



PERFORMANCE AND COST BENEFIT OF WEANER RABBITS FED FOUR DIFFERENT DIETARY ENERGY SOURCES

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ABSTRACT

An experiment was conducted at the Teaching and Research Farm, College of Agriculture, Bauchi to study the performance and cost benefit of using four different energy sources in weaner rabbit diets. Four diets containing maize, *dauro* millet, red sorghum and white sorghum were formulated and designated as diets 1, 2, 3 and 4 respectively. A total of thirty-two (32) Mongrel rabbits weighing between 869.00 – 889.00g were randomly allocated to the four dietary treatments in replicates of four containing two rabbits each in a completely randomized design (CRD). Each replicate was served 100g of the diet and 500ml of water daily. Data on daily feed intake, weight gain, feed conversion ratio and mortality were recorded. The results of the experiment indicated no significant effect of diet on performance indices. Final weight of rabbits ranges between 1968.75 and 2013g on diets 1 and 3 respectively. Daily feed intake (DFI) was from 97.34g (diet 2) to 98.12g (diet 1) while daily weight gain was between 19.64g (diet 1) and 20.24g (diet 3). Feed conversion ratio which was also not significantly affected, was between 4.84 and 4.99 on diets 2 and 1 respectively. Feed cost/kg was lowest on diet 2 (₦149.11) and highest on diet 1 (₦156.82). Feed cost/kg gain was lowest on diet 3 (₦723.12) and highest on diet 1 (₦782.67) while diet 3 (59.55) had the highest cost saving. It was therefore concluded that red sorghum can replace maize in weaner rabbit diets without any negative effect on performance. Furthermore, the use of red sorghum in weaner rabbit diets reduced feed cost and is recommended for rabbit production in the study area.

Keywords: Rabbit, Performance, Cost benefit, Millet, Sorghum.

INTRODUCTION

Rabbit meat has been considered as one of the most qualitative and nutritious meats across the globe. This was informed by its higher protein content, low contents of fat, sodium and cholesterol compared to other meat sources such as beef, pork, mutton, chevon and chicken Ajayi *et al.* (2017). It is a cheap source of high quality protein that can substantially improve the level of animal protein consumption in developing countries (Wafar *et al.*, 2018). Attia (2019) added that rabbits are suitable to raise for meat because of their high fecundity, short gestation period and high feed conversion efficiency. According to Basse *et al.* (2008) rabbits are efficient converters of fibrous feed materials and agro industrial by-products to meat than other species of livestock. Conventionally, maize has been the principal energy source in rabbit diets and it constitutes between 35 – 50% of the animals' ration (Strydom, 2008). However, with current trend at which price of ingredients is astronomically rising, the need to explore other alternative energy sources that are cheaper and readily available becomes a must. According to Yakubu *et al.* (2017) millet can substitute the whole of maize in the diets of rabbits with better performance and carcass yield. Maize milling waste/residue have also been reported to completely replace dietary maize in rabbit diets (Yusuf *et al.*, 2020), Similarly, a later study (Kawu and Ibrahim, 2021) has shown that doum palm pulp can replace maize at



30% level without any negative effect on carcass yield and organ characteristics. However, available literature on the use of different varieties of sorghum and millet as alternative energy ingredients in rabbit diets is limited. Against this backdrop, the current study was therefore designed to evaluate the performance, and cost benefit of weaner rabbits fed dietary levels of *dauro* millet, red sorghum and white sorghum as energy source.

MATERIALS AND METHODS

Study Area

The experiment was conducted at the Teaching and Research Farm, College of Agriculture, Bauchi. The area is located within the Southern Guinea Savannah on latitude 10°18'37.2 N and longitude 9°50'38.0 E, characterized by two well-defined seasons; Rainy season (May - October) and dry season (November - April). The average annual rainfall of Bauchi is about 1009 mm, highest relative humidity 94% (August) and the lowest 35 % (February). Temperatures are between 13 – 17°C (December – February) and 36 – 37° C (March – April) (World Atlas, 2015).

Experimental Diets

Four experimental diets designated as D1, D2, D3 and D4 were formulated. Diet 1 had maize as the main energy source while diets 2, 3 and 4 had *dauro* millet, red sorghum and white sorghum respectively (Table 1).

Table 1: Ingredients and Percent Composition of Diets Containing Four Different Energy Sources Fed to Weaner Rabbits

Ingredient	Diets			
	Diet 1	Diet 2	Diet 3	Diet 4
White maize	34.73	-	-	-
<i>Dauro</i> millet	-	34.73	-	-
Red sorghum	-	-	34.73	-
White sorghum	-	-	-	34.73
Soya beans meal	12.57	12.57	12.57	12.57
Wheat offal	30.00	30.00	30.00	30.00
Groundnut Haulm	20.00	20.00	20.00	20.00
Bone meal	2.00	2.00	2.00	2.00
Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Methionine	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
Total	100	100	100	100
Calculated Analysis (%)				
Metabolizable energy (kcal/kg)	2106.3	2090.84	2096.11	2096.11
Crude protein	16.00	16.00	16.00	16.00
Crude fibre	15.78	15.76	15.79	15.79
Ether extract	4.90	4.93	4.89	4.89



Management of Experimental Rabbits

A total of thirty-two (32) Mongrel rabbits weighing between 869.00 – 889.00g were used for the study which lasted for 8 weeks. The rabbits were randomly allocated to the four dietary treatments of eight per treatment, replicated four times (two rabbits per replication) in a completely randomized design (CRD). Each replicate was housed in a wooden cage measuring 24 by 36 inches in which a feeder and drinker were strategically placed. The rabbits were dewormed and given antibiotics prior to the commencement of the experiment. Each cage was served 100g of the diet and 500ml of water at 6.00h daily. Feeds refused were collected and weighed the next morning to determine the actual quantity of feed consumed before serving fresh feed.

Data Collection

At the commencement of the study, initial weight of rabbits was determined using a 10 kg scale. Thereafter body weight was measured at an interval of 7 days. Weight gain was determined by difference between two consecutive weighing. Daily feed intake was obtained from the difference between feed offered and the left-over collected the following morning. Feed conversion ratio was calculated using the relationship; daily feed intake/daily weigh gain.

Prices of feed ingredients at purchase were used to compute feed cost per kg. Feed cost per kg gain was obtained by dividing the value of total feed cost (₦) by that of total weight gain while cost saving was a difference between feed cost per kg gain on the control diet and that of a treatment diet.

Data Analysis

All data collected were subjected to one-way analysis of variance (ANOVA) using the SPSS version 25 software. Duncan's Multiple Range Test (DMRT) was adopted in separating the significantly different treatment means (Duncan, 1955).

RESULTS AND DISCUSSION

Performance of Weaner Rabbits Fed Different Dietary Energy Sources

Performance of weaner rabbits fed different dietary energy sources is presented in Table 2. The result revealed that, none of the performance parameters were significantly affected. This disagrees with the result of Kawu and Ibrahim (2021) using doum palm pulp as replacement for dietary maize. Initial weight of rabbits ranges between 860.00 and 889.00g. Final weights was from 1968.75 to 2013g on diets 1 and 3 respectively. Total feed intake was between 5.45kg on diet 2 and 5.49kg on diets 1 and 4. Daily feed intake (DFI) spanned from 97.34g on diet 2 to 98.12g on diet 1 while daily weight gain was between 19.64g (diet 1) and 20.24g (diet 3). Values for DFI obtained in this study were slightly higher than 90.62 – 94.35g reported by Yakubu *et al.* (2017). Similarly, values for DWG were higher than 10.44 – 11.83g (Abubakar *et al.*, 2023). Feed conversion ratio which was also not significantly affected, was between 4.84 and 4.99 on diets 2 and 1 respectively. These values are slightly lower than 5.73 -6.72 obtained by Ibitoye *et al.* (2020) using millet and sorghum as alternative energy ingredients in rabbits.

Table 2: Performance of Weaner Rabbits Fed Four Different Dietary Energy Sources

Parameters	Diets				SEM
	D1	D2	D3	D4	
Initial weight (g)	869.00	885.00	879.50	889.00	6.37 ^{NS}
Final weight (g)	1968.75	2009.50	2013.00	2010.25	20.78 ^{NS}
Total weight gain (g)	1099.75	1124.50	1133.50	1121.25	15.99 ^{NS}
Total feed intake (kg)	5.49	5.45	5.48	5.49	0.05 ^{NS}
Daily feed intake (g)	98.12	97.34	97.85	98.03	0.24 ^{NS}
Daily weight gain (g)	19.64	20.08	20.24	20.02	0.48 ^{NS}
Feed conversion ratio	4.99	4.85	4.84	4.90	0.09 ^{NS}
Mortality (No)	0	0	1	0	-

SEM= Standard error of Mean; NS= not significant

The cost benefits of weaner rabbits fed different energy sources is presented in Table 3. The result in Table 3 revealed that, Feed cost/kg was lowest on diet 2 (₦149.11) and highest on diet 1 (₦156.82). This finding is in line with that of Abubakar *et al.* (2023) who reported a reduced feed cost with increasing maize milling waste in weaner rabbits. Feed cost/kg gain was lowest in diet 3 (₦723.12) and highest in diet 1 (₦782.67) while diet 3 (59.55) had the highest cost saving. The results obtained in this study supports the findings of Ogunsipe *et al.* (2014) who reported that 50% replacement of sorghum offal for maize gave the highest cost saving.

Table 3: Cost Benefits of Weaner Rabbits Fed Different Energy Sources

Parameters	Diets			
	Diet 1	Diet 2	Diet 3	Diet 4
Total feed intake (kg)	5.49	5.45	5.48	5.49
Feed cost (₦/kg)	156.82	152.36	149.11	151.94
Total feed cost (₦)	860.94	830.36	817.12	834.15
Total weight gain (kg)	1.10	1.12	1.13	1.12
Feed cost/kg grain (₦)	782.67	741.39	723.12	744.78
Cost Saving (₦)	-	41.28	59.55	37.89

CONCLUSION AND RECOMMENDATION

Based on the results of this study, it was concluded that red sorghum can replace dietary maize in weaner rabbit rations without any negative effect on performance. Furthermore, the use of red sorghum in weaner rabbit diets reduced feed cost. Hence, it is recommended for the replacement of maize as main energy source in weaner rabbit diets in the study area.

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