# GROWTH PERFORMANCE AND CARCASS CHARACTERISTICS OF WEANER RABBITS FED DIETARY LEVELS OF PARKIA (*Parkia biglobosa)* PULP MEAL.

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## ABSTRACT

This study was carried out to determine the utilization of dietary levels of parkia pulp meal by weaner rabbits. A total of 16 weaner rabbits were usedand the Parkia pulp meal was included at 0, 33.3, 66.7 and 100% levels in a completely randomized design. The experiment was conducted in 4 replicates per treatment. Data were collected on daily feed intake, daily weight gain and carcass analysis. The daily feed intake ranged from 45.58-51.12g on diet 2 and 3 respectively while the daily weight gain ranged from 11.43-13.57 on diets 4 and 1 respectively. The best FCR of 3.23 was recorded on the control diet and this shows progressive decline with increasing inclusion levels of parkia pulp meal. However, the result of the experiment showed a non significant treatment effect on all the performance parameters. The carcass analysis also showed a non significant treatment effect on all the parameters except the liver and large intestine ($P<0.005$). The feed cost/kg also ranged from 4.31-90.02 on diet 4 and 1 respectively. The feed cost/kg weight gain also ranged from N290.70-355.73 on diets 1 and 4 respectively. The result shows that parkia pulp meal can only replace 33.3% of maize in weaner rabbits diets because at higher level the cost per kg is higher.

Key Words: Maize, parkia pulp, performance carcass, rabbits

## INTRODUCTION

The high cost of grains caused by high demand by man, livestock and industries has necessitated the need to source for other viable alternative energy sources for the animals. One of such alternative is parkia pulp meal. Parkia pulp meal obtained from the African locust bean (ALBP) fruit (*parkia biglobosa)* after the husk and seed have been removed. The African locust bean tree is a perennial legume which belongs to the sub family *mimosoidea* and family *leguminosea i*n West African subregion. According to Abeke (2005) the seed represent 10% of the fruit while the pulp is 90% and it composition depends on the variety, climate and processing technique.

The parkia pulp which is a yellow powdery substance is used by natives in making gruel (Kunu). It is very rich in carbohydrate which makes it an excellent energy source. According to (Akoma 2001) parkia pulp is use in rural Africa during emergencies occassioned by grain scarcity which is an indication of its edibility and non toxicity. It has low level low level of anti nutritional factors which is an indication that parkia pulp meal is partially safe for incorporation into broiler chickens. The proximate composition of locust bean pulp reported by Afolayan *et al (*2014) indicated that it has a low CP content of 3.1%, NFE of 66.39% and apparent metabolizable energy value of 2344kcal/kg. Bot *et al* (2013) reported a CP of 11.52%, CF of 12.49%, EE of 3.09%, ash of 4.08 and Nitrogen Free Extract of 68 32%. The wide variation in CP (3.1-11.52%) could be attributed to geographical locations, varietal differences or method of processing.

In a feeding trial with locust bean pulp meal as an energy source in diet for egg type chickens, inclusion levels of 22.3 and 30% LBP were recommended for chicks and pullets diets respectively (Afolayan et al 2014). Bot *et al* (2013) used LBP as alternative energy source in broilers diet and concluded that broiler chickens can tolerate up to 25% of LBPM without a negative effect on performances. This research was conducted to evaluate the performance of weaner rabbits fed graded levels of ALBPM as replacement for maize.

## MATERIALS AND METHODS

This study was conducted at the Rabbitry Unit, Teaching and Research Farm, Abubakar Tafawa Balewa University Bauchi. Bauchi is located within the Northern Guinea Savannah Ecological Zone at Latitude $10^1$ $17^N$ and Longitude $9^1$ $19^1$E at altitude 6902m above sea level. The area is characterized by two distinct seasons (dry and rainy). The dry season begins in October and end in April with a

temperature range of $13.7^0$-$38^0$C, while the rainy season is from April-September with a temperature range of 16-$32^0$C.

**Experimental Design and Management of the Rabbits**

Sixteen weaner rabbits of Mongrel breed were used for the study in a completely randomized design. The study was conducted over a period of five (5) weeks after an adjustment period of five (5) days. The rabbits were each housed in a metabolic cages. Feed and water were supplied *ad libitum.* Daily record of feed intake and weekly weight were taken.

There were Four experimental diets containing varying replacement levels of ALBPM: 0,33.33, 66.67 and 100% for maize designated as diets 1,2,3 and 4 respectively. The experimental diets were as shown in Table 1. The experiment was conducted in four (4) replicates of one rabbit per replicate.

**Data Collection**

Daily feed intake and weekly weight gain were recorded over the five weeks of the study, which form the performance parameters. The Cacass characteristics data were generated at the end of the feeding trial when all the rabbits were slaughtered, skinned, eviscerated and various organs weighted and values recorded as percentage of live weight

**Statistical Analysis**

The data generated above were analyzed using SPSS (2012) and means were separated using DMRT.

**RESULTS AND DISCUSSION**

The performance of rabbits fed graded levels of ALBPM were as shown in Table 2. The results of the daily feed intake, daily weight gain and feed conversion ratio showed a non significant dietary treatment effect. The daily feed intake ranged from 45.58-51.12g on diets 2 and 3. This finding contradicts the report of Bot (2013) on broiler chickens and Afolayan et al (2014) on layers fed ALBPM. The daily weight gain of rabbits though not significant showed progressive decrease with increase in inclusion level of ALBPM. This could be due to the higher energy value of maize compared to the experimental material. This is in agreement with Bot *et al* (2013) that also recorded significant decline in daily weight gain with increasing levels of ALBPM in broiler chickens diet which they attributed to low energy and higher levels of fibre and increase powdery nature of diets as the level of ALBPM increased. Similarly, the FCR also showed a non significant progressive increase with increase in ALBPM inclusion level where values of 3.23 -4.27 were obtained on control and diet 4 (100% ALBPM replacement) respectively. This agrees with Kwari and Igwebuike (2002) that also reported an increase in feed conversion ratio with increase in parkia pulp in broilers diet. Bot *et al* (2013) and Afolayan et al (2014) also reported a significant increase in FCR as the level of parkia pulp increase in broilers and layers diets respectively. The reduced feed efficiency on the test diets compared to the control diet could be due to reduced growth rate with inclusion of the experimental material. The cost analysis (Table 4) which was computed using the prices of the feed ingredients during the time of the research showed decrease in cost per kg of feed (₦ 84.31-90.30 on diet 4 and 1 respectively) with increase in parkia pulp meal inclusion level. The feed cost per kg weight gain however showed progressive increased with increasing level of test material inclusion. The cost ranged from ₦290.77-360.00 on control and diets 4 respectively. This finding contradicts the expectation that the use of unconventional feed ingredients in non-ruminant feed would result into cheaper cost of production (Abeke 2005). This is however related to the lower protein content of the experimental material and reduced performance recorded with its inclusion.

The carcass analysis of rabbits fed varying levels of ALBPM is shown on Table 3. Most of the parameters analyzed showed a non significant treatment effect. The weight of the liver and large intestine though were significantly ($p<0.05$) affected by dietary treatments, were not following any regular pattern. This finding shows that the inclusion of ALBPM in the diet of weaner rabbits has no negative effect on the carcass characteristics of rabbits.

## CONCLUSION

From the results of this study, the following conclusions were drawn:

1. Replacing 33.3% of maize with parkia pulp meal has no negative effect on performance and feed cost of weaner rabbits

2. Higher inclusion level of parkia pulp meal in rabbits diets leds to reduced cost /kg of feed and increased feed cost per kg weight gained.

3. Inclusion of parkia pulp in weaner rabbits diet has no negative effect on their carcass characteristics

**Table 1: Percentage Composition of Experimental Diets**

| | Replacement levels of parkia pulp meal | | | |
|---|---|---|---|---|
| Ingredients | 0% | 33.3% | 66.6% | 100% |
| Maize | 43.7 | 29.2 | 14.5 | 0 |
| Parkia pulp meal | 0 | 14.5 | 29.2 | 43.7 |
| Soya bean meal | 19.6 | 19.6 | 19.6 | 19.6 |
| Palm oil | 0 | 1.0 | 1.5 | 2 |
| Wheat bran | 20 | 20 | 20 | 20 |
| Rice offal | 10 | 9 | 8.5 | 8.0 |
| Fish meal | 3 | 3 | 3 | 3 |
| Bone meal | 3 | 3 | 3 | 3 |
| Salt | 0.25 | 0.25 | 0.25 | 0.25 |
| Premix | 0.25 | 0.25 | 0.25 | 0.25 |
| Lysine | 0.1 | 0.1 | 0.1 | 0.1 |
| Methionine | 0.1 | 0.1 | 0.1 | 0.1 |
| Total | 100 | 100 | 100 | 100 |
| Calculated Analysis | | | | |
| Crude protein (%) | 18 | 17.7 | 17.3 | 17.0 |
| ME (Kcal/kg) | 2447.3 | 2391.9 | 2252.5 | 2139.1 |

**Table 2: Performance of Weaner Rabbits Fed Graded Levels of Parkia Pulp Meal**

| | Replacement levels of parkia pulp | | | | |
|---|---|---|---|---|---|
| Ingredients | 0% | 33.3% | 66.6% | 100% | SEM |
| Initial weight (g) | 410 | 380 | 310 | 400 | - |
| Daily feed intake | 47.62 | 45.58 | 51.2 | 48.81 | $6.11^{NS}$ |
| Daily weight gain | 15.36 | 13.57 | 13.21 | 11.43 | $1.38^{NS}$ |
| Feed conversion ratio | 3.23 | 3.33 | 3.91 | 4.27 | $0.31^{NS}$ |
| Final weight | 950 | 840 | 780 | 800 | $20.12^{NS}$ |
| Feed cost/kg (₦) | 90.30 | 89.70 | 86.73 | 84.30 | - |
| Feed cost ₦/kg weight | 290.77 | 298.65 | 339.11 | 360.00 | - |

NS= Nonsignificant difference($p>0.05$). SEM= Standard error of means

**Table :3 Carcass Yield and Gut Characteristics of Rabbits Fed Varying Levels of Parkia Pulp.**

| | Replacement levels of parkia pulp | | | | |
|---|---|---|---|---|---|
| Parameters | 1(0%) | 2(50%) | 3(75%) | 4(100%) | SEM |
| Live weight (kg) | 800 733.33 | 700 | 800 | 101.04$^{NS}$ | |
| Dressed weight (g) | 377.66 | 306.68 | 325.7 | 385.68 | 32.11$^{NS}$ |
| Dressing % | 47.22 | 41.82 | 46.53 | 48.21 | 3.84$^{NS}$ |
| Head (%) | 9.87 | 10.36 | 11.82 | 9.50 | 0.79$^{NS}$ |
| Feet (%) | 2.32 | 5.16 | 4.17 | 2.50 | 7.22$^{NS}$ |
| Liver | 0.32$^{a}$ | 0.27$^{b}$ | 0.32$^{a}$ | 0.17$^{c}$ | 0.07$^{*}$ |
| Lungs | 0.86 | 1.17 | 0.72 | 0.84 | 0.13$^{NS}$ |
| Heart | 0.18 | 0.19 | 0.20 | 0.20 | 0.06$^{NS}$ |
| Abdominal fat | 0.50 | 0.53 | 0.53 | 0.55 | 0.25$^{NS}$ |
| Small intestine | 7.73 | 9.72 | 6.57 | 9.29 | 0.85$^{NS}$ |
| Large intestine | 0.53$^{a}$ | 0.47$^{a}$ | 0.39$^{b}$ | 0.46$^{a}$ | 0.08$^{*}$ |

*abc means in a row with different superscripts differ significantly (P<0.05), NS= Not significantly different (P>0.005), SEM Standard error of means.

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