction in revenue with respect to diet C (the dietary inclusion with the highest gross margins), is a meagre 0.64%, which even is not statistically significant.

Conclusion:

It is technically feasible therefore to formulate a practical diet for pigs with up to 30% level of CPM inclusion without the use of DL-Methionine and still obtain a good performance of the animals. The 15% dietary inclusion however gives the best economic result. It is at this point that CPM is efficiently utilized. Therefore, CPM could be substituted in swine production to reduce production cost and still obtain a good result.

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