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GROWTH RATE AND CARCASS CHARACTERISTICS OF LARGE WHITE PIGS FED ON ENSILED CASSAVA PULP DIETS

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ABSTRACT: *Twenty four Large White (LW) grower pigs at an average live weight of 27 kg were distributed over three treatments made up of diets containing 0, 25 and 30 percent ensiled cassava pulp. Diets were made similar to contain 15% Crude protein. Pigs were taken off the study on attaining an individual live weight of 60±5 kg slaughtered and carcass characteristics determined. The average live weight gains by the pigs were 0.40, 0.42 and 0.44 kg/day on Diet 1 (0%), Diet 2 (25%) and Diet 3 (30%) respectively. The feed conversion ratios by the pigs were 4.20, 4.30 and 5.00 kg feed /kg live-weight gain for Diets 1, 2 and 3 respectively. Eye muscle area of the pigs were 33.2, 27.3 and 37.7cm² on Diets 1, 2 and 3 respectively. Trimmed fat on the carcasses were 3.3, 2.6 and 2.4 kg respectively. The study indicated that cassava pulp could be preserved by ensiling for feeding pigs over the grower phase at least: That the cassava pulp fed at an inclusion rate of 30% gave pig performance comparable to that on the cereal-based diet. It was indicated that maize, could be completely replaced in the diet of the grower pig with ensiled cassava pulp.*

ORIGINAL ARTICLE

Key words: *Average Daily Gain, Crude Protein, Ensiled Cassava Pulp, Feed Conversion Ratio Grower Pigs, Live Weight*

INTRODUCTION

The need to improve efficiency, lower production costs and supply a product that meets consumers' expectations are key elements required for producers to remain profitable and viable (Mullan and D'Souze, 2005).

Cassava has been known to be a good source of energy for pigs for many years. Cassava-fed pigs were found to grow slower than maize-fed pigs but had firmer fat and more evenly distributed lean meat (Dodoo, 1981). It was indicated that whilst 30% cassava in the diet of the grower-finisher was best for average daily gains in live-weight, a level of 45% resulted on leaner pig carcass (Barnes and Oddoye, 1985).

Studies on the replacement of maize with sun-dried cassava in pig diets have been done in Ghana (Okai, 1971; Fleischer 1975; Dodoo, 1981). Levels of up to 55% in pig grower diets and 65% in pig finisher diets have been fed with no adverse effects on growth and carcass characteristics. Cassava-fed pigs were found to have superior feed conversion efficiency than those corn-fed (Dodoo, 1981). Average daily live-weight gain of the weaner pig was depressed as the level of cassava in the diet increased from 20% to 29% (Rhule et al., 1998).

Processing cassava into various products would generate considerable quantities of by-products such as peels and pulps. Studies on cassava peels have shown that it may be included up to a level of 37.5% in the diet of young pigs (Sonaiya and Omole, 1997). Whilst studies have been done on the peel (Tewe, 1987), very little has been done on the pulp as feed for pigs.

This project was undertaken to determine the optimum level at which the cassava pulp could be incorporated in the diets of grower-finisher pigs.

MATERIALS AND METHODS

Experimental Design

Twenty-four Large White pigs of an average initial-weight of 27 kg were used in a completely randomized design (CRD) feeding trial. The pigs were randomly allocated to three dietary treatments with four replicates per treatment and fed diets containing graded levels of ensiled cassava pulp. The ingredient composition of the diets is shown in Table 1. The calculated dry equivalents of the pulp were weighed in the morning and mixed with the previously compounded dry components of the diets before feeding.

Animals and management

The pigs were housed in individual well-ventilated concrete floored pens measuring (3 x 1). Kepromec (Ivermectin), a broad-spectrum anthelminthic, was administered by injection for the control of both internal external parasites.

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Feeding

Pigs were fed on restricted basis, a daily quantity of feed equivalent to 5% of group total live weight. Water was provided *ad libitum.* The pigs were individually weighed weekly and the daily feed allocation adjusted accordingly. The pigs were fed until they attained an average live weight of 60±5 kg.

Growth Measurement

The pigs were weighed at the commencement and end of the study. The mean of the two weights represented the initial and final live weight. Feed and water were withdrawn twelve hours before weighing. The difference between the final and initial body weights represented the weight gain. At the end of the study, the pigs were then slaughtered and their carcass characteristics measured.

Table 1 - Composition of diets containing cassava pulp fed to Grower-Finisher pigs

Ingredients composition	Diets 1 (control)	Diet 2	Diet 3
Maize	33.30	0	0
Wheat bran	30.3	0	0
Cassava pulp	0	25.0	30.0
Cassava (whole)	0	17.3	10.3
Cassava peels	0	22.0	17.0
Palm kernel cake	30.00	30.0	30.0
Fishmeal	1.0	3.0	3.0
Soya bean meal	4.0	8.0	8.0
Oyster shell	1.0	1.0	1.0
Salt	0.5	0.5	0.5
Vitamin and TMP[1]	0.2	0.2	0.2
Total	100	100	100
Determined composition (%)			
Moisture	44.32	61.30	63.62
Dry matter	55.68	38.70	36.38
Crude protein	14.19	13.45	15.37
Ether extract	5.46	4.70	6.21
Ash	8.89	5.81	8.25
Crude fibre	18.03	18.64	23.37

[1]Vitamin and TMP (Trace Mineral Premix): Inclusion rate is 25 kg/tonne to supply the following per tonne of feed: Vit.A, 12,000,000 IU; Vit.E, 15000 mg; Vit.B1, 1500 mg; Niacin 30,000 mg; Vit.B6, 1500 mg; Vit.D3, 4500,000 mg; Vit. K3, 3,000 mg; Pantothenic acid,12000 mg; Vit.B12, 10,000 mg; Vit. B2,6000 mg; Folic acid, 800 mg, Iron, 60,000 mg; Copper 75,00 mg; Iodine, 750 mg; Manganese, 130,000 mg; zinc, 70,000 mg; Selenium, 300mg. calcium,17.50%, Lysine,1,330 mg; Methionine, 1,075 mg; B-Corotenic acid, 350 mg.

Statistical Analysis

The data obtained was subjected to analysis of variance (Steel et al., 1997).

RESULTS AND DISCUSSION

There were no health related problems nor mortalities that may be attributed to the amount of ensiled cassava pulp in the diets. The analyzed composition of the diets is shown in Table 1. The diets containing the pulp had very high moisture levels compared to the control diet, being highest in diet 3. Increasing levels of the pulp in the diets resulted in increasing levels of crude fibre in both diets 2 and 3.

The general performance of the pigs on the dietary treatments is shown in Table 2. The ADG of the pigs was similar for Diets 1, 2 and 3 (P>0.05) (Table 2). The FCR by the pigs on Diet 1 was similar to that on Diet 2 and higher than was attained on Diet 3 (P>0.05) (Table 2).

Table 2 - Performance of grower large white pig fed on cassava pulp based diets

Items / Dietary Treatments	1	2	3	SEM	P
Initial wt (kg)	26.75±1.80	27.75±4.13	27.25±2.56	0.29	NS
Final wt (kg)	60.25±4.15	60.80±7.36	61.25±5.57	0.60	NS
ADG (kg/day)	0.40±0.05	0.42±0.15	0.44±0.17	0.04	NS
FCR	4.20±1.08	4.30±1.87	5.00±1.83	0.87	NS

P: level of significance; NS: not significant. (P >0.05); SEM: standard error of differences of means

The carcass characteristics measured on the pigs were found to be similar (P >0.05) on Diets 1, 2 and 3 respectively (Table 3).

Pigs on the diet, which contained 30% cassava pulp, had slightly higher ADG than those on the 25% cassava pulp diet. This indicates that pigs will consume diets containing cassava pulp up to 30% without adverse effects on growth. The ADG of the pigs on the diets containing the cassava pulp were higher than those on the cereal diet on this study and similar to other studies (Tewe O O and Iyayi E 1989; Rhule, 1998; Rhule, 2001). However, ADG of the pigs on Diets 2 and 3 were higher than value obtained with pigs on similar studies with 30% palm kernel cake diets as used in this study (Rhule, 1996).

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Feed conversion ratios of the diets by the pigs were within a range of 3.2 to 4.8 obtained on similar studies (Rhule, 1995; 1996; 1998). Feed conversion ratio obtained with the pigs in this study could be considered similar to values of 5.09 from other studies (Oke, 1978).

Table 3. Mean carcass characteristics of large white grower-finisher pigs fed on cassava pulp-based diets

Items / Dietary Treatments	1	2	3	SEM	P
Live weight at slaughter (kg)	58.75±4.15	54.00±7.36	60.25±5.57	3.15	NS
Dressed wt (kg)	41.12±2.88	26.70±8.04	42.50±4.33	3.58	NS
Dressing Percentage (%)	70.61±0.51	54.27±5.99	70.34±1.37	5.36	NS
Carcass length (cm)	66.92±1.24	63.75±2.29	66.97±2.29	1.14	NS
Shoulder fat (cm)	2.70±0.20	3.10±0.28	3.33±0.36	0.17	NS
L fat (cm)	0.98±0.09	1.20±0.13	1.00±0.30	0.11	NS
P_2 (cm)	0.90±0.15	1.20±0.22	1.03±0.16	0.11	NS
Eye muscle area (cm^2)	33.54±5.22	27.58±2.29	37.86±4.82	2.64	NS
Absolute values of body components (kg)					
Collar	3.50±0.55	3.20±0.31	4.00±0.42	0.21	NS
Hand	2.80±0.22	3.20±0.38	2.82±0.30	0.17	NS
Rib Back	1.93±0.18	1.80±0.20	1.93±0.17	0.10	NS
Rump back	2.00±0.15	1.80±0.32	2.10±0.19	0.13	NS
Streak	2.30±0.23	2.00±0.24	2.00±0.31	0.14	NS
Ham	5.77±0.76	4.50±0.51	5.30±0.47	0.35	NS
Head	4.60±0.34	4.63±0.45	4.05±0.82	0.31	NS
Trimmed fat	3.30±2.29	2.60±0.79	2.40±0.38	0.16	NS

P: level of significance; NS: not significant. (P >0.05); SED: standard error of differences of means

The indices considered for the pig carcass evaluation were found to be similar for all the dietary treatments. No significant differences (P>0.05) were observed in the carcass dressing percentages of pigs. These observations corroborate some of the earlier studies (Okai *et al.,* 2001). The mean values for carcass length, backfat thickness, loin eye muscle area and primal cuts were not significantly (P>0.05) affected by the dietary treatments imposed, however there was a trend towards improvement in carcass leaneness of LW pigs as the levels of cassava pulp increased from 0 to 30%.

Pigs on Diets 2 and 3 had lower trimmed fat than on Diet 1. The lower trimmed fat on Diets 2 and 3 compared to Diet 1 could be an indication that the carbohydrate of the pulp, energy source, was more readily available leading to efficient utilization of the crude protein in the diet for muscle development. There would be a protein-sparring effect. Although, the LW on this study were slaughtered at about 60kg live-weight, the Eye muscle area of 37.70cm² on Diet 3 could be considered comparable to a range of 36.3 to 43.3cm² obtain with pigs at 90kg live weight on similar diets containing 30% Palm Kernel Cake (Rhule, 1996).

CONCLUSION

The study indicated that cassava pulp could be preserved by ensiling. It has also shown that maize, the expensive ingredient, could be completely excluded from the diets of grower-finisher pigs and that 30% inclusion of ensiled cassava pulp in the diet had no detrimental effort in pigs performance.

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