GROWTH PERFORMANCE OF WEANER RABBITS FED DEHYDRATED AFRICAN BREADFRUIT (*TRECULIA AFRICANA*) PULP BASED DIETS

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ABSTRACT
This study was conducted to determine the growth performance of rabbits fed varying dietary levels of dried African breadfruit pulp (DABP). A total of thirty (30) weaner rabbits were randomly assigned to five treatment groups of 6 rabbits each and assigned to five dietary treatments in a completely randomized design (CRD). The dietary treatments consisted of T1: control; T2: 5% dried African breadfruit pulp; T3: 10% dried African breadfruit pulp; T4: 15% dried African breadfruit pulp; T5: 20% dried African breadfruit pulp. Each treatment was replicated three times with 2 rabbits per replicate. Feed and water were provided to the rabbits ad libitum. Final body weight, total feed intake, average daily feed intake, total weight gain, feed conversion ratio and protein efficiency ratio were significantly (P<0.05) improved in T2 and T3 compared to T1, T4 and T5. Based on the results obtained from the present study, it was concluded that 5-10% DABP can be incorporated into rabbit diets, without adverse effect on the animals.
Keywords: African Breadfruit pulp, diets, rabbits, performance, growth

INTRODUCTION

In order to achieve food security and address the challenge of dietary protein deficiency, Sub-Saharan African countries should focus on intensifying livestock production (Akuru *et al.,* 2021). It is essential to promote and support the production of micro-livestock species such as rabbits, capitalizing on their distinct advantages over larger animals such as goats, sheep, and cattle. These advantages include minimal space requirements, low initial capital investment, reduced labour demands, and rapid returns on investment (Oseni and Lukefahr, 2014). Rabbits, being herbivores with early maturation, a short generation interval, high prolificacy, and the ability to utilize locally available forages in rural areas, present a viable option for sustainable livestock production (Dalle, 2014). Moreover, rabbit meat is not only a healthy option but also has high nutritional value due to its low fat, cholesterol, calorie, and sodium content compared to beef, chicken, and pork (Dalle and Szendrő, 2011). The conventional feedstuffs such as cereal grains and legumes are both expensive and in high demand for human consumption, driving up production costs and rendering it economically impractical to feed these to rabbits in developing countries (Coles *et al.,* 2016). Consequently, to ensure year-round, cost-effective rabbit production, it is advisable to explore alternative, affordable feed ingredients with lower competition, such as breadfruit pulp, for the formulation of well-balanced rabbit diets. African bread fruit (*Treculia Africana)*, commonly known as 'ukwa' is a tropical tree belonging to the Moraceae family and native to Sub-Saharan African countries, notably Nigeria (Oladunjoye and Ojebiyi, 2012). Renowned for its significance economic value, African bread fruit holds status as a fundamental energy-rich fruit tree cultivated and consumed not only in Africa but also in various regions across the globe (Oladele *et al.,* 2009). Interestingly, numerous rural inhabitants directly or indirectly rely on African bread fruit cultivated for their sustenance (Olajide, 2012). African bread fruit pulp (DABP) is a byproduct resulting from the processing of African bread fruit, conventionally considered waste but has gained importance as a valuable feed for livestock and poultry. Given that many rural communities in Africa engage in animal husbandry for sustenance and economic reasons, utilizing DABP as animal feed rather than discarding it as waste becomes a practical approach to mitigate environment pollution. Based on the benefits mentioned above, African bread fruit is one of the essential staple crops that make a substantial impact on food security and the preservation of the environment for individuals in small-scale agricultural and rural communities in low and middle-income countries (Leyva *et al.,* 2012). Therefore the present study was designed to determine the dietary effects of DABP meal on growth performance of weaner rabbits.

MATERIALS AND METHODS

Experimental site: The study was conducted at the Rabbit Unit of the Department of Animal Science Teaching and Research Farm, University of Nigeria, Nsukka in Enugu State, South Eastern Nigeria. Nsukka lies in the derived Savannah region, and is located at the point of intersection of Longitude 7° 12.5 ^{1}N and latitude 6° 45^{1}E with a maximum plateau altitude of 443m and a minimum of 207m above sea level.

Experimental animals and managements: A total of thirty (30) weaners were randomly assigned to five (5) treatments with six (6) birds per treatment. Each treatment was further divided into three (3) replicate groups with two (2) rabbits in each hutch totaling fifteen (15) experimental units. Weaners were allowed to acclimatize to the environment for seven (7) days. Then their initial weight was taken and they were randomly selected and housed in separate hutch. Water was supplied *ad libitum* to the rabbits. They were provided the same management conditions (Floor space, temperature, light, vaccination program).

Experimental diets: An experimental basal rabbit diet was compounded (Table 1). The animals were randomly assigned to five treatment groups which have 6 rabbits per group. Each group has three (3) replicates of two (2) animals in each hutch. Rabbits assigned treatments, 2, 3, 4 and 5, were fed diets containing 0%, 5%, 10%, 15%, and 20% dried breadfruit pulp, respectively, and therefore 0% served as the control treatment. The hutches were routinely cleaned each day for 56 d (8weeks) of the experimental period. The four experimental diets were fully mixed and stored in a dark and dry place.

Table 1: Ingredient and calculated nutrient composition of experimental weaner rabbit diet

INGREDIENTS (Kg)	T1 (0%)	T2 (5%)	T3 (10%)	T4 (15%)	T5 (20%)
Maize	38.32	35.13	31.90	28.76	25.56
Wheat offal	25.52	23.42	21.30	19.17	17.04
Soya bean meal	19.32	19.47	19.70	19.85	20.04
Palm kernel cake	12.84	12.98	13.10	13.23	13.36
Dried breadfruit pulp	0.00	5.00	10.00	15.00	20.00
Lysine	0.25	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25	0.25
Bone meal	3.00	3.00	3.00	3.00	3.00
Iodize salt	0.25	0.25	0.25	0.25	0.25
Vitamin mineral premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Chemical Composition					
Crude protein (% DM)	18.00	18.00	18.00	18.00	18.00
ME (Kcal/kg)	3500.02	3500.04	3500.01	3500.00	3500.03

Data collection: The weights of weaner in each replicate were measured at the beginning and end of the trial. At the end of each week, the weights of the weaner and feed leftovers were captured and recorded to determine the average daily weight gain (ADWG), average daily feed intake (ADFI) and the feed conversion ratio (FCR). The ADWG, ADFI and FCR calculations did not include the 7-d adaptation period.

Statistical analysis: Data collected were subjected to statistical analysis using a Stat Graphic Computer Package (SPSS 2007), based on analysis of variance (ANOVA) as prescribed for a completely randomized design (CRD). Mean separation was done using Duncan's New multiple range tests, and differences were declared significant at $P < 0.05$.

RESULTS AND DISCUSSION

Growth Performance:

The effect of dietary breadfruit pulp on growth performance of weaner rabbits is presented in Table 2. Dietary treatments had no significant effect ($P > 0.05$) effect on Initial body weight (IBW) of rabbits upon grouping. However, total feed intake (TFI), average daily feed intake (ADFI), final body weight (FBW), total weight gain (TWG), average daily weight gain (ADWG), and feed conversion ratio (FCR) of the rabbits were significantly influenced by ($P < 0.05$) by dietary treatments. The rabbits exhibited a decline in body weight gain and poor feed conversion ratio with increasing inclusion

levels of African breadfruit pulp meal (DABP). It is possible that the high fibre content and some anti-nutritional factors (ANFs) present in DABP could have contributed to the decreased body weight gain of the rabbits observed in the present study. Notably, previous study by (Adekunle *et al.*, 2006) suggested that this slight reduction could be linked to increased breadfruit pulp levels in the diet, resulting in suboptimal feed utilization and efficiency. Similarly, the feed intake of rabbits was shown to increase at 5 and 10% inclusion levels of DABP and subsequently decreased at 15 and 20% inclusion. These findings suggest high palatability of DABP at lower inclusion levels below 15%. The poor feed conversion ratio recorded in the present study may indicate low digestibility and limited bioavailability of digestible nutrients from DABP containing diets to rabbits. A study by (Nwokoro and Obasuyi, 2006) reported reduced growth performance, FCR and decreased digestibility of nutrient as dietary level of bread fruit increased above 10%. This is supported by previous studies which showed a decrease in BWG and FCR of rabbits due to high dietary fibre levels (Oladunjoye and Ojebiyi, 2012). The weight gain (10.04-14.05 g/day) reported in this study was marginally higher than (8.75-11.75 g/day) reported by (Akuru *et al.,* 2021), who fed rabbits with varying levels of cowpea hull. This suggests that dietary breadfruit meal at lower inclusion level facilitated significant growth in rabbits, as observed in this study, whilst (Valdivié and Alvarez, 2003) reported an improved performance when breadfruit was fed at 20% and above. This may be due to location, weather and other climatic variations. Variations in the fibre content of different non-conventional feedstuffs may account for the differences in daily feed intake observed in the study compared to those of other studies (Akuru *et al.,* 2021; Bawa *et al.,* 2008).

Table 2: Effect of dietary bread fruit pulp on growth performance of rabbits

Parameters	T1	T2	T3	T4	T5	*P*- value
	ABFP0	ABFP5	ABFP10	ABFP15	ABFP20	
IBW (g)	559.67	558.00	558.33	559.67	559.33	0.198
FBW (g)	1250.00^{ab}	1308.30^{a}	1345.00^{a}	1141.70^{b}	1121.45^{b}	0.003
TFI (g)	5176.70^{b}	5578.00^{a}	5622.30^{a}	5324.70^{b}	5274.70^{b}	0.012
ADFI (g)	92.44^{b}	99.61^{a}	100.40^{a}	95.08^{b}	94.19^{b}	0.001
TWG(g)	690.33^{ab}	750.03^{a}	786.67^{a}	582.03^{b}	562.12^{b}	0.019
ADWG (g)	12.33^{ab}	13.39^{a}	14.05^{a}	10.39^{b}	10.04^{b}	0.007
FCR(g)	8.28^{ab}	7.44^{b}	7.15^{b}	9.15^{a}	9.38^{a}	0.016
PER (g)	104.93^{b}	107.55^{b}	107.97^{b}	136.33^{a}	87.66^{c}	0.000

^{a,b,c} Means on the same row with different superscript are significantly ($P < 0.05$) different; IBW: Initial body weight; TFI: Total feed intake; ADFI: Average daily feed intake; FBW: Final body weight: TWG: Total weight gain; ADWG: Average daily weight gain; FCR: Feed conversion ratio; PER: Protein efficiency ratio

CONCLUSION

Based on the results obtained from the present study, it can be concluded that 5-10% DABP can be incorporated into rabbit diets, without adverse effect on the animals.

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