CASSAVA PEELS AND LEAVES IN THE DIET OF RABBITS: EFFECT ON PERFORMANCE AND CARCASS CHARACTERISTICS

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ABSTRACT

An experiment was conducted using 20 growing rabbits (5-6 weeks in age) of mixed breeds and sexes with initial weight of 500-650g to evaluate the effect of replacing maize as a source of energy with cassava peel meal (CPM) and cassava leaf meal (CLM) in their diets. The rabbits were randomly allotted to five isonitrogenous and isoenergetic diets. Each dietary treatment was replicated 4-times with individually caged rabbits. The experiment lasted 56days. Dietary treatment did not have effect (p>0.05) on average daily weight gain, water consumption , feed intake and feed efficiency and carcass charactaristics. The utilization of CPM and CLM fortified with palm -oil sludge with or without amino acid supplementation greatly reduced the cost of producing a unit weight of rabbit (P<0.001) .It was concluded that combination of CPM and CLM can serve as a replacement for maize in rabbit diets without any adverse effect on growth performance and carcass characteristics.

Keywords: Cassava Peel Meal, Cassava Leaf Meal, Rabbit Performance , Carcass evaluation.

INTRODUCTION

The resurgence of interest in rabbit production in Nigeria calls for research into alternative sources of energy yielding ingredients to replace or supplement the expensive conventional cereal grains. Among such alternative food stuffs are cassava by-products particularly Cassava Peel Meal (CPM) and Cassava Leaf meal (CLM) , which are abundant in domestic and industrial cassava processing locations.

Nigeria is currently the World leading producer of cassava, producing 33 million metric tonnes per year (Ikwelle, 1999). The peels account for between 10-13% of the tuber by weight (Tewe and Kasali, 1986).Bakanga (1994) reported that 7-20 tons of cassava leaves can be harvested per hectare of cassava farmland. Harvesting cassava leaves once every two months does not have negative effect on root yield (Lutaladio and Ezumah, 1981) .

Processed CPM has been used extensively as a cheaper substitute for maize as a source of energy in diets for non-ruminants (Longe *et al.* 1977 ; Obioha and Anikwe 1982 ; Obioha *et al.*, 1984; Osei and Doudu, 1988; Anina, 1990;Ogbonna, 1991; Esonu and Udedibie, 1993; Ogbonna and Oredein, 1988).Agunbiade and Bello (1997) however observed that when dry CPM was used to replace 100% maize, there is often the need to fortify the diet for energy and protein, thus jettisoning the objective of cost reduction. There is thus the need to search for a cheap protein source that could be used in conjunction with CPM in rabbit diet. Cassava Leaf Meal (CLM) appears to satisfy this condition.

The nutritive value of CLM has been reviewed by Lancester and Brooks (1983). West *et al* (1988) indicated that the proximate composition of CLM compared favourably well with the composition of other feedstuffs such as soybeans and

maize . The objective of this study was to investigate the nutritional worth of utilising CLM as a protein concentrate in a CPM based diet for rabbit.

MATERIALS AND METHODS

Preparation of Cassava Leaf and Root Meals.

Cassava cutting from TMX 30211 variety were obtained from International Institute of Tropical Agriculture (IITA) Ibadan and grown on the Teaching and Research farm of Ogun State University, Ago-Iwoye. Fresh cassava leaves , harvested without petioles from 12 months old crop, were chopped into smaller sizes immediately , wilted under shade for 24 hours and sun - dried later until practical dryness was achieved . Leaves were then crumbled to small particles to obtain CLM. Peels of harvested roots of same age were collected from the Garri processing pavilion of the farm, sundried on concrete floor for four days and milled to obtain CPM.

Experimental Animals and Management

Twenty growing rabbits of mixed breeds and sexes with initial live weight of 500-650g were randomly allotted to five test

TABLE 1: COMPOSITON OF EXPERIMENTAL DIETS (%)

Ingredients	Diet 1 Control	Diet 2:75% replacement	Diet 3:100% replacement	Diet 4:75% replacement with Amino-acid	Diet 5: 100% replacement with Amino-acid
Maize	50	12.5	-	12.5	-
Cassava Leaf Meal	-	7.24	9.65	7.24	9.65
Fish Meal	4.0	-	-	-	-
Full Fat Soybean	12	12	13	11.91	12.89
Cassava Peel Meal	-	30.26	40.35	30.26	40.35
Palm-Oil Sludge	-	8	11	8	11
Rice Husk	30	14	11	14	11
Palm Kernel Cake	-	7	7	7	7
Blood Meal	-	5	4	4.72	3.71
Oyster Shell	1.0	1.0	1.0	1.0	1.0
Bone Meal	2.0	2.0	2.0	2.0	2.0
Salt	0.5	0.5	0.5	0.5	0.5
Vitamins/Mineral Premix	0.5	0.5	0.5	0.5	0.5
Lysine	-	-	-	0.2	0.2
Methionine	-	-	-	0.2	0.2
Total	100	100	100	100	100
Calculated Analysis					
CP	14.6	14.83	14.95	15.32	15.11
CF	11.87	14.74	16.02	14.77	15.98
ME (Kcal/Kg)	4428.7	4359.2	4335.1	4345.8	4336.6

diets (Table 1). Four rabbits, which were individually caged, were randomly allotted to each dietary treatment after balancing for weight. Diet 1 was a maize- based control while Diets 2 and 3 had 75 and 100% maize content replaced by CPM and CLM without amino-acid supplementation while Diets 4 and 5 were similar to Diets 2 and 3 but with amino acid supplementation . All CPM and CLM based diets were fortified with palm-oil sludge to boost their energetic concentration. and reduce dustiness.

Feed and water were supplied *ad libitum* over a 56 day experimental period. Feed and water intake were measured daily while weight gain was measured on a weekly basis.

At the end of the study , three rabbits were randomly taken from each treatment , starved for 24hours , weighed, stunned, slaughtered and eviscerated for carcass evaluation.

RESULTS AND DISCUSSION

The proximate composition of CPM and CLM used in this study is given in Table 2. The values were similar to these reported by West *et al* (1998), Ogbonna t (1991) and Agunbiade and Bello (1997).

The productive performance of rabbits on the test diets is presented in Table 3.Feed intake, water intake, weight gain and feed conversion ratio (FCR) were not significantly (P> 0.05) affected by dietary treatments.

The result of the present study is contrary to the finding of Esonu and Udedibie (1993) who reported that feed intake and weight gain were significantly depressed when maize was completely replaced with cassava peel meal. The substitution of CPM and CLM for maize will expectedly result in dilution of dietary energy and increased dustiness. These factors may be responsible for depressed feed intake and weight gain of earlier studies. In this study, however , the palm oil sludge , rich in residual oil was employed as an energy booster and as an aid in reducing dustiness.

Many worker (Dale and Fuller , 1979;Summer and Leeson , 1985) had indicated that fats and oil improve the general appearance and palatability of feed . Spear (1976) reported a reduction in dustiness of feed with added fat while Fuller (1981) stated that it was possible to alleviate the growth depressing effect of heat stress by the use of high level of

TABLE 2: PROXIMATE COMPOSTION (%) AND CYANIDE CONCENTRATION(MG/KG) OF CPM AND CLM

	Crude Protein	Crude Fibre	Ether extract	Ash	Moisture	HCN
CPM	5.69	20.46	0.74	5.07	19.25	27
CLM	21.45	10.32	3.87	8.20	17.5	29

Analytical Techniques

Chemical Analysis

Sample of experimental CPM, CLM and feeds were subjected to proximate analyses according to the methods of AOAC (1995) .Hydrogen cyanide content of CPM and CLM was determined using the methods of Zitnak (1973)

Statistical Analysis

Data collected from the experiment were subjected to analysis of variance using a complete randomised design as described by Mead and Curnow (1987)

TABLE 3: PERFORMANCE AND FEED ECONOMY OF RABBITS FED THE DIETARY TREATMENTS

RESPONSE CRITERIA	EXPERIMENTAL DIETS 1	2	3	4	5
Average Daily Feed intake(g)	62.86 ± 0.16	61.65 ± 0.06	60.08 ± 0.21	61.83 ± 0.21	61.79 ± 0.30
Average Daily Water intake (ml)	139.6 ± 9.36	125.64 ± 19.83	140.47 ± 17.34	135.47± 8.82	141.89± 8.65
Average Daily Weight Gain (g)	18.80± 0.78	17.65± 1.20	18.56± 0.52	18.57± 0.52	18.50± 0.72
Feed Conversion Ratio	3.34± 0.62	3.45± 0.58	3.44± 0.9	3.33± 0.32	3.34 ± 0.81
Cost /kg feed (N)	21.74	12.73	10.04	14.94	10.11
Cost/kg Weight gain (N)	72.61± 2.48^{c}	43.92 ± 3.15^{b}	34.45± 4.52^{a}	49.78 ± 3.20^{b}	33.76 ± 3.65^{a}

** Mean ± SD within row with differenbt superscript are significantly different (P<0.001)

dietary fat in poultry rations.The work of Famunyan *et al* ., (1981) showed that the rate of hydrolysis of cyanogenic glucosides in cassava to produce poisonous hydrogen cyanide was greatly reduced with palm oil. These attributes of supplemental fats and oil which were possible through the use of palm oil sludge are probably responsible for the non-significant effect of CMP and CLM on ADWG, ADFI amd FCR. However cost/kg weight gain was reduced generally with increasing dietary CPM and CLM (P<0.001)

Oke (1978) and Gomez and Manner (1984) advocated the use of amino-acid in fortifying CPM, CLM and CRM -based diets. These workers explained that methionine and cystine will serve as sulphur donor in the detoxification of hydrogen cyanide. However, in the present study the HCN levels of 27mg/kg and 29mg/kg for CPM and CLM, respectively, are quite low and would need no detoxification The sundrying

TABLE 4: THE EFFECT OF DIETARY TREATMENTS ON THE EDIBLE PARTS (% OF DRESSED WEIGHT)

	DIETARY TREATMENTS Diet 1	Diet 2	Diet 3	Diet 4	Diet 5	
Dressing Percentage	52.47 ± 0.86	49.59± 0.42	49.00 ± 1.00	50.64 ± 2.49	50.73 ± 1.78	NS
Kidney	7.75± 0.05	10.10± 0.06	8.75± 2.85	8.40 ± 2.40	9.55 ± 0.35	NS
Heart	3.80± 0.06	3.35± 0.05	3.50± 0.30	4.75 ± 0.25	3.90 ± 1.00	NS
Liver	3.62 ± 0.12	4.91± 0.07	5.15 ± 0.23	5.75± 0.34	5.74 ± 1.47	NS
Shoulder	15.63 ± 3.13	14.71± 0.03	14.59± 2.09	14.16 ± 1.22	20.05 ± 3.04	NS
Rack	25.00± 1.00	25.21 ± 0.21	22.92 ± 2.09	24.78 ± 1.70	20.05 ± 3.04	NS
Loin	32.00± 0.75	33.62 ± 0.29	31.25 ± 6.25	32.33± 0.02	34.46± 0.17	NS

NS = Not Significant (P > 0.05)

processing of both CPM and CLM is believed to have resulted in the reduction of the HCN content. Gomez and Manner (1984) indicated that more than 86% of the HCN present in cassava products was lost during sundrying.

CPM and CLM did not affect (P>0.05) carcass characteristics of rabbit (Table 4). Dressing percentage ranged from 49.00-52.47% .These finding are in agreement with the report of Agunbiade and Bello (1997) and Agunbiade *et al* (1999) that CPM did affect carcass weight and characteristics. Similar reports were obtained by Osei and Doudu (1988) in works with sundried CPM on broiler carcass

Conclusively , the result of this study indicates that combinations of CPM and CLM can serve as a replacement for maize in rabbit diet without any adverse effect on growth performance and carcass characteristics.

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