Performance characteristics and cost benefit of feeding weaner rabbits cashew nut residue based diets

F.A.O. Akinnusi¹, A.M. Bamgbose², A.B. Ogunola¹ and A.A. Alade²

¹Agricultural Science Department, Federal College of Education, Abeokuta, Nigeria.

²Department of Animal Nutrition, University of Agriculture, Abeokuta, Nigeria.

Abstract

A 42-day feeding trial was conducted to investigate the performance characteristics and cost benefit of feeding weaner rabbits cashew nut residue (CNR) based diets. Three dietary treatments containing: 0, 10 and 20% CNR at the expense of maize on a weight for weight basis were used. Eighteen weaner rabbits (mixed breeds and sexes) were randomly divided into three groups of six rabbits each in a completely randomized design (CRD). The average daily weight gain, average daily feed intake and feed conversion ratio were not significantly influenced ($P>0.05$) by the dietary treatments. But rabbits fed 10% CNR based diet had the highest values for average daily weight gain and average daily feed intake while rabbits fed the control diet (0% CNR) had the least value for feed conversion ratio. No mortality was recorded for all the dietary treatments. The feed cost/kg diet (₦), feed cost/kg live weight gain (₦/kg) and cost of feed consumed/day (₦) decreased steadily with increasing level of cashew nut residue meal. The saving on feed cost (%) was not significantly affected ($P>0.05$) by the dietary treatments, but increased across the groups. However, the saving on feed to produce 1kg live weight was significantly ($P<0.05$) influenced by the CNR based diets. Rabbits fed 10% CNR based diet had the highest value of 9.66% than their counterparts fed other diets. It is concluded that cashew nut residue could be incorporated into rabbit diet at 10% without compromising the performance.

Keywords: cashew nut residue, performance, cost benefit and weaner rabbits.

Introduction

Rabbit production is being encouraged in Nigeria as a means of improving the daily protein intake of individuals (Ekpenyong and Biobaku, 1986). Imported rabbits are assuming greater importance in an effort to bridge the supply-demand animal protein gap in Nigeria. The extent to which such efforts succeed will depend on how well local resources can be utilized to ensure optimum performance (Arijenwa and Igene, 2002). Nigeria produces large quantities of agricultural and agro-industrial by products, which serve as alternative feed sources to

conventional feed ingredients and had been proved valuable in supporting performance of livestock and poultry birds (Babatunde and Oluyemi, 2000). Among such products are yam peels, cassava waste, full-fat cashew nut waste, and cashew apple waste (Alade, 2005; Sogunle *et al.*, 2005; Muhammed *et al.*, 2003 and Fanimu *et al.*, 2003). The inclusion of alternative feeding stuffs in animal diet might be interesting in some circumstances (relative price, feed quality), which is limited because of the lack of information on their nutritive value (Fanimu *et al.*, 2003). Cashew (*Anacardium occidentale* Linn) is among the tree

nuts. It is an oilseed with excellent consumer acceptance and therefore has a great potential for increased utilization as food. Cashew nuts had been produced in Nigeria for many years and although they are obviously mainly consumed as edible nuts, there is potential for their use to some extent for animal feeding. This is because only 60-65% cashew nuts, which are produced, are suitable for edible purposes and of these, a further 35-40% are discarded as broken kernels or due to scorching in the roasting process. Cashew nuts provide 7.76Kcal/g energy, 21% protein and 48% fat. They are also good sources of many minerals such as phosphorus, potassium, magnesium and iron (Fetuga *et al.*, 1974). This study sought to investigate the effects of inclusion of cashew nut residue in diets on the performance of weaner rabbits.

Materials and Methods

The study was carried out in the Rabbitry Unit of the Agricultural Science Department, Federal College of Education, Abeokuta, Nigeria.

The cashew nut residue (broken, slightly burnt and scorched kernels) used in the experiment was obtained from Cashew Nut Processing Limited, University of Agriculture, Abeokuta (UNAAB), Nigeria, and the proximate chemical constituents determined according to AOAC (1990). During processing, roasting of the nuts was done to cut down the amount of cashew nut shell liquid and thereby make the shell more brittle for cracking. The cashew nut residue was ground using hammer mill. It was included in the diets at 0, 10, 20% levels to formulate weaner rabbit diets (Table 1).

Table 1: Percentage composition of the experimental diets

Ingredients	Levels of inclusion		
	T 1 (0%)	T 2 (10%)	T 3 (20%)
Maize	45.00	35.00	25.00
Cashew nut residue	0.00	10.00	20.00
Groundnut cake	12.00	12.00	12.00
Soybean meal	6.00	6.00	6.00
Fish meal	1.00	1.00	1.00
Palm kernel cake	10.00	10.00	10.00
Wheat offal	21.50	21.50	21.50
Bone meal	2.50	2.50	2.50
Oyster shell	1.50	1.50	1.50
Vit./min. Premix*	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Total	100.00	100.00	100.00
Metabolizable energy(MJ/Kg)**	10.72	11.33	12.18
Determined analysis (DM-basis)			
Crude protein (%)	17.79	17.35	17.48
Crude fibre (%)	7.40	7.35	7.43

*Premix (Univit 15 Roche) contained:

1500 I.U., Vit A; 1500 I.U., Vit D; 3000 I.U., Vit E; 3.0g Vit K; 25g Vit B₁; 0.3g Vit B₂; 8.0Mg Vit B₁₂; 8.0g Nicotinic acid, 3.0g Ca-Panthothenate; 5.0mg I; 0.02g Co; 0.01g Se.

**Metabolizable energy was calculated using Ponzenga (1985) formula $[MJ/Kcal/kg] = (37 \times \%CP) + (81.8 \times \% \text{ Ether extract}) + (35.5 \times \%NFE)]$

Eighteen weaner rabbit diets (mixed breeds and sexes) were purchased from the Rabbitry Unit of UNAAB Teaching and Research Farm. They were allotted on weight equalization basis to three (3) dietary treatments of six rabbits each. Each treatment was replicated three times with two rabbits per replicate. Feed and water were supplied *ad libitum* throughout the forty-two day experimental period. Every necessary medication was administered to ensure good health status of the experimental animals.

The feed intake, weight gain and mortality rate were monitored. The cost benefit of feeding cashew nut residue was estimated at the end of the study. All data generated from the study were subjected to one way analysis of variance (ANOVA). Differences among means were compared using the Duncan New Multiple Test (Steel and Torrie, 1980).

Results and Discussion

The results of performance characteristics of weaner rabbits fed cashew nut residue (CNR) based diets are shown in Table 2. There were no significant ($P>0.05$) differences among treatment groups in average daily weight gain, average daily feed intake, feed conversion ratio and mortality rates. Rabbits fed 20% CNR based diet had the lowest values of 8.30g and 54.80g for the average daily weight gain and average feed intake. Similar observation had been reported by Sogunle *et al.* (2005) for broilers. The authors reported that full-fat cashew nut reject based

diets (0-100%) had no significant ($P>0.05$) influence on daily weight gain, feed intake and mortality of broiler chicken. The values of feed conversion ratio of rabbits fed the control and CNR based diets were not significantly ($P>0.05$) affected by the dietary treatments. This further implies that CNR can be partially utilized to replace maize in the practical weaner rabbits' diet with no adverse effect on efficiency of feed utilization. The results obtained was similar to the observations of Waldroup *et al.*, (1976) and Pesti (1982) that as the level of metabolizable energy in the diets increases or decreases, feed intake changes inversely, although the rate of adjustment is not always sufficient to keep energy intake constant.

The results of the cost benefit analysis of feeding weaner rabbits cashew nut residue based diets are shown in Table 3. Rabbits fed 10% CNR based diet had higher ($P<0.05$) value of saving on feed to produce 1 kg live weight than their counterparts fed other diets. This showed that it is cheaper to produce one kilogram of rabbit by using 10% CNR. Although, 20% inclusion level was least expensive in terms of feed cost, however, it costs more to produce one kilogram live weight. This is because of the need to eat more of the diet by the rabbits to gain one kilogramme weight.

However, the feed cost/kg and cost of feed consumed/day decreased with increasing level of the CNR. This observation is in conformity with the findings of Ijaiya and Awonusi (2002)

Table 2: Performance characteristics of weaner rabbits fed cashew nut residue based diets.

Parameters	Levels of inclusion			SEM
	T 1 (0%)	T 2 (10%)	T 3 (20%)	
Average daily weight gain (g)	11.00	11.10	8.30	1.64
Average daily feed intake (g)	60.00	63.00	54.80	1.64
Feed conversion ratio	5.45	5.68	6.60	1.63
Mortality	0.00	0.00	0.00	0.00

Table 3: Cost benefit analysis of feeding cashew nut residue based diets to weaner rabbits.

Parameters	Levels of inclusion			SEM
	T 1 (0%)	T 2 (10%)	T 3 (20%)	
Feed cost/kg (₦)	38.10	33.45	29.39	1.63
Cost of feed consumed/day (₦)	2.29	2.11	1.61	0.68
Cost of feed/liveweight gain (₦/kg)	208.72	188.55	193.26	1.63
Saving on feed cost (%)	0.00	12.20	22.86	1.10
Saving on feed to produce 1 kg liveweight (%)	0.00 ^b	9.66 ^a	7.41 ^a	1.10

^{abc}Means on the same row having different superscripts differ significantly ($P < 0.05$)

when yam peel meal was fed to growing rabbits. Decrease in feed cost per kilogram gain with increase in dietary level of unconventional feedstuffs had been reported in rabbits (Doma *et al.*, 1997). This is expected because unconventional feedstuffs are cheap and locally available.

It would therefore be affirmed that it is cheaper to reduce the cereal content of weaner rabbit diets by partial replacement of the cashew nut residue. The CNR is thus a potential livestock feed component (Onifade *et al.*, 1999). The results showed that the cashew nut residue in the diet of the weaner rabbits did not adversely affect the performance characteristics. In terms of cost, there was reduction in feed cost/kg and cost of feed/kg live weight, hence, lower cost of production. Therefore, cashew nut residue could be included at a level of 10% in weaner rabbit diets without compromising performance.

References

- Alade, A.A. 2005. Utilization of graded levels of yam peel meal as replacement for maize in weaner rabbit diet. Masters Dissertation, Department of Animal Nutrition, University of Agriculture, Abeokuta, Nigeria.
- A.O.A.C. 1990. Association of Official Analytical Chemists. *Method of Analysis* 15th Edition. Washington D.C.
- Arijeniwa, A and F.U. Igene, 2002. Evaluation of the nutritive value of some tropical legumes in raw state for weaner rabbits: performance, carcass and organ weights. *Proc. 7th Ann. Conf. Anim. Sci. Ass. of Nig. (ASAN)* (Eds A.O. Fanimio and J.A. Olanite), Univ. of Agric., Abeokuta, Nigeria, Sept. 16 – 19, Pg 124. 127.
- Babatunde, B.B. and J.A Oluyemi, 2000. Comparative digestibility of three commonly used fibrous ingredients in maize-soybean meal-fish diet by broiler chicks. *Trop J. Anim. Sci.* 3(1):33-34.
- Doma, U. D., Adegbola, T. A., Bamgbose, A. M. and P. A. Umeh, 1999. Utilization of cowpea shell and maize cobs in diets for rabbits. *Trop. J. Anim. Sci.* (1) 27-32.
- Ekpeyong, T. E. and W. O. Biobaku, 1986. Growth response of rabbits fed activated sewage and dried poultry waste. *Journal of Applied Rabbit Research.* 1:14-16.

- Fanim, A.O., Oduguwa, O.O., Alade, A.A., Ogunnaike, T.O. and A.O.K. Adesehinwa, 2003. Growth performance, nutrient digestibility and carcass characteristics of growing rabbits fed cashew apple waste. *Livestock Res. For Rural Devt.* 15(3):1-7. <http://www.utaoundation.org/Irrd158/fani158.htm>
- Fetuga, B.L. Babatunde, G.M and V.A. Oyenuga, 1973b. Protein quality of some Nigerian feedstuffs II. Biological evaluation of protein quality. *J. Sci. Fd. Agric.* 24:1515-1523.
- Ijaiya, A.T. and E.A. Awonusi, 2002. Effect of replacing maize with yam peel on the growth performance of weaner rabbits. *Proc. 7th Ann. Conf. Anim. Sci. Ass. Of Nig. (ASAN)* (Eds A.O. Fanim and J.A. Olanite), Univ. of Agric., Abeokuta, Nigeria, Sept. 16 – 19, Pg 161. 163.
- Muhammed, A.S., Bogoro, S. and T.A. Adegbola, 2003. Effect of varying levels of cassava peel meal on the performance and organ weights of growing rabbits. *Science Forum: J. Pure and Appl. Sci.* 6(1):26 – 32.
- Onifade, A.A., Tewe, O.O., Okunola, O. and A.O. Fanim, 1999. Performance of laying pullets fed on cereal free dietary based on maize offal, cassava peels and reject cashew nut meal. *Brit. Poult. Sci.* 40: 84-87.
- Paузenga, V. 1985. Feeding Parent stock. *Zootechical International*.pp 22 – 25.
- Pesti, G.M. 1982. Characteristics of the respond of male broiler chickens to diets with various protein and energy contents during the growing phase. *Brit. Poult. Sci.* 24:91.
- Sogunle, O.M., Fanim, A.O., Biobaku, W.O. and A.M. Bamgbose, 2005. The feed value of full-fat cashew nut (*Anarcadium occidentale* L) rejects and low cereal diets for broiler chickens. *Nig. J. Anim. Prod.* 32(1):46 – 53.
- Steel, R. G. D. and J. H. Torrie, 1980. Principles and procedures of statistics. A Biometrical Approach. 2nd edition Mc Graw Hill Book Company. New York.
- Waldroup, P.W. Mitchell, R.J. Payne, J.R. and Z.B. Johnson, 1976. Characterization of the response of broiler chickens to diets varying in nutrient density contents. *Poult. Sci.* 55:130.

(Received 15th Feb., 2006; Accepted 12th Jan., 2007).