



## PERFORMANCE, DIGESTIBILITY AND COST BENEFITS OF WEANER RABBITS FED DIETARY LEVELS OF MAIZE MILLING RESIDUE

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### ABSTRACT

A nine-weeks study was conducted to evaluate the growth performance and cost benefits of weaner rabbits fed dietary levels of maize milling residue (MMR). Forty (40) mixed breeds of both sexes, aged between 8 and 10 weeks having an initial weight of 759 - 771g each, were allotted to four experimental diets in replicates of ten containing one rabbit each in a complete randomised design. The diets contained maize milling residue at 0, 30, 35 and 40% levels, coded as T1, T2, T3 and T4, respectively. Data was collected on performance, digestibility and cost benefit. Except for feed conversion ratio, no significant ( $P < 0.05$ ) effect of diet was observed on performance indices. Feed conversion ratio was best ( $P < 0.05$ ) on T3 (4.66), followed by T5 (5.15) and T2 (5.85) which were the same, then T1 (6.03). Daily feed intake ranged between 60.68g on T4 and 65.00g on T2, daily weight gain was from 10.44g (T1) to 11.83g (T3) while final weight ranged between 1292.50g and 1430.00g on T3 and T4 respectively. Nutrient digestibility revealed higher ( $P < 0.05$ ) mean values for crude protein on T3 (80.46%) and T4 (79.84%) than on T1 (79.25%) and T2 (79.29%). Feed cost/kg reduced linearly from ₦190.01 (T1) - ₦135.00 (T4) with increased dietary MMR. Feed cost per kg gain also decreased with increased level of dietary MMR. Diet T4 (₦750.25) had the lowest value. It was therefore concluded that inclusion of up to 40% MMR in weaner rabbit diets reduced feed cost without compromising growth performance.

**Keywords:** Rabbit, Performance, Digestibility, Maize milling residue, Financial benefit.

### INTRODUCTION

The potential of rabbit meat as a quality or nutritious food stemmed from its higher protein content, lower fat, lower sodium and cholesterol contents compared with other meat sources such as beef, pork, mutton, chevon and chicken Ajayi *et al.* (2017). Rabbit has been identified as cheap source of high-quality protein that can substantially improve the level of animal protein consumption in developing countries (Wafar *et al.*, 2018). Bassey *et al.* (2008) reported that rabbits are efficient converters of fibrous feed materials and agro industrial by-products to meat than do other livestock species. However, in order to achieve this, feeding and nutrition need to be adequate (Abonyi *et al.*, 2012). Conventionally, maize has been the ingredient of choice as energy source in non-ruminant and pseudo-ruminant diets. Now that cost and availability of maize have become an issue, the need to explore the use of alternative energy ingredients that are cheaper and readily available becomes necessary. A number of studies have shown that maize milling waste/residue can partially or completely replace maize in poultry diets (Balogun *et al.*, 2017; Yusuf *et al.*, 2020 and Doma, 2020). However, available literature on the use of same in rabbits feeding is limited. Against this backdrop, the current study was designed to evaluate the growth performance, digestibility and cost benefit of weaner rabbits fed dietary levels of maize milling residue as energy source.



## MATERIALS AND METHODS

### Study Area

The experiment was conducted at the Teaching and Research Farm, Abubakar. Tafawa Balewa University, ATBU, 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 and Management of Rabbits

Four diets were compounded to contain 0, 30, 35 and 40% maize milling residue, designated as T1, T2, T3 and T4 respectively (Table 1). Forty (40) weaner rabbits of both sexes were used for the experiment. The rabbits were randomly distributed to four dietary treatments, each replicated 10 times in a complete randomize design. At week 8, a 5-day day faecal collection was carried out for the determination of apparent digestibility of the nutrient. Faecal sample was collected from each rabbit (replicate) using a clean cloth placed on the net of the cages. Faeces from each rabbit were weighed and dried for 24 hrs. and stored in an air tight polythene bag for chemical analysis.

**Table 1:** Ingredients and Percent Composition of Experimental Diets Fed to Weaner Rabbits

Ingredient	Diets			
	T1 (0%)	T2 (30%)	T3 (35%)	T4 (40%)
Maize	45.17	31.62	29.36	27.10
Soya bean	11.33	11.33	11.33	11.33
Maize milling residue	0.00	13.55	15.81	18.07
Wheat offal	20.00	20.00	20.00	20.00
G/nut hay	15.00	15.00	15.00	15.00
Rice offal	5.00	5.00	5.00	5.00
Bone meal	2.50	2.50	2.50	2.50
Salt	0.50	0.50	0.50	0.50
Premix	0.50	0.50	0.50	0.50
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
<b>Calculated Analysis (%)</b>				
Crude protein	16.00	16.00	16.00	16.00
ME (kcal/kg)	2630.00	2622.18	2614.09	2608.33
Crude fibre	9.00	9.06	9.08	9.50
Ether extract	3.56	3.43	3.46	3.30

### Data Collection

Data was collected for final weight, daily feed intake (DFI) daily weight gain (DWG), feed conversion ratio (FCR) and motility. The daily feed intake was obtained by difference between quantity of feed offered and the left-over, retrieved the following morning. Weight gain was determined by difference between two consecutive weighing carried out on weekly basis while feed conversion ratio was computed using the relationship between daily feed intake and daily weight gain.



### Chemical Analysis

Proximate composition of diets and faecal samples were determined according to standard AOAC (2000) methods. Digestibility coefficients were calculated according to Harris (2009).

### Data Analysis

Data collected were subjected to analysis of variance using SAS software (SAS, 2008) while significant means were separated with Duncan multiple range test at 5% level of significance.

## RESULTS AND DISCUSSION

### Performance of Weaner Rabbits Fed MMR Based Diets

The crude protein and metabolizable energy of experimental diets have met requirements of weaner rabbits in the tropics. Most of the performance parameters Measured are not significantly affected as shown in Table 2 Except for feed conversion ratio, all parameters measured in this study were similar to those reported by Idowu *et al.* (2013) in weaner rabbits fed Bamboo leaf meal. Feed conversion ratio was best ( $P<0.05$ ) on T3 (4.66), followed by T5 (5.15) and T2 (5.85) which were the same, then T1 (6.03). Other parameters which include final weight (1292.50 – 1430.00 g), daily feed intake (60.68 – 65.00 g) and daily weight gain (10.44 – 11.83 g) were not influenced by the dietary levels of MMR. These findings are comparable to those obtained by Bawa *et al.*, (2017) in weaner rabbits fed mucuna shell meal-based diets.

**Table 2:** Performance of Weaner Rabbits Fed Maize Milling Residue Based Diet

Parameters	T1 (0%)	T2 (30%)	T3 (35%)	T4 (40%)	SEM
Initial weight (g)	759.80	761.30	771.80	771.50	5.83 <sup>NS</sup>
Final weight (g)	1351.40	1380.40	1292.50	1430.00	6.10 <sup>NS</sup>
Daily feed intake (g)	64.07	65.00	62.18	60.68	4.83 <sup>NS</sup>
Daily feed gain (g)	10.44	11.09	11.83	10.95	0.90 <sup>NS</sup>
Feed conversion	6.03 <sup>a</sup>	5.85 <sup>b</sup>	4.66 <sup>c</sup>	5.15 <sup>b</sup>	0.39*
Mortality (Number)	0	0	1	1	

SEM= Standard error of Mean; NS= not significant; \*= significant at  $P<0.05$ ; <sup>abc</sup> Means in the same row with different superscript differs significantly ( $P<0.05$ ); MMR= Maize Milling Residue.

### Nutrient Digestibility of Weaner Rabbits Fed MMR Based Diets

Results for digestibility of weaner rabbits fed maize milling residue is presented in Table 3. Except for dry matter all other indices were significantly ( $P<0.05$ ) influenced. Dry matter digestibility ranged from 88.42% on T1 to 88.96 on T3. Crude protein digestibility was significantly ( $P<0.05$ ) higher on T3 (80.46%) which was comparable with T4 (79.74%) and lower on T1 (79.25%) and T2 (79.29%) which were the same. Digestibility for crude fibre was highest ( $P<0.05$ ) in rabbits fed T4 (56.53%) which did not differ with T3 (54.44%) but lowest on T1 (50.31%). Ether extract digestibility was higher ( $P<0.05$ ) and the same on T4 (70.41%), T2 (70.37%) and T3 (69.57%) but lower on T3 (60.83%). Digestibility for ash was higher ( $P<0.05$ ) on T4 (81.08%) and T1 (80.24%) which were similar and lower on T2 (79.35%). The findings in this study agrees with Bamgbose *et al.* (2002).

**Table 3:** Nutrient digestibility of Weaner Rabbits Fed Maize Milling Residue Based diets

Parameters	T1	T2	T3	T4	SEM
Dry matter	88.42	88.87	88.96	88.57	0.21 <sup>NS</sup>
Crude protein	79.25 <sup>b</sup>	79.29 <sup>b</sup>	80.46 <sup>a</sup>	79.74 <sup>ab</sup>	0.08***
Crude fibre	50.31 <sup>bc</sup>	53.61 <sup>b</sup>	54.44 <sup>ab</sup>	56.53 <sup>a</sup>	0.11***
Ether extract	60.83 <sup>ab</sup>	70.37 <sup>a</sup>	69.57 <sup>a</sup>	70.41 <sup>a</sup>	0.09***
Ash	80.24 <sup>ab</sup>	79.35 <sup>c</sup>	79.80 <sup>bc</sup>	81.08 <sup>a</sup>	0.06***

SEM= Standard error of Mean; NS= not significant; \*= significant at P<0.05; <sup>abc</sup> Means in the same row with different superscript differs significantly (P<0.05); MMR= Maize Milling Residue.

The cost benefits of feedings maize milling residue to weaner rabbits is presented in Table 4. Feed cost/kg decrease with increasing levels of maize milling residue from ₦190.01 to 135.00 for T1 and T4. However, feed cost/kg gain also decrease with increasing level of MMR in the diet ranging from ₦1172.25–750.25 for T1 and T4 respectively. This agrees with the previous report on the use of sorghum offal by Idowu *et al.* (2022) in weaner rabbits.

**Table 4:** Cost Benefits of Feeding Varying Levels of Maize Milling Residue to Weaner Rabbits

Parameters	Diets			
	T1 (0%)	T2 (30%)	T3 (35%)	T4 (40%)
Total feed intake/ (kg)	3.58	3.64	3.48	3.39
Feed cost/kg (₦)	190.01	170.20	150.00	135.00
Total feed cost(₦)	680.20	618.80	522.22	457.65
Total weight gain (kg)	0.58	0.62	0.66	0.61
Feed cost/kg gain (₦)	1172.75	998.06	790.90	750.25

## CONCLUSION AND RECOMMENDATIONS

Based on the results of this feeding trial, it was concluded that maize milling residue can replace dietary maize in weaner rabbit rations up to 40% level without any negative effect on performance. Furthermore, the use of maize milling residue in weaner rabbit diets reduced feed cost. Hence, it is recommended for inclusion in weaner rabbit diets.

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