

NUTRITIONAL POTENTIAL OF KENAF GRAIN-LEAF MIXTURES MEAL AS REPLACEMENT FOR GROUNDNUT CAKE MEAL IN THE DIET OF WEANED RABBITS

Y. A. POPOOLA¹, A. O. OWOSIBO², A. O. AWE², B. J. HARRY¹, A. J. OMOLE¹,
J. O. FAYENUWO¹, J. O. ODEJIDE³ AND V. E. OKPEZE³

¹Obafemi Awolowo University, Institute of Agricultural Research and Training Moor Plantation, Ibadan, Nigeria.

²Federal College of Animal Health and Production Technology, Moor Plantation, Ibadan

³Federal College of Agric. Moor Plantation, Ibadan.

ABSTRACT

Groundnut cake meal is a good source of plant protein but it is expensive hence there is need to look for other alternative source of protein which is less expensive in order to reduce feed cost which is the most limiting factor in livestock production. This study was conducted to determine the effect of feeding rabbits with the mixture of kenaf leaf and grain meal (KGLM) as replacement for groundnut cake meal fraction of the diet on performance characteristics, and cost benefits of weaned rabbits. A total of thirty six weaned rabbits of mean weight 566.45 ± 2.65 g were randomly allotted into four dietary treatments replicated three times and each replicate contained ten rabbit per replicate in a completely randomized design. Four diets were formulated to contain KGLM at 0% (KGLM₁) Control, 50% (KGLM₂), 75% (KGLM₃) and 100% (KGLM₄) as replacement for groundnut cake meal fraction in the diet of weaned rabbit. The mean weight gain of rabbits fed diet containing 0% and 50% KGLM was not significantly influenced by the diet. The highest cost/weight gain was recorded in the diet that contained zero% KGLM while the lowest cost/weight gain was reported in KGLM₄.

Keywords: Cost benefits, Feed conversion ratio, kenaf grain -leaf mixtures meal, weight gain.

INTRODUCTION

The cost of groundnut cake meal was fifty six naira six years ago, the price was around one hundred and twenty naira during the course of this experiment. The cost is relatively high compared to other sources of plant protein hence there is need to look for alternative sources (Orunmuyi *et al.*, 2006 ; Omole *et al.*, 2007). Kenaf grain is another source of protein with high energy. Kenaf is usually considered as a fiber crop and primarily used for rope, twine, coarse cloth and paper (Ikisan, 2000). Kenaf plant is composed of useful components (Webber, 1993; Ikisan, 2000). The stalk is useful in paper industry while the leaves and the seed could be used for feeding livestock (Cross 2000; Swingles *et al.*, 2001). Kenaf seed is rich in protein, the crude protein contents vary between 25 and 40% (Ikisan, 2000). The cost of kenaf grain is relatively low compared to that of groundnut cake meal. Kenaf meal has been included in the diet of broiler which has resulted in reduction in the cost of feed without any adverse effect. This study was conducted to determine the effect of feeding rabbits with the mixture of kenaf leaf and grain meal (KGLM)

as replacement for groundnut cake meal fraction of the diet on performance characteristics, and cost benefits of weaned rabbits

MATERIALS AND METHOD

The experiments was carried out at the rabbitry Unit of the Institute of Agricultural Research and Training (I.A.R.&T.), Moor Plantation, Ibadan which is located on Longitude 03°51'E, Latitude 07°23'N and Altitude 650' lies in the humid zone of the rainforest belt 0703.25 of Southwestern Nigeria with mean annual rainfall of 1220 mm and mean temperature of 26°C. A total of thirty six weaned rabbits of mean weight 566.45 ± 2.65 g were randomly allotted into four dietary treatments replicated three times and each replicate contained ten rabbit per replicate in a completely randomized design. The rabbit were acclimatized for one week before the commencement of the feeding trial. Kenaf grain meal (KGM) was purchased from I.A.R.& T. Ibadan, Oyo state, Nigeria. Kenaf grain was toasted and mixed with dry kenaf leaf in ratio 3:1 and later incorporated with other feedstuffs. Four diets were formulated to contain KGLM at 0% (KGLM₁) Control, 50% (KGLM₂), 75%

(KGLM₃) and 100% (KGLM₄) as replacement for groundnut cake meal fraction in the diet of weaned rabbit. The diets were formulated to contain about 16% crude protein and energy of about 2600 kcal/kgME (Table 1).

Feed intake and weight gain were measured on daily and weekly basis with the use of weighing balance. Feed intake and weight gain were measured on daily and weekly basis with the use of sensitive weighing balance respectively. Feed intake was calculated by subtracting the left-over feed from the feed given while the weight gain was calculated by deducting the initial weight from the final weight. Feed conversion ratio was calculated as the ratio of feed intake to weight gain. Feed cost and cost per weight gain were also calculated. The feed cost and cost per weight gain were calculated. The prevailing market prices of the feed ingredients at Ibadan, Oyo State, Nigeria where the feed ingredients were purchased at the time of study were used to calculate the feed cost/kg feed and the cost of the feed to produce a unit weight (N/kg weight gain). Proximate composition of the feed was carried out according to the method of A.O.A.C (1990). All data were subjected to analysis of variance using SAS (1999).

RESULTS AND DISCUSSION

The proximate composition of KGLM, groundnut cake meal (GNC) and the experimental diets on dry matter basis are shown in Table 2. The crude protein of GNC was nearly the same with that of KGLM. The initial weight of the rabbits was relatively the same ($P>0.05$) across the treatment as shown in table 2. The mean weight gain of rabbits fed diet containing 0% and 50% KGLM was not significantly influenced by the diet thus indicating that GNC fraction of the diet could be replaced with KGLM up to 50% without any deleterious effect on the growth performance of the rabbit. The lowest weight gain was recorded in the diet containing 100% KGLM ($P<0.05$). The mean daily feed intake also follow the same pattern with that of weight gain. The feed was efficiently utilized in KGLM₂ which was relatively the same with KGLM₁ ($P<0.05$). The feed to weight gain ratio was at lowest in KGLM₄. The lowest weight gain recorded in rabbit fed KGLM₄ could be due to the effect of high fibre content of

KGLM compared to that of GNC as indicated in Table 2.

KGLM- Kenaf seed- leaf meal mixtures

It has been reported that feed intake and weight depress when fibre content of the feed is high. The relatively the same feed conversion ratio reported in 0 and 50% replacement of GNC with KGLM is an indication that KGLM could be used to replace GNC in the diet of rabbits. The results of cost analysis shows that the cost/kg feed and total feed cost reduced as the level of KGLM increased from zero to 100% in the diets (Table 2). The highest cost/weight gain was recorded in the diet that contained zero% KGLM while the lowest cost/weight gain was reported in KGLM₄ as observed in Table 3. The lowest cost/weight gain reported in KGLM₄ could be due to low cost of KGLM compared to GNC, the prevailing market price of GNC during course of the feeding trials was N95 while the cost of KGLM₄ was N65. Low cost per weight gain has been observed by several authors when conventional feed ingredients was replaced by less expensive unconventional feed ingredients (Orunmuyi *et al.*, 2006 Omole, *et.al.*, 2007). The lowest cost/ weight gain reported is an indication that KGLM could be used to replace groundnut cake at reduced cost. Only one rabbit showed sign of sickness which could be as a result of cold rabbit recovered after administration of antibiotic (terramycin). The zero mortality reported in all the treatments indicates that KGLM had no detrimental effect on the rabbits. Proper adherence to management practices of the rabbits could also be responsible for the low mortality reported across the treatments. Based on the present results, it could be concluded that that Groundnut cake meal fraction of the diet could be replaced with Kenaf grain- leaf meal mixtures up to 50% without any deleterious effect on the growth performance of the rabbit.

REFERENCES

- Association of Official Analytical Chemist, A.O.A.C. (1990). Official Methods of Analysis, 13th Edition. Washington, D: C.
- Orunmuyi, M. Bawa, G.S. and R.M. Musa (2006): Performance of weaner rabbits fed graded levels of sun-dried sweet potato tuber meal (*Ipomea batatas*) diets. Nigeria Journal of Animal Production. 33 (2): 186 – 191.
- Cross (2000) Kenaf -An Alternative Crop for the Tropics http://www.satglobal.com/about_kenaf.htm

- Ikisan, (2000) Leguminous plant as cover crops and source of nutrients.
http://www.ikisan.com/links/knt_coconutNutrient%2shmt0
- Omole A J Ajasin F O Oluokun J A and Tiamiyu A K 2007 Rabbit Farming without Tears. Green Choice Agric. Publications. Pp. 22-34.
- Swingles, R.S. Urias, A.R, Doyle J.C And Voigt R.L. 2001 Chemical composition of kenaf forage and its

- digestibility by lamb and invitro and digestibility.
<http://www.jas.fass.org>
- Webber, C.L. 1993 Crude protein and yield components of six kenaf cultivars as affected by crop maturity. Ind. Crops Prod. J. 2:27-31.
- S.A.S. (1999). S.A.S. User's Guide. Statistical Analysis System Institute, Inc. Cary, N.C. 7th ed. 78pgs.

Table 1. Gross Composition of the Experimental Diet

Ingredient (%)	KGLM ₁ (0% KGLM)	KGLM ₂ (50% KGLM)	KGLM ₃ (75% KGLM)	KGLM ₄ (100% KGLM)
Maize	32.0	32.0	32.0	32.0
Groundnut cake	10.0	5.0	2.5	0.0
KGLM	0.0	5.0	7.5	10.0
*Others	58.0	58.0	58.0	58.0
Total	100.0	100.0	100.0	100.0
Cost/kg feed (N/kg)	51.64	49.40	47.89	46.12
Calculated analysis				
Crude protein (%)	16.45	16.35	16.13	15.91
Metabolizable energy (kcal/KgME)	2628.1	2611.0	2602.2	2589.32

*Other fixed ingredients : Wheat offal-24, BDG, 25, Fish meal-0.5, Soya bean meal-2.55, Bone meal-1.50, Oyster shell-4.2, Premix-0.25.

KGLM- Kenaf grain- leaf meal mixtures

Table 2: Determined Proximate Composition of the KGLM and the Experimental diets

Parameters	KGLM	Ground nut cake meal	KGLM ₁ (0% KGLM)	KGLM ₂ (50% KGLM)	KGLM ₃ (75% KGLM)	KGLM ₄ (100% KGLM)
Dry matter	97.72	96.24	95.92	94.38	94.89	93.80
Crude Protein	43.34	45.36	16.32	16.04	15.94	15.71
Crude Fibre	6.75	3.28	11.37	11.47	11.98	12.01
Ether Extract	5.23	5.56	5.53	5.46	5.32	5.18
Ash	7.23	7.78	12.85	12.46	12.31	12.12
Nitrogen Free Extract	37.45	38.02	53.93	54.57	54.45	54.98

KGLM- Kenaf grain- leaf meal mixtures

Table 3: Performance and cost benefits of weaned rabbit fed different levels of KGLM in the diet.

Parameters (Mean values)	KGLM ₁ (0% KGLM)	KGLM ₂ (50% KGLM)	KGLM ₃ (75% KGLM)	KGLM ₄ (100% KGLM)	± SEM
Initial weight (g)	567.34	565.23	568.21	566.18	4.24
Final weight (g/16weeks)	2715.50 ^a	2706.67 ^a	2383.73 ^b	2369.38 ^b	23.24
Total weight gain (g/16weeks)	2148.16 ^a	2141.44 ^a	1815.52 ^b	1803.20 ^b	18.89
Total feed intake	9576 ^a	9495.36 ^a	9213.12 ^b	9075.36 ^b	36.13
Daily weight gain (g)	19.18 ^a	19.12 ^a	16.21 ^b	16.10 ^b	1.95
Daily feed intake (g)	85.5 ^a	84.78 ^a	82.26 ^b	81.03 ^b	1.22
Feed conversion ratio	4.46 ^b	4.43 ^b	5.09 ^a	5.03 ^a	0.13
Cost/kg feed (N)	56.38 ^a	53.40 ^b	47.89 ^c	46.12 ^d	1.51
Total feed cost (N/kg)	539.89 ^a	507.05 ^b	441.22 ^c	418.56 ^d	15.89
Cost/weight gain (N/kg)	251.35 ^a	236.83 ^c	243.10 ^b	232.15 ^c	4.56
Morbidity (%)	0.0	0.0	2.78	0.0	
Mortality (%)	0.0	0.0	0.0	0.0	

Means along rows with different superscript are significantly different from each other (P<0.05)