EFFECT OF VARIOUS DIETARY LEVELS OF SUNFLOWER SEED MEAL ON THE PERFORMANCE OF GROWING RABBITS IN SUDANO-SAHELIAN ZONE

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ABSTRACT

The experiment which lasted for seventy (70) days was conducted to determine the effects of various dietary levels of sunflower seed meal (SSM) on the performance of growing rabbits. Thirty-two (32) indigenous breeds of rabbits obtained from small-scale producers were used in the study. They were individually weighed and randomly assigned to the four (4) dietary treatments, in which 0, 10, 20 and 30% of the groundnut cake was replaced by SSM, respectively. The diets contained 2391.76, 2387.44, 2383.12 and 2378.80 Kcal ME/Kg for diets 1, 2, 3 and 4, respectively. The crude protein (CP) was approximately 14.0% for the four (4) experimental diets. The diets, in mash form were fed to the rabbits *ad libitum*. There was no significant difference ($P > 0.05$) amongst the treatments in all the parameters examined. However, the incorporation of SSM resulted in a considerable decrease in feed cost with increasing levels of SSM. The results of this study therefore suggest that 30% or more of the GNC could be replaced by SSM in the diets of growing rabbits without deleterious effect on performance.

Key words: Sunflower seed meal, Rabbits, Sudano-Sahelian zone.

INTRODUCTION

The rapid population growth and low animal protein intake are some of the major problems facing developing countries. Oyenuga (1975) reported that an average Nigerian was obtaining about 7.5g of animal protein, a level far below the 28g recommended by the British Medical Association. The low protein intake may be attributed to inadequate production (FAO,

1970) and high cost of poultry meat, beef, mutton, pork and "bushmeat" which are the traditional sources of animal protein in many developing countries. Thus the search for cheaper sources of animal protein brings rabbits into focus. Rabbits are highly prolific and this makes rabbit rearing an economically viable venture (Abe, 1988). Rabbits compare favourably with other meat producing farm animals; it is as efficient as other farm animals in converting feed into meat (Sanford, 1951). Perhaps accelerated rabbit production may be one of the fastest means of bridging the gap of protein deficiency.

To tap the enormous potentials of rabbits, a sound knowledge of their nutrition is essential. Crampton and Harris (1969) reported that rabbits can digest 65 to 75% dietary crude fibre. King (1978) suggested that breeding does and young rabbits need about 14% fibre in their diets, while non-breeding stock can be allowed up to 25%. Energy levels ranging from 40Kcal to 220Kcal have been recommended for rabbits (Brody, 1935; Benedict and Lee, 1939). As far as lipids are concerned, a minimum level of 3% fat (ether extract) is desirable to provide essential fatty acids and to maintain a gloss, sleek hair coat (Cheeke, 1979). King (1978) reported that the minimum level of protein adequate for maintenance of adult non-breeding stock is 10%, and 16 - 20% for pregnant, lactating and young growing rabbits. Okorie (1977) suggested that rations for dry does, herd bucks and growing rabbits should contain 12 - 15% protein and those of pregnant and lactating does 16 - 20%. Levels of 16, 12, 15 and 17% for growth, maintenance, pregnancy and lactation are recommended by NRC (1980).

The major protein supplements used in rabbit feeding are cotton seed meal (CSM), Soyabean meal, sesame meal, linseed meal and groundnut cake (GNC) (Cheeke, 1979). Little attention is paid to sunflower seed meal (SSM), a protein supplement which may be a cheaper alternative to the aforementioned ones. Therefore, the objective of this study is to examine the effects of various dietary levels

of sunflower seed meal (SSM) on the growth and performance of growing rabbits.

MATERIALS AND METHODS

Experimental Stock

Thirty-two (32) local breeds of rabbits of mixed sexes obtained from small-scale producers in Maiduguri, were used for the study. They were individually weighed and

TABLE 1: COMPOSITION AND THE CALCULATED ANALYSIS OF THE EXPERIMENTAL DIETS

INGREDIENTS	DIETS %			
	1	2	3	4
Sunflower Seed Meal	0.00	1.20	2.40	3.60
Maize	8.00	8.00	8.00	8.00
Maize offal	44.00	44.00	44.00	44.00
Groundnut Cake	12.00	10.80	9.60	8.40
Groundnut hay	34.00	34.00	34.00	34.00
Bone meal	1.00	1.00	1.00	1.00
Premix*	1.00	1.00	1.00	1.00
Total:	100.00	100.00	100.00	100.00
Calculated Analysis				
ME (Kcal/Kg)	2391.76	2387.44	2383.12	2378.80
Crude Protein (%)	14.41	14.31	14.22	14.12
Ether Extract (%)	4.94	4.90	4.87	4.82
Crude Fibre (%)	17.55	17.62	17.69	17.77
Calcium (%)	0.92	0.92	0.93	0.93
Phosphorus (%)	0.48	0.49	0.50	0.51

*A vitamin-mineral premix supplying the following/Kg of diet: Vitamin A, 17, 000IU; Vitamin D₃, 2, 600 IU; Vitamin E, 15IU; Vit. K, 2mg riboflavin 12IU; Vitamin B₃, 48mg; lysine, 240mg; Methionine 50mg; choline, chloride, 600mg; manganese, 120mg; iron, 80mg; copper, 10mg; iodine, 2.2mg; selenium, 0.2mg; antioxidant, 250mg.

TABLE 2: PROXIMATE CHEMICAL COMPOSITION OF THE SUNFLOWER SEED MEAL

Constituents	%
Moisture	5.80
Crude Protein	37.00
Crude Fibre	11.36
Ether Extract (fat)	2.60
Ash	6.85
Nitrogen Free Extract (NFE)	36.39
Calcium	0.50
Phosphorus	0.60

randomly assigned to the four (4) experimental diets. Eight rabbits were assigned to each treatment in 4 replicates of two (2) rabbits each. The rabbits were individually housed in cages measuring 30.48 x 38.1 x 38.1cm. Plastic drinkers and feeding troughs were provided in each cage.

Feed and water were supplied *ad libitum* to rabbits throughout the experimental period of 70 days. All diets were fed in mash form and slightly moistened with water to reduce dustiness.

Experimental diets

The composition of the experimental diets (treatments) is shown in Table 1. The

proximate analysis of the SSM samples was carried out according to the A.O.A.C. (1970) methods. Calcium was analysed by atomic absorption spectrophotometry and phosphorus by a colorimetric method (Murphy and Riley, 1963).

The dietary treatments were:

Diet 1 (Control) - 0% SSM; Diet 2 - 10% of the GNC replaced by SSM; Diet 3 - 20% of the GNC replaced by SSM; and Diet 4 - 30% of the GNC replaced by SSM

Response Criteria

Feed consumption, average liveweight gain and feed conversion (gain to feed ratio) of each experimental group were used as the response criteria. Feed intake was measured on daily basis;

Liveweight gain was measured on weekly basis. The prevailing market prices of the feed ingredients were used to estimate the unit cost of the various diets.

Statistical Analysis

Data were subjected to analysis of variance (Steel and Torrie, 1980) using a completely randomized design. Significant differences ($P < 0.05$) between treatment means were determined by the least significant difference (LSD), (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

The performance data on liveweight gain, feed consumption, feed conversion efficiency (gain to feed ratio) and mortality are summarised in Table 3. The mean liveweight gain for all the experimental groups was not significant ($P > 0.05$). However, rabbits on diet 4 numerically gained more weight ($P > 0.05$) than the other groups. This is in agreement with the works of Alawa *et al.* (1989) and Abu and Ekpenyong (1991). Conversely, the liveweight gain recorded in this study was relatively lower than the results reported by Oyawoye (1989), and Abella *et al.* (1988) for growing rabbits fed soyabean meal, decorticated cotton seed meal and molasses. The final liveweight for all the dietary treatments was not significant ($P > 0.05$). Perhaps the good results obtained in relation

to the control may be attributed to the similarities between the amino acid profile of GNC and SSM (Church, 1979). Similarly, the feed intake (Table 3) showed no significant difference ($P > 0.05$). This indicates that the addition of SSM to diets 2,3 and 4 did not adversely influence the feed consumption of the rabbits.

The results of this study showed no significant difference ($P > 0.05$) in feed efficiency amongst the various treatments. Similar observations were made by Abu and Ekpenyong (1991) while Aduku *et al.* (1988) and Oyawoye (1989) reported 0.21 and 2.50 respectively. The differences in the results may be due to variations in the ingredients and the high fibre (17.55 to 17.77%) content of the experimental diets. King (1978) reported that diets containing more than 14% crude fibre lower the rate of liveweight gain in growing rabbits. Dafwang (1987) asserted that good quality feeds give better rate of conversion. The mortality data (Table 3) indicated that one (1) rabbit died in treatment 2 during the entire experimental period. The death, however, may not be attributed to the inclusion of SSM; the post-mortem examination implicated strangulation as the possible cause of death. Probably the rabbit was strangled in an attempt to escape from the cage.

The economic analysis of the experimental diets is presented in Table 4. The cost prices per Kg of feed were ₦2.72, ₦2.67, ₦2.62 and ₦2.58 for diets 1,2,3 and 4 respectively. The feed cost per Kg decreased with increasing levels of SSM. The highest (₦2.72) and the lowest (₦2.58) feed cost per Kg were obtained from diets 1 (control) and 4 respectively. A lot of money could thus be saved by incorporating SSM into diets of growing rabbits. The economic benefit observed in this study was as a result of the price differential between GNC and SSM. At the time this study was conducted, the prevailing prices were ₦5.00 and ₦1.00 per Kg of GNC and SSM respectively.

TABLE 3: PERFORMANCE DATA OF THE RABBITS FED VARIOUS DIETARY LEVELS OF SUNFLOWER SEED MEAL

DIETS	1	2	3	4
Percentage replacement of Groundnut cake (%)	0	10	20	30
Number of Animals	8	7	8	8
Initial Liveweight (Kg)	0.756	0.700	0.618	0.703
	± 0.071	± 0.061	± 0.089	± 0.048
Final liveweight (Kg)	1.110	1.022	0.968	1.167
	± 0.003	± 0.004	± 0.001	± 0.006
Liveweight gain (Kg)	0.354	0.322	0.350	0.464
	± 0.001	± 0.005	± 0.002	± 0.006
Feed intake (Kg)	2.07	1.96	1.96	2.13
	± 0.016	± 0.009	± 0.010	± 0.013
Feed efficiency (gain/feed)	0.17	0.11	0.11	0.12
	± 0.017	± 0.018	± 0.018	± 0.015
Mortality	0	1	0	0

TABLE 4: ECONOMICS OF FEEDING SUNFLOWER SEED MEAL (SSM) TO RABBITS.

Ingredients	DIETS								
	price/kg ¹ (₦)	Quantity ¹ (Kg)	Price (₦)	Quantity ² (Kg)	Price (₦)	Quantity ³ (Kg)	Price (₦)	Quantity ⁴ (Kg)	Price (₦)
Sunflower Seed Meal	1.00	0.00	0.00	1.20	1.20	2.40	2.40	3.60	3.60
Groundnut Cake	5.00	12.00	60.00	10.80	54.00	9.60	48.00	8.40	42.00
Maize	5.00	8.00	40.00	8.00	40.00	8.00	40.00	8.00	40.00
Maize Offal	2.00	44.00	88.00	44.00	88.00	44.00	88.00	44.00	88.00
Groundnut Hay	2.00	34.00	68.00	34.00	68.00	34.00	68.00	34.00	68.00
Bone Meal	2.00	1.00	2.00	1.00	2.00	1.00	2.00	1.00	2.00
Premix	14.00	1.00	14.00	1.00	14.00	1.00	14.00	1.00	14.00
Total		100.00	272.00	100	267.20	100.00	262.40	100.00	257.60
Price/Kg Feed(₦)		2.72		2.67		2.62		2.58	

1 = Prevailing Market Price at the time the study was conducted.

CONCLUSION

The results of this study show that up to 30% of GNC could be replaced by SSM in the diets of growing rabbits without a deleterious effect on performance. It is speculated that with more research, higher levels of SSM could be incorporated into the diets of rabbits. This will be economically viable in view of the cheaper cost of procuring SSM. Finally, the current prices of beef, mutton, goat and poultry meats underscore the need to embark on extensive rabbit production as a means of raising animal protein intake of Nigerians and people in other developing countries of the world.

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