

EVALUATION OF THE NUTRITIVE POTENTIAL OF CASSAVA (*MANIHOT ESCULENTA* CRANTZ) PEELS-BLOOD MEAL MIXTURE ON THE PERFORMANCE CHARACTERISTICS OF FEMALE GROWING RABBITS IN THE DERIVED SAVANNAH ZONE OF NIGERIA

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ABSTRACT

A feeding trial using sixty crossbred 7-9 weeks old female rabbits was conducted to investigate the effect of pre-treatment methods as well as the inclusion levels of sun dried cassava peel/blood meal mixture (3:2) on their performance characteristics. Three types of cassava peels treatment were compared. Ten experimental diets were formulated with diet 1 serving as the control without cassava peel/blood meal mixture. Diets 2, 3, and 4 had 10, 20 and 30% inclusion of ash treated cassava peels/blood meal mixture. Diets 5, 6 and 7 had 10, 20 and 30% parboiled cassava peel/blood meal mixture while diets 8, 9 and 10 had 10, 20 and 30% simply sun dried cassava peels/blood meal mixture. The rabbits were divided into 10 treatments (after weight balancing) groups of six rabbits each and assigned randomly to the ten diets with each rabbit serving as a replicate in a randomized complete block design experiment. The average initial weights were 610, 611 and 613 g for the control, ash treated, parboiled and sun dried cassava/blood meal diets as well as the 10, 20 and 30% inclusion levels. Rabbits received feed and water *ad libitum* during the 12 weeks of the experiment. The pre-treatment methods of cassava peels had no significant ($P>0.05$) effect on the average daily gain which was 8.94 g/d for the control, 8.13 g/d with ash treatment, 8.48 g/d for parboiled treatment and 8.92 g/d sun dried cassava peels. The rate of inclusion also had no significant ($P>0.05$) effect on the average daily gain which were 8.94, 8.92, 8.53 and 8.40 g for the control, 10, 20 and 30% levels of inclusion. The pre-treatment methods as well as the rate of inclusion did not significantly ($P>0.05$) affect the feed to gain ratio which were 6.16, 7.04, 7.27 and 7.15 (pre-treatments) for the control, ash treated and parboiled respectively and 6.16, and 7.45, 6.99 and 6.49 (rate of inclusion) for 10, 20 and 30% respectively. In conclusion, growing rabbits can tolerate up to 30% of either treated, parboiled or sun dried cassava peels/blood meal mixture (3:2) without negative effect on performance.

Keywords: Ash treated cassava peels, Parboiled cassava peels, Sun dried cassava peels and rabbit does.

INTRODUCTION

Rabbits have high potential for converting feed to meat, the actualization of it depends on the quality of nutrition. Presently the prices of most conventional feed ingredients are high sequel to stiff competition for them directly by man and industrial usage. The search for alternative feed ingredients therefore becomes the focus of most animal nutritionists. Two of such alternatives are the cassava peels and blood meal. Cassava peels have been variously used in diet of rabbit, pig and broilers (Omole and Sonaiya, 1981; Agunbiade *et al.*, 2002) while blood meal has been used to replace protein in poultry diet (Njoku, 1985). Cassava peels though abundantly available as a waste from cassava tuber processing is low in protein while blood meal is high in protein and equally available.

There is paucity of information if any on the possible combination of cassava peels and blood meal in rabbit diet. These present study is design to look at three different treatments method of cassava peels

and their combination with blood meal at varying inclusion levels. The processing of the peels was done to see whether it affect its utilization.

MATERIALS AND METHODS

Location

The study was carried out at the Rabbitry unit of Teaching and Research Farm, Ladoke Akintola University of Technology, Ogbomoso, Oyo State, Nigeria. Ogbomoso is in the derived savannah zone of Nigeria. The description of the study area had earlier been giving by Oguntoyinbo, 1978.

Collection of test ingredients

Cassava peels: Fresh cassava peels from sweet variety were collected from local gaari processing factory located about 2 km from the study area. The thickness of the peels was immediately measured using veneer caliper before further processing. The average thickness is 3.5-4.0 mm.

Blood: Fresh bovine blood was collected from the central abattoir located within the study area and transported in plastic buckets to the study area for processing.

Ash: Wood ash were collected from bakeries located within the study area, sieved using 2mm sieve to remove the foreign particles like stones and un-burnt wood.

Processing of the test ingredients

1. Cassava peels: The freshly collected cassava peels were divided into three parts after weighing and treated as follows:

Sun drying: The fresh cassava peels were washed in ordinary water to remove dirt and sand. The washed peels were then thinly spread on water proof material and sun dried with turning at intervals to prevent fermentation.

Parboiling: Fresh cassava peels were poured into water pre-heated to 100°C in a cooking vat and allowed to stay on fire for thirty minutes with stirring at intervals before draining and spreading on water proof material to sundry.

Ash treatment: The fresh cassava peels were soaked in plastic containing ash solution (500 g wood ash/l of water) for twenty four hours with stirring at regular intervals of 6 hours each. After 24 hour the peels were drained and spread thinly to sundry.

2. Blood meal: The bovine blood was boiled inside vat at 100°C for one hour with continuous stirring to prevent burning and allow even cooking. The brownish lumps were cut into smaller pieces to allow easy and faster drying and then spread outside to sundry.

The sun dried test ingredients were stored in sacks until needed.

Preparation of experimental diets

Ten experiment diets were prepared by mixing the three differently processed cassava peels and blood meal in ratio 3:2 together with other ingredients (Table 1) as follows. Diet 1 control, Diets 2, 5 and 8: 10% cassava peel + blood meal mixture, Diets 3, 6 and 9: 20% cassava peel + blood meal mixture, Diet 4, 7 and 10: 30% cassava peel + blood meal mixture. For diets 2, 3 and 4 cassava peels were sun dried for diets 5, 6 and 7 they were parboiled and for diets 8, 9 and 10 they were ash treated. The cassava peel + blood meal was introduced in diets in replacement of the groundnut and palm kernel cakes. The diets were pelleted using 5 mm pelleting die through extrusion method.

Table 1: Percentage composition of experimental diets

Ingredients (%)	Control diet 1	Experimental diets		
		2 – 5 - 8	3 – 6 - 9	4 – 7 - 10
Ground nut cake	14.50	8.0	3.00	0.00
Palm kernel cake	27.0	23.50	18.50	11.50
Maize	12.25	12.25	12.25	12.25
Cassava peels +Blood meal (3+2 mixture)	0.0	10.00	20.00	30.00
Wheat bran	40.00	40.00	40.00	40.00
Fish meal	0.50	0.50	0.50	0.50
Molasses	2.50	2.50	2.50	2.50
Salt	0.50	0.50	0.50	0.50
Bone meal	2.50	2.50	2.50	2.50
Premix	0.25	0.25	0.25	0.25

Experimental animals and management

Sixty cross-bred female rabbits of between 7–9 weeks used for the study. The rabbits were allowed seven days adjustment period on the control diet, dewormed and treated with broad spectrum antibiotics. At the end of the adjustments period the rabbits were weight balanced such that the initial average ranged between 610–614 g. They were then assigned into 10 relative equal mean group weights of 6 rabbits per treatment with each serving as a replicate in randomized complete block design experiment.

The rabbits were housed in individually in wood-wire cages measuring 44 x 34 x 44cm. The drinking and feeding troughs made of earthen pot re-enforced with cement to prevent tipping off were of removable types for easy cleaning.

A total of 100 g of feed divided into two portions of 50 g in the morning 8.00 hour and 50 g in the evening 16:00 hour were supplied to each rabbit per day. Orts were collected and weighed the following morning in order to determine feed intake. Water was provided *ad libitum*.

The rabbits were weighed at the start of the experiment and thereafter they were weighed weekly to determine weight gain. Records of actual feed intake and weight changes were kept for further analyses. The experiment lasted for 12 weeks.

Proximate analysis and Statistical analysis

Representative samples of the test ingredients, as well as the experimental diets were analyzed for their chemical constituents using the method of AOAC (1990).

All data collected were subjected to analysis of variance using the general linear model (GLM) according to SAS (1999) and significant differences were compared using Duncan's Multiple Range Test (Duncan 1955) of the sample package.

RESULT AND DISCUSSION

Table 2 shows the proximate composition of the experimental diets. The crude protein content ranged from 16.74 to 18.27%, while the crude fat ranges from 3.67 to 4.13%, the crude fibre content range 7.98–8.94%. The crude protein of the diets used in this study falls within the range reported by Ojebiyi, *et al.* 2006 and Amaefule and Ironkwe (2007). The analysed nutrient content of the diets were within the range recommended by Lebas (1979), Lang (1981) and NRC (1984).

The performance characteristics of the rabbit fed with diets containing cassava peels/blood meal mixture is presented in Tables 3 and 4. It must be pointed out that all the initial rabbits were still alive after the 12 weeks of experiment.

Table 2: Proximate composition (%) of experimental diets

	Diets									
	1	2	3	4	5	6	7	8	9	10
Dry matter	89.1	89.6	89.0	89.0	89.5	89.1	89.2	89.4	89.3	89.4
Crude protein	18.3	16.7	16.9	18.2	17.9	17.9	18.0	17.1	17.7	17.5
Crude fibre	8.87	7.87	8.14	8.04	8.09	7.98	7.08	8.94	6.70	8.15
Ash	7.32	6.82	6.94	7.13	7.18	7.24	3.95	6.99	6.94	6.86
Ether extract	4.13	3.69	3.73	3.78	3.89	4.04	3.95	3.86	3.93	4.07

The effect of the pre-treatment methods on the performance of the rabbit (Table 3) shows that the pre-treatment methods did not have any significant ($P>0.05$) effect on the response criteria measured. The final live weight obtained in this study is higher than that of Olabanji *et al.* 2007 but lower than that of Ajayi *et al.* 2007.

Table 3: Performance characteristic of rabbit does as influenced by pre-treatment methods of cassava peels/blood meal mixture

	Control	Cassava peels treatment			SEM	Prob.
		Ash treated	Parboiled	Sundried		
Initial weight (g)	610	610	611	613	139	NS
Final weight (g)	1363	1278	1314	1323	169	NS
Daily feed intake (g/d)	58.1	58.8	58.7	54.6	3.7	NS
Daily weight gain (g/d)	8.94	8.13	8.48	8.92	3.00	NS
Feed to gain ratio	6.16	7.04	7.27	6.15	2.00	NS

The daily weight gain as influenced by pre-treatment method shows that A_T had 8.13 g, P_b 8.48 g, S_d 8.92 g and control 8.94 g. The values though not significantly ($P>0.05$) different from each other were lower than the 12.9 g/d and 18.3 g/d reported by Muir and Massaete (1996) and Din *et al.* (1990) respectively.

The performance characteristics of the rabbits as influenced by the rate of inclusion of cassava peel/blood meal mixture (Table 4) revealed that the parameters measured were not significantly ($P>0.05$) affected. The parameters measured especially the final live weight and daily weight gain were similar the values obtained by pre-treatment methods. The results obtained in this study shows that the pre-treatment methods of cassava peels especially those Ash treated and parboiled will only increase labour and add to the cost of production for farmers. Washing cassava peels and sun drying directly without further processing will suffice so far it is properly dried.

Table 4: Performance and characteristic of rabbit does as affected by the rate of inclusion of cassava Peels/Blood meal mixture

	Control 0%	Inclusion rate			SEM	Pro.
		10%	20%	30%		
Initial weight (g)	610	610	611	613	139	NS
Final weight (g)	1363	1334	1312	1312	269	NS
Daily feed intake (g)	58.1	58.4	57.4	56.7	3.7	NS
Daily weight gain (g)	8.94	8.92	8.53	8.40	3.00	NS
Feed to gain ratio	6.16	7.45	6.99	6.49	2.00	NS

The comparative performance of the rabbits on the control diet as well the 30% inclusion level is a reflection of the adequacy of the test ingredient nutritionally and tolerance of the rabbit for the test ingredient.

CONCLUSIONS

The results of this study show that young female rabbits can tolerate cassava peel/blood meal mixture up to 30% inclusion without adverse effect on growth performance. Since these materials are of low value in human diet and are of easy acquisition, their inclusion in rabbit diet in partial or complete substitution of ground nut and palm kernel cake, has potential usefulness in increasing rabbit

production and an ultimate increase in animal protein in the diet of the populace in developing countries.

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