

EFFECT OF DIETS CONTAINING VARYING LEVELS OF FERMENTED CASSAVA PEEL MEAL ON PERFORMANCE OF WEANERS PIGS

*OLUWANDE, K.O., OMAGE, J.J. and OLUGBEMI T.S.

Department of Animal Science, Ahmadu Bello University Zaria

*Corresponding author: olu.kay4ann14@gmail.com

ABSTRACT

A feeding trial was conducted to evaluate the effect of feeding weaners pig with varying levels of fermented cassava peel meal. In this study, twenty-four (24) cross-bred (Landrace X Large white) weaner pigs were randomly assigned to individual pens. The animals were randomly assigned to four dietary treatments T1: 0%, T2: 25%, T3: 50% and T4: 75% FCPM with six pigs per treatment and a pig per replicate in a Completely Randomized Design (CRD). All data generated were subjected to analysis of variance of SAS 2002, version 9.0 and significant differences among treatment means were compared using Tukey test. Growth performance result showed that dietary treatments had no significant effect ($P > 0.05$) on all growth performance indices evaluated. Initial weights ranged from (9.92 - 10.0 kg $\pm$ 0.58) while Final weights ranged from (24.00 - 27.92 kg $\pm$ 1.41) respectively. Pigs fed 25% FCPM recorded the highest feed intake (49.42 kg $\pm$ 2.74) and weight gain (17.75 kg $\pm$ 0.90). Inclusion of the FCPM diets did not significantly improve the growth performance of the pigs. Inclusion level of FCPM up to 75% significantly reduce cost of feed per kg resulting in a better production economics for weaner pig.

Keywords: Pigs, Cassava, Treatment, Growth, Feed cost

INTRODUCTION

There are an estimated 90 pig breeds and over 200 strains globally, along with various crosses and indigenous breeds (www.breedlist.com, 2017). Unlike most domestic animals, pigs are omnivorous and compete with humans for food (Oluwande, 2013). However, they efficiently convert grasses, legumes, concentrates, and agro-industrial wastes into bristle, skin, meat, and lard (Oluwande, 2013). Maize has been the primary energy source in livestock production, but its high cost and demand necessitate alternatives (Adeschinwa *et al.*, 2016). Agro-industrial by-products, such as cassava peel, offer a low-cost alternative.

Cassava peels contain Crude Protein (5.70%), Crude Fibre (9.26%), Ether Extract (0.71%), Ash (3.00%), and Nitrogen-Free Extract (69.30%) (Ogundipe, 2002), while Aduku (2003) reported similar values. Efficient utilization in pig feeding requires physical or chemical treatments to break down fibre for better digestion (Aro *et al.*, 2017), with fermentation being a viable method. This study aims to assess the effects of varying dietary replacement levels of fermented cassava peel meal on the performance of weaner pigs.

MATERIALS AND METHODS

Study Location

The study was conducted at the swine unit of the Animal Science Teaching and Research Farm, Ahmadu Bello University, Zaria, Kaduna State, Nigeria. The area lies in the Northern Guinea Savannah at 11°09'01.78"N, 7°39'14.79"E, 671m above sea level.

Source and Processing of Experimental Materials

Cassava peels were collected within 24 hours from fufu and garri processing sites in Lusada-Igbesa, Ogun State, Nigeria. Processing followed Aro and Aletor (2012): peels were washed to remove soil contaminants, placed in airtight polythene sacks on wooden pallets, fermented for five days (120 hours), sun-dried, ground, and stored for diet formulation. Other ingredients were sourced from Rebson Feed Mill, Zaria.

Experimental Design and Animal Management

Twenty-four crossbred (Landrace $\times$ Large White) weaner pigs were obtained from the university farm and Samaru College of Agriculture. Pigs were weighed at arrival and assigned to four dietary treatments (0%, 25%, 50%, 75% FCPM) in a completely randomized design (CRD), with six replicates per treatment (one pig per replicate). They had *ad-libitum* water access and were fed at 5% body weight. Mortality was recorded as it occurred.

Growth Performance Traits

The 56-day (8-week) trial measured initial and final weights, daily feed intake, total feed intake, daily weight gain, and feed conversion ratio (feed intake/weight gain). Feed intake was calculated as feed offered minus leftovers, while total weight gain was the difference between initial and final weight.

Statistical Analysis

Data were analysed using ANOVA via the SAS (2002) GLM procedure (version 9.0). Significant differences were separated using Tukey's test (1953).

Table 1: Ingredient composition and nutrient analysis of experimental diets

Ingredient (%)	FCPM			
	Control	25%	50%	75%
Maize	46.00	34.50	23.00	11.50
Cassava peel	0.00	10.95	21.90	32.85
Maize offal	15.54	15.54	15.54	15.54
Palm kernel cake	12.00	12.00	12.00	12.00
Groundnut cake	9.00	9.55	10.10	10.65
Soybean meal	12.00	12.00	12.00	12.00
Limestone	0.8	0.8	0.8	0.8
Bone ash	3.00	3.00	3.00	3.00
Salt	0.35	0.35	0.35	0.35
Vit-premix	0.30	0.30	0.30	0.30
L-Lysine (ADM)	0.25	0.25	0.25	0.25
DL-Methionine (MHA)	0.38	0.38	0.38	0.38
L-Tryptophan	0.05	0.05	0.05	0.05
L-Threonine	0.2	0.2	0.2	0.2
Choline chloride	0.1	0.1	0.1	0.1
Vitamin C	0.025	0.025	0.025	0.025
Total	100	100	100	100
Calculated analysis				
Metabolizable energy (kcal/kg)	2806.3	2732.7	2659.2	2585.6
Crude protein (%)	18.1	18.1	18.1	18.1
Ether extract (%)	3.67	3.44	3.21	2.98
Crude fibre (%)	6.15	6.93	7.71	8.49
Calcium (%)	1.17	1.17	1.17	1.17
Phosphorus (%)	0.52	0.54	0.58	0.58
Lysine (%)	0.94	0.95	0.95	0.96
Methionine (%)	0.58	0.58	0.58	0.58
Tryptophan (%)	0.19	0.19	0.19	0.18
Threonine (%)	0.71	0.69	0.66	0.63

FCPM -fermented cassava peel meal; VITAMIX (HL) Premix supplied the following per kg diet: Vit A 14,000 IU; Vit D3 2,800 IU; Vit E 20 IU; Vit K 2.4mg; Vit B1 18 mg; Vit B2 4.8mg; Vit B6 1.8 mg; Vit B12 0.012 mg; Biotin 0.024

RESULTS AND DISCUSSION

The growth performance of weaner pigs fed diets with varying levels of fermented cassava peel meal (FCPM) is shown in Table 2. Dietary treatments had no significant effect ($P>0.05$) on growth performance indices. Initial weights ranged from 9.92–10.0 kg $\pm$ 0.58, while final weights ranged from 24.00–27.92 kg $\pm$ 1.41. The result showed no significant difference ($P>0.05$) in Final weight between treatment means. A similar trend was observed for average daily feed intake and average daily weight gain across treatment means. Pigs on 25% FCPM had the highest feed intake (49.42 kg $\pm$ 2.74) and weight gain (17.75 kg $\pm$ 0.90). Although numerical differences were observed, FCPM inclusion did not significantly enhance growth performance. This result contrasts with Adeschinwa *et al.* (2016) when they examined the effects of using high-quality cassava peel meal as a replacement for maize on weaned pigs but aligns with Akinola *et al.* (2013). Contrary to the outcome of this study, the work of Adeschinwa *et al.*, (2016) and Taiwo *et al.* (2022) recorded their highest daily feed intake at 50 and 56% cassava peel replacement level for maize in diets of weaned pigs respectively. Differences in findings may be due to processing methods, feed composition, and anti-nutritional factors.

Table 2: Performance characteristics of weaners pig fed diets containing varying levels of fermented cassava peel meal

Parameter	FCPM				
	0%	25%	50%	75%	SEM
Initial weight (kg)	9.92	10.00	9.92	10.00	0.58
Final weight (kg)	26.33	27.92	25.92	24.00	1.41
Total weight gain (kg)	16.42	17.75	16.00	14.00	0.90
Total feed intake (kg)	47.44	49.42	47.20	45.88	2.74
Daily feed intake (kg)	0.85	0.88	0.84	0.82	0.05
Daily weight gain (kg)	0.30	0.32	0.29	0.25	0.02
Feed conversion ratio	2.89	2.78	2.95	3.28	0.07
Feed cost/kg (₦)	131.9 ^a	123.0 ^b	114.2 ^c	105.3 ^d	2.99
Mortality	0	0	0	0	ND

^{abcd}Means having different superscripts within the same rows are significantly different ($p < 0.05$).

FCPM = fermented cassava peel meal; SEM = Standard error of means; ND = Not determined

Feed cost per kg decreased linearly from ₦131.9 to ₦105.3 as FCPM inclusion increased ($P < 0.05$), aligning with Irekhore *et al.* (2015) who concluded a linear reduction in cost per kg of feed as the level of cassava peel increased in the diets. This is as a result of reduction in the quantity of maize as the level of FCPM increased in the diets which impacts cost of production.

CONCLUSION

It can be concluded that inclusion of the FCPM diets did not significantly improve the growth performance of the pigs. Inclusion level of FCPM up to 75% significantly reduce cost of feed per kg resulting in a better production economics for weaner pig.

RECOMMENDATION

FCPM diets can replace maize based diet up to 75% without having any negative effect on growth performance of weaner pigs and reduced the cost of production.

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