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Maize Replacement Value of Raw Sundried Wateryam (*Dioscorea alata*) in Rabbit Diet

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Abstract: Twenty-four cross bred, six weeks old Rabbits of average initial weight of 437.5g were placed on feeding trial that lasted five weeks. The rabbits were randomly divided into three treatment groups of 8 rabbits each and fed three diets containing 0% (control), 50% and 100% Raw Sundried Water Yam (RSWY). Result showed that there were no significant differences ($p>0.05$) among the dietary treatments in weight gain feed intake and feed efficiency ratio. However significant difference ($p<0.05$) existed in protein efficiency ratio. The cost per Kg feed and cost of feed per Kg Weight gain were significantly ($p<0.05$) influenced.

Key words: Maize replacement, *Dioscoren alata*, rabbit diet

INTRODUCTION

Rabbit is one the best of all the short production cycle animals in term of capital input, Space, fecundity and prolificacy[1]. Rabbit meat is wholesome, low in cholesterol, sodium and fat but high in protein[2]. It is a small non-ruminant animal and can subsist on forage because of its potential to degrade cellulose cell wall of the forage. However it performs better when it is exposed to concentrate as a supplement or as a co-feed.

Provision of concentrates for the animal immensely increases the animal productivity. However, in developing country like Nigeria, it results to extensive use of food grains, hence it is becoming increasingly difficult to raise livestock on conventional feed ingredients such as maize, sorghum, soybean, wheat etc.[3] This is as a result of diverse use as well as competition that are in contrary to low production, hence creating a threat on increasing and improving animal protein production.

Water yam of which its demand is relatively low compare to its production since it does not give satisfactory local dish of pounded yam[4]. It has little or no storage potential due to its high moisture content of about 70 and 65.85%.[5,6].

Hence an experiment was therefore carried out to evaluate the response of rabbits to raw sundried water yam (RSWY) based ration and examine the cost efficiency of RSWY in the rabbit diet.

MATERIALS AND METHODS

Experimental materials

Site: The experiment was carried out at the rabbit unit of

Teaching and Research Farm, University of Agriculture Abeokuta (UNAAB), Abeokuta Ogun State, Nigeria.

Animals: Twenty-four six weeks old rabbits with an average weight of 437.50 g were purchased and randomly divided into three groups each of eight animals.

Text ingredient: Tubers of water yam were purchased in an open market, sliced, sundried and milled to obtain Raw Sundried Water Yam (RSWY). All other feed ingredients were purchased at a reputable feed mill in Abeokuta.

Experimental design and procedure: Complete Randomized Design (CRD) was adopted for this research. Only the diets brought about the variation among the treatment. The three groups of animals were randomly allotted to three diets in which maize was replaced with raw sundried water yam at 0, 50 and 100%. The compositions of RSWY and the diets were presented in Table 1 and 2, respectively. An average of 100g of feed per animal was offered per day while water was supplied *Ad-libitum*.

Data collection and analysis: Data were collected on daily feed intake, weight gain, final live weight, feed efficiency,

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Table 1: Nutrient composition of RSWY

Components	RSWY
Moisture content (%)	4.32
Crude protein (%)	9.34
Ether Extract (%)	6.34
Crude Fibre (%)	3.64
NFE (%)	70.32
Ash (%)	4.72
Potassium (%)	0.08
Sodium (%)	0.06
Phosphorous (%)	0.38
Calcium (%)	0.72
Magnesium (mg Kg^{-1})	16.42
Zinc (mg Kg^{-1})	21.00
Manganese (ppm)	220.00
Iron (ppm)	160.00

Table 2: Composition of experimental diets

Feed composition	Diet I	Diet II	Diet III
Corn	47.64	23.87	-
RSWY	-	23.87	47.64
Soybean meal	14.78	14.78	14.78
Blood meal	3.69	3.69	3.69
Wheat brand	30.00	30.00	30.00
Oyster shell	2.00	2.00	2.00
Bone meal	1.00	1.00	1.00
Methionine	0.40	0.40	0.40
Vit./min. premix*	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Determined analysis			
Crude protein %	19.34	18.36	17.74
Ether extract %	8.42	8.00	7.92
Crude fibre %	18.84	18.72	18.42
NFE %	42.26	43.40	44.46
Ash %	5.06	4.34	4.12
ME (Mj Kg^{-1})	18.43	17.73	17.44

* Vit./Min Premix contain the following (g Kg^{-1}) : Vit. A 4,000,000 IU; Vit. D_3 1,000,000 IU; Vit. E 6.00 g ; Vit. B_2 2.00 g; Vit. K 8.00g; Nicotinic acid 12.00 g; Calcium D- Pantothenic 4.00 g ; Vit. B_{12} 4.80mg ; Folic acid 0.40 g ; Biotin 0.02g ; Iron 20.00 g ; Zinc 18.00 g ; Copper 0.80 g ; Iodine 0.62 g ; Colbalt 0.80 g ; Iodine 0.62 g ; Chloride 3 g and Selenium 0.04 g

protein efficiency and feed gain ratio was determined. Proximate composition of RSWY and the diets were determined according to the methods of AOAC[7]. Data were subjected to one-way analysis of variance (ANOVA) tests as described by Steel and Torrie[8]. Duncan Multiple Range Test[9] was employed to separate the means.

RESULTS AND DISCUSSION

The value obtain on the proximate composition of RSWY confirmed that the crude protein content, ether extract and crude fibre were higher than that of maize while nitrogen free extract was similar[10,11]. The value shows RSWY as a good substitute for maize in times of scarcity.

Table 2 shows that as the percentage of replacement increased, crude protein, ether extract, crude fibre and metabolizable energy (MJ Kg^{-1}) decreased. However, the benefit of using RSWY as an energy supplement was realized because this did not affect the energy and crude protein distributions among the dietary treatments.

Table 3 shows the Performance characteristics in which the dietary treatment did not influence ($p>0.05$) daily feed intake, though diet II and III showed higher values. This may be connected to the palatability of RSWY as reported[5] that fresh water yam has 0.5% sugar and 28% starch.

The decrease in average daily weight gain from 17.50 to 16.83 and 15.46 in diets II and III respectively agreed with the formal finding[11] that growth rate, feed intake and nitrogen retention of rabbit increases with increasing crude protein up to 15%. Although no significant difference ($p>0.05$) was indicated as crude protein levels in the diets fall within the optimum range (18-22%) for efficient rabbit production as recommended[12].

Feed efficiency ratio was similar to the previous result[13] where maize was replaced with cassava root meal. This can be attributed to the reduction in Metabolizable Energy (ME), hence the feed intake increased in order to satisfy energy requirement[14]. This gradual reduction in feed efficiency ratio could be due to some toxic materials such as saponin present in the yam peel that impaired the digestibility[15].

On protein efficiency ratio, there was a significant decrease ($p<0.05$) in the values. Cost per Kg feed was not significantly affected ($p>0.05$) while costs of feed

Table 3: Performance characteristic of rabbits fed diets containing different level of RSWY

Parameters	Diet I	Diet II	Diet III
No of rabbits	8	8	8
Ave. initial weight (g)	437.50	437.50	437.50
Ave. Final weight (g)	1049.96±15.83	1026.70±23.09	978.50±20.11
Ave. Body wt. gain (g day^{-1})	17.50±0.81	16.83±0.64	15.46±0.50
Daily feed Intake (DFI) (g)	55.03±3.44	67.86±3.99	67.51±3.18
Feed eff. Ratio (FER)	0.32±0.07	0.25±0.03	0.23±0.04
Protein eff Ratio (PER)	1.64±0.30[a]	1.35±0.19[b]	1.29±0.43[b]
Cost Kg^{-1} feed (N)	32.97	34.00	35.60
Cost of feed consumed (N)	63.50	80.75	84.12
Cost of feed Kg^{-1} wt Gain (N)	103.68	137.05	155.49
% Mortality	0.00	0.00	0.00

[a b] Means with different superscripts on the same row are significantly different ($p<0.05$)

consumed and cost of feed per Kg weight gain were significantly increased ($p<0.05$) as the dietary inclusion level of RSWY increased. The control diet has the lowest feed cost per Kg of N 32.97 and the highest was recorded by rabbit fed 100% RSWY. Rabbits fed control diet had the best feed cost per Kg weight gain of N103.65.

This study clearly indicated that replacement of maize with RSWY favoured performance characteristics considered. The cost of replacing maize with RSWY was found more expensive, though the period of study may account for this. It could be relatively cheaper during the harvesting period or season.

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REFERENCE

1. Biobaku, W.O. and E.O. Dosumu, 2003. Growth respond of rabbit fed graded level of processed and undehulled sunflower seed, Nig J. Anim. Prod., 30: 179-184.
2. Biobaku, W.O. and E.B. Oguntona, 1997. The effect of feeding multi nutrient miniblocks and pelleted diet on the growth of rabbit, Nig. J. Anim. Prod., 24: 147-149.
3. Salawat, M.B., S.K. Adedeji and W.H. Hassan, 1994. Performance of broilers and rabbits given diet containing fullfat neam (*Azadiracta indica*) feed meal, J. Ani. Sci. Technol., British, 58: 285-289.
4. Oduruka, S.A., 1986. Yam-maize intercropping investigation in Nigeria, Nig. J. Tropical Agriculture (Trinidad) 63: 17-22.
5. Onwene, I.C., 1978. The tropical tuber crops, Yam Cassava, Sweet potato and cocoyam, John Willey and sons,/ Chietiester, New York.
6. Oyenuga, V.A., 1968. Nigeria's food and Feeding Stuff. Their Chemistry and Nutritive Value, 3rd Ed., Ibadan university Press Ibadan, Nigeria, pp: 99.
7. AOAC, 1990. Official Methods of Analysis, 15th Ed. Washington D. C.
8. Steel, R.G.D. and J.H. Torrie, 1980. Principle and procedure of statistical analysis, *Mc Graw hill*, New York.
9. Duncan, S.D.B., 1955. Multiple Range and F-test Biometrics 11: 1-24.
10. Ikurior, S.A. and J.D. Akem, 1998. Replacing maize with cassava root meal or its mixture with brewers yeast slurry in rabbit diets, Nig. J. Anim. Prod., 25: 31-35.
11. Oyenuga, V.A., 1978. Nigeria Food and Feeding Stuff, Their Chemistry and Nutritive Value,I, Ibadan, Nigeria.
12. Spreadbury, D. and J. Davidson, 1978. A study of the need of fibre by the growing Newzealand White Rabbit, J. Sci. and food and agriculture, pp: 29-640.
13. Omole, J.A., 1972. The effect level of dietary protein on growth and reproductive performance of rabbit, J. Appl. Rabbit.
14. Oke, O.L., 1979. Problem in the use of cassava as animal feed, Ani. Feed Sci. and Tech., 3: 345-380.
15. Balogun, O.O., A.A. Adedeji and J.T. Azua, 2003. Protein and energy value of maize and millet milling waste for rabbit, Nig. J. Anim. Prod., 30: 27-301.