

MLP -03

Effect of Yam-Peel Meal Diets on Performance and Nutrients Digestibility of Grower Rabbits

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Abstract

This study was conducted to determine the effect of Yam-peel meal diets on performance and nutrients digestibility of grower rabbits. Five diets were formulated containing yam-peels meal (YPM) at dietary levels of 0, 5, 10, 15 and 20% designated as T1, T2, T3, T4 and T5 respectively. Diets were offered to thirty 30 grower rabbits (Mongrels) in a completely randomized design and each treatment was replicated 3 times consisting of 2 rabbits per replicate. The experiment lasted 7 weeks. Diets and faecal samples were also subjected to proximate analysis to determine the crude nutrients compositions. The results on the performance of rabbits showed there were significant differences ($p < 0.05$) in the final body weight (1990.30 -2556.70g), daily weight gain (24.36 -35.65g) and daily feed intake (128.00 -132.43g). The results of nutrients digestibilities showed there were significant differences ($p < 0.05$) in the digestibilities of dry matter (66.00 – 85.00 %), crude protein (61.00 – 67.00 %), crude fibre (55.70 – 66.70 %) and nitrogen free extract (65.70 – 75.70 %). Rabbits fed 10% YPM diet had the highest weight gain (35.65g /day/ rabbit), with better feed conversion ratio (3.74) and feed cost per kilogram gain (₦196.73) compared to others. Crude protein and crude fibre digestibilities were better at 10% YPM dietary level compared to others. Based on this study, it was concluded that yam peel meal can be included in the diet of grower rabbits up to 10% without any adverse effect on growth performance and nutrient digestibility by grower rabbits.

Keyword: Yam-peel, rabbits, performance and nutrients digestibility

Introduction

Rabbit is an ideal animal in meeting the protein needs of developing countries. It plays a vital role in supply of animal protein to the Nigerian populace (Amaefule, 2005). They are highly prolific with short gestation period and attain maturity within short period of time. They are efficient converters of feed to meat and can utilized up to 30% crude fibre as against 10% by most poultry species (Egbo and Finzi, 2001). Rabbit's meat is rich in protein, vitamins with little fat and has linoleic and linolenic fatty acids (Aduku, 1990). Rabbit has ability to utilized agro-industrial by-products that are non-conventional feedstuff to produce animal protein. Yam-peels are abundant by- product of agricultural production which are available at backyard level.

This study was designed to investigate the effect of yam peels diets on the performance and nutrients digestibility by grower rabbits.

Materials and Methods

This study was conducted at the Teaching and Research Farm of the Department of Animal Science, Kano University of Science and Technology, Wudil. The farm is located on latitude 11° 37'N and longitude 8° 58' E at an altitude of 403 m above sea level. The mean annual rainfall is 890 mm and the average relative humidity and temperature are 75% and 26°C, respectively (Olofin, 2008).

Yam- peel was purchased from Wudil weekly market, sun-dried for 7 days and milled into coarse particles. Yam-peel meal was then incorporated in the diets of grower rabbits at 0, 5, 10, 15 and 20% designated as T1, T2, T3, T4 and T5 respectively. The crude protein and crude fibre of yam- peel meal was evaluated as 7.98 and 9.70% respectively AOAC (1990).

A total of thirty (30) mongrels grower rabbits were allocated to experimental diets in a completely randomized design and each treatment was replicated 3 times consisting of 2 rabbits per replicate. The room where the cages were kept was well ventilated with enough windows covered with wire mesh. It was fully protected against predators and against any possible environmental hazard such as rain and wind storm. The experimental animals were immediately treated with anti-coccidia (Amprolium) against protozoal infections. They were carefully monitored and adhered to accepted standards routine management. The experiment lasted within 7 weeks.

The initial weights of rabbits were recorded immediately at the beginning of the study. The rabbits were then re-weighed on weekly basis to determine the weight gain. The daily feed consumption was determined by subtracting leftover from amount offered to rabbits. The feed conversion ratio was also determined by calculation as ratio of daily feed consumed to daily weight gain. The feed samples (diets) and faecal samples from each replication were collected for 2 weeks, weighed, oven dried

and evaluated for proximate compositions. At the end of study, the digestibility of nutrients by rabbits were determined by calculation.

Data collected were subjected analysis of variance (ANOVA) using SAS statistical software package (2002) and means were separated using Duncan's multiple range test option.

Table 1: Composition of grower rabbits diets containing graded levels of Yam-peel meal

Ingredients (%)	Treatments				
	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	T5 (20%)
Maize	57.56	52.56	47.56	42.56	57.56
Yam- peel meal (YPM)	0.00	5.00	10.00	15.00	20.00
Soya bean meal	7.34	7.34	7.34	7.34	7.34
Fish meal	3.00	3.00	3.00	3.00	3.00
Wheat offal	28.00	28.00	28.00	28.00	28.00
Bone meal	3.00	3.00	3.00	3.00	3.00
Salts	0.35	0.35	0.35	0.35	0.35
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Vitamin-premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated Analysis	18.00	18.00	18.00	18.00	18.00
Metabolizable Energy (Kcal/Kg)	2567	2538	2628	2631	2632
Crude fibre (%)	11.48	11.78	12.38	13.04	13.97

Results and Discussion

The result of growth performance of grower rabbits fed graded level of yam peel is presented in Table 2. The results revealed that there were significant differences ($p < 0.05$) in the final body weight, daily weight gain, daily feed intake and feed conversion ratio. Final body weight was recorded highest in rabbits fed 10% yam peel meal diets (2556.70g) and the lowest value was observed in rabbits fed 20% YPM diet. Similarly, rabbits fed 10% YPM diets had the highest daily weight gain compared to others. This agrees with report of Omoikojie (2006) who report that rabbit has greater ability to utilize yam- peel and agro-industrial by- product than other livestock. The daily weight gain was observed to be highest for rabbits fed T3 (35.65g) compared to others. However, rabbits fed T3 consumed highest feeds (132.43g) compared others. Rabbits fed diet containing 10% YPM had better feed conversion ratio (3.74) compared to others. This may be attributed to feed utilization by rabbits and the lower the value of FCR the better the diet. This agrees with report of Doma (1998) who reported that the lower the feed conversion ratio the better the diet in monogastric animals.

Table 2: Performance of Grower rabbits fed graded levels of Yam-peel meal

Parameters	Treatments					SEM
	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	T5 (20%)	
Initial body weight (g)	800.00	810.01	800.00	810.02	810.05	6.80
Final body weight (g)	2500.00 ^a	2350.02 ^{ab}	2556.70 ^a	2146.70 ^{bc}	1990.30 ^c	22.03
Daily weight gain (g)	32.71 ^b	31.67 ^b	35.65 ^a	27.62 ^{bc}	24.36 ^c	1.88
Daily feed intake (g)	128.00 ^b	130.00 ^a	132.43 ^a	129.80 ^a	132.02 ^a	1.70
Feed conversion ratio	3.75 ^c	4.23 ^b	3.74 ^c	4.73 ^b	5.34 ^a	0.35
Feed cost /Kg gain	209.43 ^b	235.61 ^a	196.73 ^c	238.27 ^a	214.70 ^b	12.78
Mortality rate (%)	0.00	0.00	0.00	0.00	0.33	0.20

^{abc}= means with different on the same raw are significantly different ($p < 0.05$); SEM= Standard error of means

Table 3: Nutrients digestibility by Grower rabbits fed graded levels of Yam-peel meal

Parameters	Treatments					SEM
	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	T5 (20%)	
Dry matter (%)	68.00 ^c	75.00 ^b	85.00 ^a	77.70 ^b	66.00 ^c	0.89
Crude protein (%)	61.00 ^c	69.00 ^b	87.00 ^a	66.33 ^b	63.00 ^c	6.83
Crude fibre (%)	66.70 ^c	75.33 ^b	85.00 ^a	71.00 ^b	55.70 ^c	1.73
Ether extract (%)	79.00 ^a	62.33 ^b	62.70 ^b	62.00 ^b	60.33 ^b	2.63
Ash (%)	82.33	82.70	77.33	71.33	76.00	2.72
Nitrogen free extract (%)	75.70 ^a	72.33 ^b	72.33 ^b	65.70 ^c	68.70 ^c	2.13

^{abc}= means with different on the same raw are significantly different ($p < 0.05$); SEM= Standard error of means

The results of digestibility of nutrients by grower rabbits is presented in Table 3. The results showed there were significant differences ($p < 0.05$) in dry matter, crude protein, crude fibre and nitrogen free extract. Crude protein digestibility was higher in rabbits fed 10% YPM diets (87.00%) and lowest in rabbits fed T5 (63.00%). Similarly, crude fibre digestibility value was also significantly ($p < 0.05$) highest in T3 (85.00%) and lowest in T4 (55.70%). This may be due to some residual anti-nutrients and fibre content in the YPM. This agrees with Dafwang, *et al.* (2001) who recorded a reduction in nutrient digestibility by rabbit with increase in fibre in the diet. Ether extract and Nitrogen free extract digestibilities were significantly ($p < 0.05$) affected by the dietary utilization of yam peel meal in the experiment.

Conclusion

Based on this study yam-peel meal can be included in the diet of grower rabbits up to 10% dietary level without any deleterious effect on the performance and digestibility of nutrients.

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