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Performance Characteristics of Rabbits Fed Maize Sievate Based Diets

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Abstract: Twenty crossbred (Chinchilla and New Zealand white) rabbits, aged 7-8 weeks made up of 4 males and 16 females with initial weight of 22.5kg were used to assess the effect of different levels of maize sievate inclusion on their feed intake and growth performance. The rabbits were randomly allotted to 5 treatment groups of 4 rabbits per treatment. The treatments were replicated twice with each replicate having 2 rabbits. The rabbits were fed diets containing 0, 25, 50, 75 and 100% maize sievate in treatments I, II, III, IV and V, respectively. The chemical composition of the test ingredient was investigated prior to its use in the diets. Data were collected on daily feed intake, daily water intake, average weekly body weight, average weekly body weight gain, feed efficiency and feed conversion ratio. There were no significant ($p>0.05$) differences in the above mentioned parameters. However, cost of control diet was highest while that of 100% maize sievate was least, feed cost per unit gain was also highest for the rabbits on 0% maize sievate (control). Results suggest that 100% replacement level of maize as an energy source with maize sievate appears to support performance in rabbit production comparable to maize.

Key words: Performance, maize sievate, energy source, chinchilla, New Zealand white

INTRODUCTION

In Nigeria as in most developing countries, there is low animal protein intake. This is due primarily to the low level of animal production and productivity in terms of growth rate, long calving interval, slow reproductive cycle and low yield (Owen, 1981). This brought about the need to intensify efforts to improve on livestock production. The prolificacy and rapid rate of reproduction of the rabbit makes it a valuable animal in the task of supplying the much needed animal protein in the diet of the people of this country (Komolafe *et al*., 1983). They are efficient converter of feed to meatand can utilize up to 30% crude fibre as against 10% by most poultry species (Egbo *et al*., 2001). In addition, one can derive between 80-83% nutrition from rabbits as compared to the 50-53% nutrition derivable from the more traditional meat source (Anwana, 1991; FAO, 1985). Study shows that the white meat of rabbit is very nutritious, easily digestible and extremely low in cholesterol and sodium levels (Omole *et al*., 2005). However, in spite of the highly nutritious meat from rabbits, high cost of feed threatens sustained production, productivity and profitability. This is further compounded by the underproduction of grains and the keen competition among humans, industries and livestock for the scarce grains and oilseeds (Ndubuisi *et al*., 2007). According to Okah and Udedibe (2007), apart from the short supply of feedstuff for livestock feed production, competition for the available ones between livestock and human is a major clog on the wheels of the development of the livestock industry. Maize accounts for about 50-65% of average concentrate diet (Oso *et al*., 2007) and contributes about 60-80% of the total poultry diet in Nigeria (Abdulrashid *et al*., 2007) but it is very expensive. The choice of using cheaper alternative becomes imperative. Therefore, any effort to substitute maize in rabbit concentrate will significantly reduce the cost of production (Oso *et al*., 2007). In this study, maize sievate, which is usually a waste and a by-product of maize, was used as an alternative feed stuff to maize for rabbit feed.

MATERIALS AND METHODS

The study was carried out in 2006 at the experimental rabbitry, teaching and research farm, Department of Animal Science, University of Calabar, Calabar, Nigeria.

Twenty crossbred growers of chinchilla and New Zealand white of about 28 weeks were used for this experiment. The rabbits comprising of 4 males and 16 females were randomly assigned to 5 treatment diets. The diets were formulated using maize sievate to replace maize at 0, 25, 75 and 100% for treatments 1, 2, 3, 4 and 5, respectively. Each treatment had 4 animals replicated twice with 2 animals per replicate. They were fed twice

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Table 1: Percentage composition of the experimental diets

Composition	0%	25%	50%	75%	100%
Maize	43.78	32.84	21.89	10.94	-
Maize sievate	-	10.94	21.89	32.84	43.78
Wheat offal	17.51	17.77	18.06	18.34	18.62
Palm kernel meal	26.26	26.66	27.09	27.52	27.93
Soya bean meal	8.70	8.04	7.32	6.61	5.92
Bone meal	3.00	3.00	3.00	3.00	3.00
Salt	0.50	0.50	0.50	0.50	0.50
Vitamin premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100

a day, morning by 7.00am and evening by 5.pm, clean fresh water was supplied daily (Table 1).

The test ingredient (maize sievate) was subjected to proximate analysis using procedures of A.O.A.C. (1995). The rabbits were once weekly to obtain liveweight and body weight again. Record on feed and water intake were collected daily. Data obtained were subjected to analysis of variance using the completely randomized design. Where significant difference was observed, the Least Significant Difference method (LSD) as described by Steel and Torrie was used to separate treatment means.

RESULTS AND DISCUSSION

Table 2 shows the determined proximate composition of the test ingredient. Although information on maize sievate is scanty, the proximate composition indicates its apparent potential as feedstuff for rabbits.

The growth performance of rabbits is shown in Table 3.

The average daily feed intake of the rabbits were not significantly ($p>0.05$) different between the treatments. Generally, the intake increased across the treatment groups with age. This is in agreement with reports of Lang (1982) that feed intake of growing rabbits is related to their sizes and there is an increased intake as rabbits grow larger in size. In addition, the slightly higher feed consumption for rabbits in treatments III, IV and I may be due to the differences in the feed. The increased feed intake without corresponding increase in weight may be ascribed to lower energy concentration per kg feed, the rabbits thus increased intake to meet their energy requirement (Sobayo *et al.*, 2007). Higher feed intake to compensate for reduction in dietary energy is also a predictable outcome (Ayoade *et al.*, 2007). However, the low level of intake in treatment V counters the trend. It is probable that the difference may be due to animal differences. Feed intake depends on the kind of feed, age and stage of production (Lebas *et al.*, 1997). The average daily water intake of the rabbits in treatment I, II, III, IV and V was 0.133, 0.14, 0.151, 0.142 and 0.141L, respectively (Table 3). The water intake in this study is higher than feed intake but lower than three times the amount of feed taken. This is contrary to reports that rabbits take in thrice as much water per unit of feed consumed (Lukefalir, 1992). There was no significant difference in water intake. The average body weights of the experimental rabbits were 1.133, 1.475, 1.328, 1.387 and 1.592kg for treatments I, II, III, IV and V (Table 3). Although, the values did not differ significantly ($p>0.05$) among themselves, the highest final body weight was obtained for treatment V (1.592kg). The results are lower than those reported by Okon and Olawoye (2007), but near similar to Ramchurn and Ragoo (2000). Interestingly, values for treatment V in this study are higher than both reports. It may be that, the high fibre content may have influenced intake and growth rate. Other reports (Ekpenyong, 1986; Aliyu, 1990; Lukefalir, 1992) have indicated that fibrous diets stimulate feed intake causing ceacal colonic motility. Similarly, the body weight gain values in this study did not significantly differ among treatments, but rabbits on treatment V had the highest body weight gain (0.1kg). The production cost analyses are shown in Table 4.

Treatments I, II and III had the highest cost of production while the least was obtained in treatment V. However, the highest cost of feed unit^{-1} gain was obtained in treatment I (31.37 kg^{-1}) while the least cost was in treatment V (23.48 kg^{-1}). The stepwise reduction

Table 2: Chemical composition of maize sievate

Composition (%)	Maize sievate
Dry Matter (DM)	87.77
Crude Protein (CP)	11.74
Ether Extract (EE)	10.09
Crude Fibre (CF)	1.76
Ash	4.10
Nitrogen Free Extract (NFE)	72.28
Metabolizable energy (Kcal 1kg)	2185

Table 3: Growth performance of rabbits fed maize and maize sievate based diets

	Treatment				
Parameters	I	II	III	IV	V
Average daily feed Intake/rabbit (kg)	0.08	0.07	0.08	0.08	0.07
Average daily water Intake/rabbit (litres)	0.13	0.14	0.15	0.14	0.14
Average weekly body Weight/rabbit(kg)	1.13	1.47	1.82	1.38	1.59
Average weekly body Weight gain/rabbit(kg)	0.03	0.06	0.06	0.02	0.10
Feed efficiency of Rabbits	0.23	0.01	1.89	0.23	1.05
Feed conversion Ratio of rabbits	-0.17	0.41	0.02	1.22	0.13

Table 4: Production cost analysis of rabbits fed maize sievate

	Treatment				
Parameters	I	II	III	IV	V
Cost of feed (kg N^{-1})	64.00	60.61	57.17	53.72	50.29
Total cost of feed Consumed (N rabbit^{-1})	5.24	4.49	5.00	5.00	4.00
Cost of feed unit^{-1} Gain (N kg^{-1})	31.37	26.93	30.05	28.51	23.48

in production cost as maize sievate increased in the diet is similar to reports of Amaefule and Osuagwu (2005) for Bambara groundnuts and Ayoade *et al.* (2007) for sugarcane scrapings. The decrease in production cost in this study could be attributed to the fact that maize sievate demand is currently low and its price is relatively cheap since it is regarded as a waste.

CONCLUSION

The results of this study, indicate that replacing maize sievate at 100% supported best body weight gain with the least cost of production. This is an indication that maize sievate can successfully replace maize in the diet of rabbits and that the low cost of production due to inclusion of maize sievate could also improve profitability. The result equally points to the possibility of the use of maize sievate in the diets of other livestock like pigs.

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