

EFFECT OF FEEDING A COMPOUND DIET BASED ON NON-CONVENTIONAL FEEDSTUFFS ON GROWTH AND CARCASS CHARACTERISTICS OF RABBITS.

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SUMMARY : Thirty weaner rabbits were randomly allocated to three diets : a laboratory formulated diet based on extruded soybean meal, groundnut haulms, maize and rice-milling by-products, and designated compound diet, a commercial rabbit pelleted diet and a commercial poultry grower's mash. Feed and water were supplied *ad libitum*. The compound diet elicited significantly ($P < 0.05$) higher weight gains (15.2 g/d vs 13.4 or 6.3 g/d), feed consumption, feed

conversion efficiency and total edible viscera weight compared to the commercial preparations. The dietary effect on the dressing percentage and relative organ and tissue weights was non significant ($P > 0.05$). These results showed that cost-effective rabbit diet could be formulated from extruded soybean meal, groundnut haulms, and by-products of the milling of maize and rice.

RÉSUMÉ : Effet sur la croissance et les caractéristiques de carcasse du lapin, de l'alimentation par un aliment formulé avec des composants non conventionnels.

Trente lapins sevrés ont été répartis au hasard en trois régimes : un régime expérimental comprenant de la farine de soja extrudée, des fanes d'arachide, des rafles de maïs et les sous-produits de meunerie du riz, désigné "aliment composé" ; un aliment granulé lapin du commerce et une farine du commerce pour volaille en croissance. L'aliment et l'eau étaient disponibles *ad libitum*. Les gains de poids

(15,2 g/d vs 13,4 et 6,3 g/d), l'indice de consommation, l'efficacité alimentaire et le poids total des viscères comestibles étaient significativement plus élevés ($P < 0.05$) avec l'aliment composé qu'avec les aliments du commerce. L'effet du régime sur le rendement des carcasses et les poids relatifs des tissus et des organes n'était pas significatif ($P > 0.05$). Ces résultats montrent qu'un aliment lapin efficace et peu onéreux, composé de farine de soja extrudée, de fanes d'arachide et des sous produits de meunerie du maïs et du riz, peut être utilisé.

INTRODUCTION

In Nigeria, rabbit was second only to poultry as back yard animals kept for animal protein production until the cost of commercial poultry and rabbit feeds jumped to heights beyond the reach of the average man during the late eighties. However, one advantage of rabbits is that they can use feedstuffs such as crop residues and processed by-products which are not eaten by man (FIELDING, 1991). Also since soybean is easy to use and provides the main protein in the diet of livestock (SASSON, 1990), the increased interest in soybean production in Nigeria suggests that rabbit diet based on the extruded soybean meal and such agricultural by-products as groundnut haulms, maize offals and rice milling by products may help to solve the problem of rabbit feeding. This become important since local technologies for processing soybean into human foods such as milk and other local dishes have not proved too successful in removing the beany flavour.

This study was conducted to compare the effects of a laboratory formulated diet based on extruded

soybean meal, maize offals, groundnuts haulms and rice milling by products with a commercial rabbit pelleted diet and poultry growers' mash on the growth, feed efficiency and carcass characteristics of growing rabbits.

MATERIAL AND METHODS

Fresh groundnut haulms got from the National Seed Service Farms, Ilorin, were sundried and milled. Maize and rice milling by-products from a commercial cereal grains miller at Kulende, Ilorin, were air-dried. Extruded soybean meal from Oja Farms Ltd., Ilorin, was milled to pass through 1mm mesh sieve and air-dried.

The compound diet was formulated to contain extruded soybean meal 30 %, groundnut haulms 45 %, maize offals 23 %, rice milling by-products 1 %; sodium chloride 0.5 %, and vitamin/mineral mix 0.5 %. The commercial rabbit pellet (Ladokum Livestock Feeds Nig. Ltd., Ibadan) was claimed to

Table 1 : Chemical composition of feedstuffs used in formulating the compound diet.

Feedstuffs	Dry matter %	Crude protein % D.M	Ether extract % D.M	Crude fibre % D.M.	Ash % D.M.	Nitrogen free extract % D.M.
Groundnut haulms	93.9	15.19	2.4	27.9	8.6	45.4
Maize offals	89.3	5.1	2.7	20.8	3.0	68.4
Rice milling by-products	90.6	9.7	7.9	30.6	11.5	40.3
Extruded soybean meal	92.5	31.5	23.9	5.6	4.0	34.9

contain maize, wheat middlings, groundnut cake, dried brewer's grains, bone meal, oyster shell, salt, vitamin mixture, mineral mixture, antioxidant and antibiotics with the following stated composition on as fed basis : protein 20 %, fat 3.5 %, crude fiber 9 %, Ca 1.2 % and P 0.6 %. The commercial poultry grower's mash (Jofa Livestock Feeds Ltd., Ilorin) was claimed to contain maize, guinea corn, wheat middlings, fish meal, groundnut cake, dried brewer's grain, bone meal, oyster shell, salt, vitamin and mineral premix, terramycin and coccidiostat (amprolium). It was given as containing 16 % protein, 7.5 % fibre and 3.5 % fat on as fed basis.

Thirty male rabbits of mixed local breed aged 8–9 weeks and with average weight of 700g were randomly assigned to the three diets. Animals were housed in individual cages with wire-mesh floor measuring 55 x 30 x 30 cm. Rabbits were fed with their respective diets *ad libitum* and offered fresh water daily. The temperature inside the rabbit house averaged 21°C during the experiment.

Daily feed intake was recorded for each animal throughout the 42 days of the experiment and animals were weighed at weekly intervals. During the last 7 days of the experiment, the faecal output by each animal was collected, weighed, and oven dried on a daily basis. The DM content of the faeces was determined and the results used in the calculation of DM digestibility of the experimental diets according to the equation of DANIELS *et al.* (1986).

On the last day of the experiment, each rabbit was killed by exsanguination and the skin, head, kidneys and liver were removed before weighing the hot carcass. The dressing percentage was calculated by expressing carcass weight as a percentage of the liveweight taken prior to slaughtering. The liver and kidneys were blotted free of water and blood and weighed.

Proximate composition of the various feed ingredients, compound diet, commercial rabbit pellets

and commercial poultry grower's mash was determined according to standard method (AOAC, 1980). The data were subjected to analysis of variance (ANOVA) according to STEEL and TORRIE (1980).

RESULTS AND DISCUSSION

The proximate composition of the feed ingredients used in making the compound diet and of the three experimental diets are given in Table 1 and 2 respectively. Table 3 shows the effects of dietary treatments on body weight and carcass parameters of rabbits.

Tableau 2 : Proximate analysis of experimental diets (% DM).

Chemical component	Compound diet	Commercial rabbit pellets	Poultry grower's mash
Crude protein	18.0	17.5	15.4
Crude fibre	15.8	10.7	8.7
Ether extract	8.8	4.5	4.5
Ash	6.8	11.4	9.4
Nitrogen free extract	50.6	55.9	62.0
* Calculated D.E. (Kcal/kgDM)	2985	2650	2475

* Calculated according to DANIELS *et al.* (1986) using the determined DM digestibilities of 68, 61 and 57 % for the compound diet, commercial rabbit pellet and poultry grower's mash respectively.

The determined crude protein (CP) content (N x 6.25) of 17.5 and 15.4 % for commercial rabbit

Table 3 : Effect of dietary treatments on body weight and carcass parameters of rabbits.

Performances parameter	Compound diet	Commercial rabbit pellet	Poultry grower's mash
Initial body weight (g)	695 ± 71	703 ± 29	704 ± 15
Final body weight (g)	1333 ± 40 ^a	1265 ± 29 ^b	969 ± 25 ^c
Daily weight gain (g)	15.2 ± 1.3 ^a	13.4 ± 3.8 ^a	6.3 ± 0.7 ^b
Daily feed intake (g)	111.9 ± 6.51 ^a	99.0 ± 8.9 ^b	8.47 ± 6.3 ^c
Feed per gain (g/g)	7.6 ± 0.6 ^a	7.7 ± 1.1 ^a	10.4 ± 0.3 ^b
Edible viscera (g)	43.7 ± 3.2 ^a	25.6 ± 2.1 ^c	33.3 ± 2.2 ^b
Dressing %	49.0 ± 3.3	49.5 ± 3.7	49.9 ± 3.3
% of body weight :			
Skin	11.2 ± 1.2	12.9 ± 1.1	11.6 ± 1.3
Liver	3.1 ± 0.2	2.6 ± 0.3	3.2 ± 0.3
Kidney	0.8 ± 0.1	0.7 ± 0.1	0.8 ± 0.1
Head	6.7 ± 0.7	6.7 ± 0.8	7.6 ± 0.8

a, b, c, Means (± SD) within a row carrying different superscripts are significantly different (P<0.05).

pellet and poultry grower's mash respectively, were 12.5 and 3.8 % lower than the values given by the manufacturers of these products. While the CP contents of the test rations met the recommended 16 % in diets of growing rabbits, except for the poultry growers'mash, the determined crude fibre (CF) content for only the compound diet met the recommended 14 % level (LANG, 1981). This shows the compound diet to be superior in quality to the other two.

The compound diet gave the highest growth rate of 15.2 g/d and feed efficiency of 7.6 g/g when compared to the other diets, especially the poultry grower's mash, mash which gave corresponding values of 6.3 g/d and 10.4 g/g respectively for growth rate and feed efficiency. The average final weight of 1333 g and 1265 g for rabbits fed the compound diet and commercial rabbit pellets respectively compared well with values reported by OMOLE (1977, 1979). The slight variations might be due to the fact that the earlier experiments lasted 56 days as against the 42 days for our own study. Also the final slaughter weight of mixed breed rabbits used in this study was close to the 13 week weight of 1600 g reported by RASTOGI (1989) for mixed breed rabbits fed on a 18 % CP broiler finisher pellets and mixed grass free choice. This might suggest that the breed of rabbit used in this study, mature around this weight.

The growth rate of 15.2 g/d recorded for rabbits fed the compound diet was comparable to the 16.6 g/d which was the average of the values of 12.7 to 20.5 g/d reported by OMOLE and AJAYI (1976) and OMOLE (1977, 1979). These earlier workers fed diets composed of conventional ingredients to the test rabbits. This suggests that the feed ingredients (maize,

guinea corn and fish meal) could be replaced by such substitutes as extruded soybean meal, groundnut haulms, maize and rice-milling by-products, all of which are not edible by man, without serious deleterious effects on the growth of rabbits.

Going by the estimated current market prices of the feedstuffs used in formulating the compound diet, it cost an average of two naira fifty kobo (N 2.50) to produce 1 kg. This price is 37.5 and 28.5 % cheaper than the corresponding costs of the commercial rabbit pellet and poultry grower's mash which cost four naira (N 4.00) and three naira fifty kobo (N 3.50) per kg respectively.

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BIBLIOGRAPHY

ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS,
1980. Official methods of analysis. 13th edition,
Washington DC.

- DANIELS L.B., SHRIVER L.A., NELSON T.S., 1986. Energy digestibility of certain feedstuffs by growing rabbits. *Nutr. Rep. Int.*, **33** (2), 269-274.
- FIELDING D., 1991. Rabbit as sources of food and income. Reasons for keeping rabbits. In : Rabbits. The tropical Agriculturist, CTA/MacMillan, London.
- LANG J., 1981. The nutrition of the commercial rabbit, part 1 : Physiology, digestibility and nutrient requirements ; part 2 : feeding and general aspects of nutrition. *Nutr. Abst. Rev., Ser. B, Livestock Feeds*, **51**, 197-225, 287-302.
- OMOLE T.A., AJAYI T.A., 1976. Evaluation of brewer's dried grains in the diets of growing rabbits. *Nutr. Rep. Int.*, **13** (1), 383-387.
- OMOLE T.A., 1977. Influence of level of dietary protein and supplementary copper on the performance of growing rabbits. *Br. Vet. J.*, **133** (6), 593-599.
- OMOLE T.A., 1979. The influence of dietary fat and supplementary copper on liveweight and carcass qualities of growing rabbits. *Nig. J. Agri. Sc.*, **1** (1), 31-37.
- RASTOGI R.K., 1989. Livestock production and diseases in the Tropics : Rabbit production in the Caribbean with special reference to Trinidad (West Indies). In : *Proc. 6th Int. Conf. of Institutes for Tropical Vet. Med., AITVM, Wageningen, Netherlands*, 252-255.
- SASSON A., 1990. International trade in agricultural commodities. In : *Feeding tomorrow's world sextant 3. UNESCO/CTA Paris*, 426p.
- STEEL R.G.D., TORRIE J.H., 1980. Analysis of variance 1 : The one way classification. In : *Principles and procedures of statistics, McGraw-Hill Book Company Inc., New-York*, 99-128.
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