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Performance of Weaner Rabbits Fed Rice Milling Waste Based Diets

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Abstract: Sixteen weaner rabbits of six weeks old, mixed breeds were fed Rice Milling waste based diets at 0, 25, 50 and 75% levels (replacing maize), respectively. This was done for a period of thirty-five days. The weight gain, feed conversion and protein efficiency ratios of rabbits fed 0% level and 25% level were significantly higher than those of rabbits fed 50 and 75% levels of the experimental diet. 0% and 25% levels do not have any significant difference between them. No mortality was recorded and also no physiological changes were observed throughout the thirty-five days of experiment. The nitrogen retention and crude fibre digestibility of diets fed 0% RMW and 25%RMW were significantly ($p<0.05$) the same and higher than others. Basically, from the performance data, there were no significance differences between the control diet 0% (RMW) and 25% (RMW) when compared, but there were significant differences when compared with diet 3 (50% RMW) and diet 4 (75% RMW), with diet 4 having the least performance. In terms of costing, diet 4 (75%) was the cheapest, but the least performance, while that of diet 2 (25% RMW) had a better performance and at a reduced cost. It can be concluded that RMW can conveniently be included in a weaner ration at 25% level of inclusion (replacing maize) without any adverse effect.

Key words: Rice milling waste, weaner rabbits, utilization

INTRODUCTION

The competition between man and livestock particularly monogastric animals over available food grains has continued to be a problem in developing countries. This is mostly due to underproduction that has typified the economy of many developing countries[1].

Smith and Kabaija[2] and Olomu[3] suggested that cheap and suitable substitutes should be used to replace these grains. They also concluded that industrial by-product of grains could also serve as a major ingredients in livestock feeds, provided intensive research was conducted to estimate their nutritive values and any limitations, arising from their usage.

The production of rabbit meat is not as demanding as beef, pork and chicken in terms of feeds, land and other requirements. Thus, rabbit meat can help to reduce the protein deficiency in the meals of Nigerians in both the short and long terms and it is known that the production per dam in rabbit is higher than what obtains in other herbivorous farm animals due to its high rate of reproduction, short generation interval and high growth rate.

Rabbit meat is high in protein, also low in cholesterol and sodium which make it very good for people with High Blood Pressure (HBP), Biobaku and Oguntona[4]. It is also of medical use in human pregnancy test (Encyclopedia Britannica).

The objective of this study was to determine the affect of substituting maize with Rice Milling Waste (RMW) on performance characteristics and nutrient digestibily of weaner rabbits.

MATERIALS AND METHODS

Experimental animals and management: Sixteen weaner rabbits of six weeks old, unsexed, crossbred with initial average weight of between 530-550 g were obtained from the University farm and involved in a completely randomized design experiment to assess intake and digestibilities of feeds formulated from rice milling waste. The rabbits were housed in individual hutches of 0.85 mX0.65 mX0.5 m dimension in size. The floors of the hutches were covered with poultry wire mesh, to allow faeces and urine to run through for disposal.The rabbits were given normal medication and cleaniness were maintained throughout the experiment. This study was conducted at the Rabbitry Unit of the University of Agriculture, Abeokuta, Nigeria.

Test ingredient and dietary treatments: The test ingredient was obtained from the University Feed mill and incorporated at 0, 25, 50 and 75% level of inclusion replacing maize in a weaners ration. The sixteen weaner rabbits were randomly divided into 4 groups involving four rice milling waste inclusion levels (0, 25, 50 and 75%)

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Table 1: Experimental diets for the weaner rabbits fed rice milling waste based diet

Ingredients	0%	25%	50%	75%
Maize	45.00	33.75	22.50	11.25
Rice milling waste	-	11.25	22.50	33.75
Soybean meal	15.00	15.00	15.00	15.00
Fish meal (72%)	1.50	1.50	1.50	1.50
Wheat offal	34.00	34.00	34.00	34.00
Bone meal	2.00	2.00	2.00	2.00
Oyster shell	1.00	1.00	1.00	1.00
Premix	0.25	0.25	0.25	0.25
Salt	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00

replacing maize. Each treatment was replicated twice with 2 rabbits per replicate.The composition of the experimental diets is shown in Table 1.

Feeding trial: Feed consumed and weight gain were monitored weekly. Feed convertion ratio was computed dividing the feed consumed by the weight gain. The protein efficiency ratio was calculated by dividing the weight gain by the protein consumed.

Digestibility trial: At the end of the feeding trial,a rabbit per replicate was selected from each replicate and moved to the metabolic cage.Acclimatization period of three days was allowed prior to collection period of 6 days.The rabbits were given known weight of feed, droppings were collected and weighed while the urine were also collected in a clean bottle.The urine sampleswere frozen while feed samples were dried at 65°C to constant weight, milledand stored in airtight bottles until analysed for proximate compositions according to A.O.A.C[5] methods.

Data analysis: The data collected were subjected to analysis of variance (ANOVA) in a Completely Randomized Design (CRD) while means were separated by using Duncan's Multiple Range Test[6].

RESULTS AND DISUSSION

The results of chemical analysis of experimental diets showed that the Ether extract, crude fibre and ash content were significantly higher ($p<0.05$) than those found in the control (diet 1) at 0% RMW (Table 1). The result of performance effect from the experiment (Table 2) showed no significant differences ($p>0.05$) in body weight gain, feed conversion ratio and protein efficiency ratio between rabbits fed control diet (0% RMW) and diet 2 (25% RMW).

The results also show that the rabbits fed the control diet and 25% RMW diet utilized the feed consumed better than those rabbits fed 50% and 75% RMW diets with Table 3 (75% RMW) having the least performances.

Table 2: Performance of weaner rabbits fed experimental diets level of replacement

	0%	25%	50%	75%	
	Diets				
Parameters	1	2	3	4	SEM±
Total no of rabbits	4	4	4	4	-
Av. Initial Wt. (g/rabbit)	550	530	550	540	-
Av. final Wt. (g/rabbit)	1280	1200	950	925	-
Av. weight gain (g/rabbit)	20.86^{a}	19.14^{a}	11.43^{b}	10.85^{c}	3.14
Av. daily feed intake (g/rabbit)	90.40^{a}	88.40^{a}	70.80^{b}	90.00^{a}	15.98
Feed Conversion Ratio (FCR)	1.764^{c}	1.948^{c}	2.338^{b}	2.564^{a}	5.12
Protein Efficiency Ratio (FER)	0.790^{a}	0.786^{a}	0.710^{b}	0.639^{c}	0.25
Mortality (%)	0.00	0.00	0.00	0.00	0.00

A,b,c,d -superscripts of mean values. Means are not significant at 5% ($p<0.05$)

Table 3: Results of weekly effect of experimental diets on the protein efficiency ratios of rabbits

Periods (Week)	0% RMW	25% RMW	50% RMW	75% RMW
1st week	1.319±0.22	1.319±0.22	1.319±0.22	1.319±0.22
2nd week	0.997±0.19	0.455±0.21	0.637±0.22	0.675±0.23
3rd week	0.472±0.13	0.542±0.16	0.196±0.15	0.362±0.09
4th week	0.515±0.23	0.647±0.19	0.435±0.10	0.494±0.25
5th week	0.644±0.20	1.056±0.22	0.817±0.16	0.679±0.22
Total	3.95	0.786	0.710	0.639
Average	0.790	0.786	0.710	0.639

Values are means of 4 analyses ± standard error mean, means are not significant at 5% ($p<0.05$), RMWD-Rice Milling Waste Diet

Table 3 shows the result for protein efficiency ratio between rabbits fed control diet (0% RMW) and experimental diets. The result also shows that the rabbits fed the control diet and 25% RMW diet utilized the feed consumed better than those rabbits fed 50 and 75% RMW diets.

The results for feed conversion ratio in Table 4 was significant in rabbits fed 25% RMW (diet 2) and 50% RMW (diet 3) when compared with others.

The cost analysis of experimental diet as reflected in (Table 4) shows the economic benefits of rabbit production. It was observed that the cost of the experimental diets reduced along the line, that is, in diets 2, 3 and 4, respectively. However, the cost of feed per kilogram weight gain was the highest in the control diet and also significantly high ($p<0.05$) in the 25% RMW diet. However, 75% RMW being the cheapest, but with the least performance. Relatively, the 25% RMW (diet 2) had a lower cost compared to the control (diet 1) with better efficiency compared to 50% RMW diet and 75% RMW diet, that is diets 3 and 4 which had lower cost but poorer performance.

Results of apparent nutrient digestibility of rabbits fed maize milling is shown in Table 5. Only the nitrogen retention and crude fibre digestibility revealed a significant effect; with diets 1 and 2 showing

Table 4: Results of weekly effect of experimental diets on the feed conversion ratio of rabbits

Periods (Week	0% RMW	25% RMW	50% RMW	75% RMW
1st Week	4.69±5.12	4.53±2.85	5.95±0.81	4.73±2.33
2nd Week	5.79±2.12	14.22±3.33	11.90±4.15	8.95±5.12
3rd Week	12.30±0.81	10.83±4.19	15.60±2.12	29.75±0.88
4th Week	11.52±3.33	8.42±5.11	14.38±0.91	13.65±2.12
5th Week	9.79±4.31	10.72±2.12	1063±4.31	7.00±3.33
Total	8.82	9.74	11.69	12.82
Average	1.764	1.948	2.338	2.564

Values are means of 4 analyses ± standard error mean, Means are not significant at 5% ($p<0.05$), RMWD-Rice Milling Waste Diet

Table 5: Apparent nutrient digestibility of rabbits fed maize milling waste

Parameters	0% RMW	25% RMW	50% RMW	75% RMW	SEM
Dry matter digestibility (%)	66.02	63.66	65.06	64.14	0.11
Nitrogen retention (%)	72.06^{a}	70.01^{a}	64.41^{b}	54.01^{c}	0.2
Ash retention (%)	70.56	72.56	81.31	80.11	1.60
Ether extract digestibility (%)	81.00	80.01	81.90	81.31	1.70
Crude fibre digestibility (%)	82.29^{a}	81.99^{a}	74.00^{b}	71.00^{b}	1.30

A,b,c,d -superscripts of mean values. Means are not significant at 5% ($p<0.05$)

significantly higher nitrogen retention and crude fibre digestibility.

Rice Milling Waste, from the result of chemical analysis (Table 1) showed that, it contains very high level of crude fibre and ash but low in crude protein and also the carbohydrate content is low suggesting it is a low protein feed material, although suitable for rabbit feeding. It appears that the increase in fibre level brought about a decrease in body weight gain while feed conversion ratio increased with an increase in feed intake and decrease in body weight gain. This simply support the findings of Cheeke[6] that increasing the fibre level of a diet will cause a resultant decrease in protein intake and hence reduce body weight.

It is also known that even though rabbits are poor digester of fibre, they can selectively excrete significantly large fibre faecal matter, while at the same time being able to retain soluble and small particles in the caecum for fermentation by the microbial floral Cheeke, [6]; Biobaku and Oguntona[4]. However, there was no mortality on any of the replicates per treatment.

The similar nitrogen and crude fibre retention obtained for the control and 25% RMW shows that the rabbits could still tolerate the RMW to 25% level of inclusion. This is also reflected on the performance characteristics, which are significantly the same.

Although, the cost of production reduces as RMW inclusion increases. However when compared viz a viz the performance traits, T2 seems to have the optimum reduced cost.

It shows that RMW can conveniently be included in a weaner ration at 25% level of inclusion (replacing maize) without any adverse effect.

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