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Effects of Local Spices on the Utilization of Cassava Peel Meal-Based Diets by Weaner Rabbits

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Abstract: The performance of weaner rabbits fed diets containing *Monodora nyristica Spice, Zingiber official* (ginger spice) and Cocos nucifera (coconut spice) respectively was compared with that of weaner rabbits fed diet that did not contain any of the spices to ascertain the influence of spices on the utilization of cassava peel meal. Four diets 1, 2, 3 and 4 were formulated with diet 1 (control) containing no spice while diets 2, 3 and 4 contained *Monodora myrsitica, Zingiber ans Cocos nucifera* soices respectively. The experiment was a completely Randomized Design with four treatments and two replicates each. Thirty-two weaner rabbits (New Zealand White X Chinchilla) were used with four rabbits per replicate and eight per treatment in the experiment which lasted eight weeks. The final body weight, and weight gain of rabbits fed Zingiber officinal spice diets were significantly higher ($P<0.05$) than the other diets (1, 2 and 4). The feed intake of the diets containing the spices (diets 2, 3 and 4) was significantly higher ($p<0.05$) than diet 1 (control) which had no spice. This shows that the spices made the diets more palatable than the diet without spice. The feed conversion ratio of rabbits fed the diet containing *Zingiber officinal* spice was significantly better ($p<0.05$) than others. The hemoglobin and packed cell volume content of the blood of rabbits fed *Zingiber officinal* spice were significantly higher ($p<0.05$) in the percentage dressed weight and erum cholesterol contents of the rabbits fed all the treatment diets. For economics of production, the diet containing *Monodora myristica* recorded the highest cost per kg feed whereas the containing *Zingiber officinal* had the highest cost per kg weight gain. Spices especially ginger spice enhanced the utilization of cassava peel meal.

Key words: Monodora myristica spice, Zingiber officinal spices, cocos nucifera spice,

Introduction

The use of spices to enhance the flavouring and nutritive potentials of human food in Nigeria dated many decades ago. For farm animals however, not much has been done to deliberately incorporate local spices in the formulation of livestock feeds to increase the favour, consumption and utilization of such feed by the animals. The use of spices in cassava peel meal based diets will enhance the utilization since cassava peel meal is unpalatable, dusty and less acceptable to farm animals (Obioha and Anikwe, 1982).

Three indigenous spices namely monodora myristiea (Ehuru.lgbo). Zingiber Officinal Rose (ginger) and Cocos nucifera (copra spices) were used in this work to improve the utilization of cassava peel mean by animals. Keay (1989) reported that *Monodora* spices is obtainable from the fruits of Monodora myristic tree found commonly in the rain forest of Eastern Nigeria Ginger spice is prepared from the rhizome of Zingiber Officule Rose (ginger), an annual crop propagated vegetatively (Ebewele and Jomoh, 1998). The copra spice (coconut) is obtained from the endosperm of coconut fruit (Umoh, 1998). Okwu (2001) determined the chemical composition of these spices thereby necessitating this work which aims at exploiting the flavouring potentials of the spices to enhance the utilization of cassava peel meal rabbits.

Tewe and Iyayi (1995) reported that among the roots produced in Nigeria, Cassava from which cassava peel is obtained constitute 20 percent of total tubers produced annually.

Cassava peel meal could serve as a cheap source of energy for farm animals but should be fortified with additional protein source because of its low protein level (Obioha and Anikwe, 1982) Improvement in the consumption and metabolism of feed by farm animals especially rapidly growing species like rabbits would help to solve the problem of dearth of animal protein source in Nigeria. According to Mayer (1990) average Nigeria consume about 5.5 head of protein daily against the recommended 35g/head daily (FAO, 1982). The objective of this study was to determine the influence of spices on the utilization of cassava peel meal based diets.

Materials and Methods

This study adopted four treatment diet groups which were replicated into two Diet I as shown in Table 1 was formulated without spice and so served as the control. Diets 2, 3 and 4 contained *Monodora mytistica. Zingiber officinal* and Cocos nucifera spices respectively. All the diets contained equal amount of Cassava peel meal

(Table 1).

Proximate analysis of the formulated rations shown in Table 2 was carried out using the methods of association of official analytical chemists (AOAC, 1999) to ensure that the feed conformed to the expected nutrient requirement of weaner rabbits. Thirty two weaner rabbits (New Zealand white X chinchilla) with average weight of 790g and about 7 weeks of age were randomly allotted to the treatment diets. Each replicate contained four rabbits making eight rabbits per treatment diet. The rabbits were housed in a hutch of 120 X 150cm raised 120cm from the ground. The cassava peels were procured fresh, sundried for five days and milled with 2 mm screen into a meal. The spices were prepared from their parent sources namely monodora spice from the seed, ginger spice from the rhizome and copra spice from coconut. They were collected, oven dried and milled into powder.

The rabbits were fed once a day with 50g concentrate and 300g of forage per rabbit. Water was served *ad libitum* during the experiment which lasted eight weeks. Daily feed consumption was recorded by taking the difference between feed supplied and the quantity left in the feed trough every morning. Weekly weighing of the rabbits was also carried out. Data on feed intake, weight gain, feed conversion ratio and mortality were obtained. Economic data on cost of feed and cost/ Kg weight gain were also collected. At the end of the experience one rabbit from each replicate was slaughtered to enable data on carcass characteristics and hematological evaluation be obtained.

Data generated was subjected to analysis of variance test in completely Randomized Design and significant means separated using New Duncan Multiple Range test according to Steel and Torrie (1980).

Table 1: Percentage Composition of Experimental Diets

Ingredients	Experimental Diets			
	1	2	3	4
Cassava peel meal	20	20	20	20
Monodora Mysrischa	-	20	-	-
Zingiber Officinal	-	-	20	-
Cocos nucifera	-	-	-	20
Maize Offals	58.5	56.5	56.5	56.5
Soyabean meal	15	15	15	15
Fish Meal	20	20	20	20
Bone Meal	20	20	20	20
Oyster Shell	1	1	1	1
Palm oil	1	1	1	1
Salt	0.25	0.25	0.25	0.25
Vit Premix	0.25	0.25	0.25	0.25
Total	100	100	100	100

Table 2: Percentage Composition of Experimental Diets

Component	Experimental Diets			
	1	2	3	4
Dry matter	94.02	93.25	93.6	93.80
Crude protein	16.24	16.30	16.33	16.12
Crude fibre	10.90	11.0	11.0	11.0
Either extract	3.58	4.35	3.74	4.79
Nitrogen Free Extract	61.62	60.02	59.65	59.85
Ash	3.65	3.66	3.76	3.66
Energy (kcal/ KgDM)	2112.5	2484.02	2445.85	2502.3

Results and Discussion

The values of ether extract and crude fibre in the proximate composition of the experimental diets (Table 2) agree with that reported by Esonu and Udedibic (1993) for weaner rabbits.

The final body weight (Table 3) of rabbits fed treatment diets 3, containing ginger spice was significantly higher ($P<0.05$) than the other diets, and were also higher than the that reported by Esonu and Udedibic (1993). The daily feed intake and weight gain of treatment diet 3 were also significantly higher ($p<0.05$) than that of the other diets. It could thus be inferred that giner spice tended to positively influence the appetite and feed utilization of the rabbits more than the others spices. The feed intake of the rabbits more than the others spices. The feed intake of the rabbits given the diet without spice (control) was the least confirming the report by Obioha and Anikwe (1982) that cassava peel meal could be unpalatable to animals because of its high content of prussic acid. The flavouring agents (species) may have stimulated an increase in feed intake among rabbits that were fed on the spices whose effects could be due to smell or teste as opined by Adeniyi and Balogun (2002). In terms of utilization of the treatment diets by the rabbit, the group fed with ginger spice (diet 3) has a significantly better ($p<0.05$) feed conversion ratio (FCR) than others while that of diets 1, 2 and 4 were not statistically different ($P<0.05$) from one another.

The economic data showed that the diet without spices (diet 1) has the least cost/weight gain the diet containing ginger spice had the highest. The reason being that the spice added extra cost. This higher cost by the spices seems to be compensated by the higher feed intake and weight gain of rabbits that fed on them. The percentage dressed weight for all the experimental diets were not significantly different ($P<0.05$) from one another even though the value for diet 3 was highest. the Percentage dressed weight values agreed with those obtained by Aduku and Olukosi (1990), Agunbiade *et al*. (1999) and Ijaiya (2001) on rabbits fed cassava peel meal.

The heamoglobin and packed cell volume of rabbits fed diet 3 (Ginger spice) were significantly greater that others ($P<0.05$). it suggests that ginger spice may contain more blood forming factors or may have induced the rabbit cells to from more blood than other spices and the cassava peel meal alone. The serum cholesterol of the rabbits fed all the treatment diets were not significantly different ($p<0.05$) from one another. This means that addition of the spices did not affect the cholesterol status of the blood of the rabbits. This result

Table 3: Growth and Economic Performance of the Weaner Rabbits Fed the Experimental Diets

Parameters	Experimental Diets				
	1	2	3	4	SEM
Final Weight (g)	1650^{b}	1560^{a}	1800^{a}	1660^{a}	14.14
Av Daily Feed Intake (g)	70.45^{b}	72.32^{ab}	74.4^{a}	74.0^{a}	0.49
Av. Daily Wt Gain (g)	15.12^{b}	13.84^{b}	18.0^{a}	15.6^{b}	0.178
FCR (Feed/gain ratio)	4.66^{b}	5.23^{b}	4.14^{a}	4.7^{b}	0.105
Mortality (%)	0.00	0.00	0.00	0.00	-
Cost/kg Wt Gain (N)	119.06^{a}	151.67^{b}	223.1^{a}	124.9^{bc}	1.573
Percent dressed weight	54.2	51.5	56.3	55.4	8.14
Hemoglobin (g/dl)	11.0^{b}	92^{c}	13.8^{a}	13.1^{ab}	0.28
PCV (%)	34^{b}	29^{c}	43^{a}	9b	1.56
Serum Cholesterol (g/dl)	0.64	0.79	0.54	0.65	0.12

Abcd: Means in the same row with different superscripts are significantly different from one another ($p<0.05$)

different with that of Onwudike (1996) which reported that coconut oil generally elevates scrum cholesterol of experimental rabbits.

Conclusion: It has been established in this study that it is not only necessary to stimulate the appetite of human beings with the use of spices which has been in practice many years ago but also that farm animals propensity to consume feed can be enhanced by the inclusion of spices in their diets. This was prove in the better utilization of Cassava peel meal based diet containing the spices monodora mytusticu. Zingiben officinal and cocos nucifera by rabbits as against the diet that did not contain spice. The palatability, acceptability and utilization of cassava peel meal can thus be enhanced by the use of spices. Zingiber officinal (ginger spice) proved the most effective of all in lerms of feed consumption, weight gain feed conversion ratio, haemoglobin and packed cell volume.

It is recommended that deliberate attempt should be made by nutritionists to incorporate spices in the diet of livestock animals to enhanced the utilization of come ingredients like cassava peel meal that are characteristically unpalatable. *Zingiber afficianale* (ginger) spice is the recommended choice for this purpose.

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