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Carcass Characteristics and Economic Benefits of Weaner Rabbits Fed Cassava Tuber Meals

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Abstract: An eleven-week research was conducted to evaluate the carcass characteristic and economics of production of rabbit fed cassava peel meal, peeled cassava tuber meal and composite cassava tuber meal diets. Twenty-four weaner rabbits of mixed strains and sexes aged 6 to 7 weeks randomly allotted to four dietary treatments replicated two times each with 3 rabbits per replicate in a completely randomized design. The parameters studied were final live-weights, dressed weight, dressing percentage, internal organs weights, feed cost (N kg^{-1}), total feed cost (N), feed cost (N kg^{-1} gain) and relative cost advantage (%). There was no significant difference ($p>0.05$) in the final live weights, dressed weights, dressing percentage and in most of the internal organs measured. However, economic of production data indicated lowest cost per weight gain (N kg^{-1}) by the rabbits fed composite cassava tuber meal, while highest cost per weight gain was recorded in the rabbits fed the control diet (maize meal).

Key words: Carcass characteristics, economic benefit, cassava, rabbit

INTRODUCTION

The rising cost of agricultural input, high unemployment rate and malnutrition occasioned with the rising cost of cereal grains have caused poor farmers to resort to rabbit production as an alternative agricultural enterprise in many developing countries (Owen, 1981; Lukefahr and Cheeke, 1991). Feed cost is estimated to represent over 70% of the total cost of producing livestock intensively (Oluyemi, 1984). This high cost of conventional feed ingredients has necessitated the use of agro-by-products in animals feeds. Cassava roots and its by-products offer a tremendous potential as a cheap and alternative feed stuff to maize and other source of energy ingredient. Several researchers have confirmed the suitability of cassava root flour and peels in the diet of rabbits (Eshiet *et al.*, 1980; Esonu and Udedibie, 1993). The ability of rabbits to convert forage and agro-by-products into meat more efficiently than ruminants is of great importance in the tropics where both human population and food/feed shortages are greatest (Lebas *et al.*, 1986). The potential of rabbits as good source of meat has gained recognition than other uses because the meat is rich in protein and has fat and low cholesterol levels. The meat is white, fine grained and appetizing. It is highly recommended by medical experts for patient and anyone who wants good animal protein in his diet. It has less sodium content than red meat but contains about the same amounts of iron and vitamins (Fielding, 1991). Therefore, this study was aimed at comparing the carcass characteristics and economic benefit of rabbits fed maize meal, cassava peel meal, peeled cassava tuber meal and composite cassava tuber meal diets.

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MATERIALS AND METHODS

The experiment was carried out at the Rabbitry Unit of the Teaching and Research Farm of the University of Uyo, Uyo, Akwa Ibom State, Nigeria between the months of November and January of preceding year.

Processing of Test Materials

Fresh unpeeled cassava (whole) tubers (local bitter variety) bought from a private farm in Uyo were washed and cut into slices of about 1cm thickness and spread in the sun for five days and later milled in a hammer mill to produce Composite Cassava Tuber Meal (CCTM).

Another portion of the same fresh unpeeled cassava tubers were later peeled using sharp knife and the pulp washed and cut into slices of about 1cm and spread in the sun for five days. The dried cassava pulp was later milled in a hammer mill to produce Peeled Cassava Tuber Meal (PCTM), while the peels of the same cassava batch collected were washed and spread on a clean concrete slab to sundry for five days and further milled in a hammer mill to produce Cassava Peel Meal (CPM).

The cassava peel meal, peeled cassava tuber meal and composite cassava tuber meal were tested for cyanide, as described by Bradbury *et al*. (1999).

Experimental Diets

Four diets were made such that diet 1 (control) contained 37% maize as the main energy source. The proportion of maize in diet 1 was replaced with cassava peel meal, peeled cassava tuber meal and composite cassava tuber meal in diets 2, 3 and 4, respectively. Each experimental diet was supplemented with legume forage (*Centrosema* sp.) and given *ad-libtium*. Ingredient composition of the diets is shown in Table 1.

Experimental Procedure

A total of twenty four weaner rabbits of mixed strains aged 6 to 7 weeks old were procured from some private and government livestock farms in Akwa Ibom State, Nigeria. The twenty-four weaner rabbits (12 males and 12 females) were conditioned for weeks before randomly allotted

Table 1: Ingredient and chemical composition of the experimental diets

	Treatments			
Ingredients	T_1 (control)	T_2 (CPM)	T_3 (PCTM)	T_4 (CCTM)
Maize	37.00	-	-	-
CPM	-	37.00	-	-
PCTM	-	-	37.00	-
CCTM	-	-	-	37.00
Soyabean meal	16.00	18.00	18.00	18.00
Fish meal	1.00	2.50	4.50	2.50
Wheat offal	41.50	38.00	36.00	38.00
Bone meal	2.50	2.50	2.50	2.50
Oyster shell	1.50	1.50	1.50	1.50
Premix*	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Chemical composition (Calculated %)				
Crude protein	18.07	18.00	18.00	18.20
Crude fibre	6.19	8.52	6.11	7.64
Ether extract	5.48	7.01	6.69	6.43
Ash	4.26	6.52	5.25	5.04
ME (Kcal g^{-1})	2.57	2.08	2.56	2.67

*Each kg contained vit A, 8,500.000 I.U; vit D_3, 2,000,000 I.U; vit E, 8,000 I.U; vit K_3, 1,500 mg; vit B_1, 3,200 mg; vit B_6, 1,800 mg; vit B_{12}, 10 mcg; pantothenic acid, 5,500; folic acid, 500 mg; biotin, 20 mg; choline chloride, 200,000 mg; manganese, 75,000 mg; zinc, 45,000 mg; iron, 20,000 mg; copper, 3,500 mg; iodine, 1,000 mg, selenium, 200 mg; cobalt, 200 mg; antioxidant, 125,000 mg to the 4 treatment diets at 6 rabbits per treatment in a completely randomized design. Each treatment group was replicated twice, with 3 rabbits per replicate and each replicate housed in a hutch measuring 70×40 cm. The entire hutch system was of the three-tier model. The rabbits were individually weighed to determine their initial body weights. Weight measurement was sequentially carried out on weekly basis with the use of weighing balance. The experimental diets and water were given ***ad libitum***. The experiment lasted for 11 weeks. Feed samples were analyzed using the standard methods (AOAC, 1990).

Data Collection and Analysis

At the end of the 11 weeks feeding trial, eight rabbits (one per replicate) were randomly selected, starved overnight, weighed and stunned before slaughtering (external severing of the jugular veins) to enhance proper bleeding. Eviscerated carcass weight were then determined. The weights of organs (the heart, lungs, liver, kidney and spleen) were taken individnally using electronic scale and calculated as % of live weight. The dressed carcass was cut into the various divisions (foreshank, thoracic cage, loin, hind shank) and weighed. Dressing percentage was calculated as the ratio of dressed weight to live weight.

Cost Benefit Analysis

Cost of feed was calculated based on prevailing cost of ingredients per kg as at the time the experiment was conducted: maize, N60; soybean, N100; wheat offal, N24; fish meal, N200; bone meal, N50, oyster shell, N50; vit premix N500; salt, N30; cassava peel meal, N2; peeled cassava tuber meal, N12; Composite Cassava Tuber Meal (CCTM), N14. From the cost kg^{-1} of diet, the quantity of feed consumed for the experimental period per unit weight gain of rabbits gave the cost of feed kg^{-1} weight gain. Cost differential was calculated by deducting cost kg^{-1} weight gain of test diet from cost kg^{-1} weight gain of control diet, while relative cost advantage was cost differential divided by the cost kg^{-1} weight gain of control diet in percentage.

Statistical Analysis

Data collected were subjected to one way analysis of variance as outlined by Zar (1984). Where ANOVA indicated significant treatment effect, means were separated using Duncan new multiple range test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Carcass and Internal Organ Weights of the Experimental Rabbits

Mean values of 58.3 (T_1), 55.8 (T_2), 55.9 (T_3) and 55.1% (T_4) obtained for dressing percentages of all the treatments were within normal range expected of normally reared rabbits and were not significantly different (p>0.05). Similarly, values obtained for the liver, heart, lungs, kidney and spleen did not show significant differences (p>0.05) among the treatments either (Table 2). Therefore, it seems to follow that not only did the processing method used significantly eliminated the HCN contents of the cassava but the 37% inclusion level of the cassava meals in the rabbits diet was proper. The carcass yield values obtained are in agreement with earlier reports of Omole and Sonaiya (1981) and Omole (1992), who obtained similar carcass yield (54.73 to 59.4%).

Cost of Production

The cost kg^{-1} feed reduced from N54.16 kg^{-1} in T_1 to N44.82 kg^{-1} in T_4. The lowest cost per weight gain (N249.76) was recorded in T_4 (CCTM) followed by T_2 (CPM), while the highest cost per weight gain (N292.39) was recorded in the control diet (T_1). The highest total feed cost (N268.52) for

Table 2: Effect of the experimental diets on carcass and Internal organ weights of the experimental rabbits

	Treatments				
Parameters	T_1 (control)	T_2 (CPM)	T_3 (PCTM)	T_4 (CCTM)	SEM
Av. Live weight (g)	1662.000	1612.00	1700.00	1725.00	3.26
Av. Dressed weight (g)	970.000	900.00	950.00	950.00	2.54
Dressing (%)	58.300	55.80	55.90	56.70	0.55
Liver (% of lw)	3.280	2.62	2.50	3.67	1.48
Heart (% of lw)	0.240	0.25	0.27	0.23	0.25
Lungs (% of lw)	0.560	0.76	0.56	0.40	0.70
Kidney (% of lw)	0.680	0.65	0.51	0.61	0.49
Spleen (% of lw)	0.048	0.05	0.04	0.05	0.15
Forelegs (g)	179.000	173.10	169.75	161.20	1.29
Thoracic cage (g)	139.400	134.60	149.00	140.40	1.14
Loin (g)	270.500	230.00	259.50	255.15	1.93
Hindlegs (g)	293.600	281.00	301.65	303.40	1.46

*Means within a row without any superscript are not significantly different ($p>0.05$), Lw: Live weight, SEM: Standard error of the means

Table 3: Economics of production of rabbits fed the experimental diets

	Treatments			
Parameters	T_1 (control)	T_2 (CPM)	T_3 (PCTM)	T_4 (CCTM)
Cost/kgfeed (N kg^{-1})*	54.16	36.86	44.08	44.82
Mean total feed cost (N)	268.52	203.64	239.86	257.26
Mean total weight gain (kg)	0.92	0.81	0.88	1.03
Cost/weight gain (N kg^{-1})	292.39	251.40	272.56	249.76
Cost differential	-	40.99	19.83	42.63
Relative cost advantage(%)	-	14.01	6.78	14.57

*$1 = N 140

the period was recorded in T_1, while the lowest feed cost (N203.64) for the period was recorded in T_2 (Table 3). This was due to high cost of maize (N60 kg^{-1}) at the time of this study compared with low cost (N14 kg^{-1}) of cassava tuber. The relative cost advantage (%) indicated that CCTM (T_4) and CPM (T_2) had better economic advantages when compared to control (T_1). A Similar report on cost benefit in favour of cassava based diets was made by Obikaonu and Udedibie (2006).

CONCLUSION

This study has revealed that cassava peel meal, peeled cassava tuber meal and composite cassava tuber meal could be substituted for maize meal as energy sources in rabbit diets because there was no significant difference in the carcass characteristics between the test materials and the control. However, composite cassava tuber meal is recommended as it attracted the lowest cost per weight gain compared to the other experimental diets.

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