

# EFFECT OF GRADED LEVELS OF AFRICAN LOCUST BEAN (*Parkia biglobosa*) PULP ON THE GROWTH PERFORMANCE OF JAPANESE QUAILS (*Coturnix coturnix japonica*)

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## Abstract

Two hundred and forty, two weeks old quails were used to determine the effect of the inclusion of African Locust bean pulp in the diets of Japanese quails on their growth performance. The birds were divided into 5 treatment group of 48 birds each and each group was further divided 4 replicates of 12 birds in a completely randomized design. The birds were fed grower diets from 2 weeks to the end of the experiment. Data obtained on the growth performance and carcass of the quails was subjected to a one way analysis of variance. The average daily feed intake, average daily weight gain and feed conversion ratio (FCR) of the birds were not significantly ( $P>0.05$ ) different across all the dietary treatment. The value for the daily feed intake 16.57g/bird and average daily weight gain 3.66g/bird were observed to be higher in T3 (10%) African locust bean pulp and T1 (0%) locust bean pulp. Bird fed T1 (0%) locust bean pulp had the best feed conversion ratio with the value of 4.43. Therefore, it was concluded that African Locust Bean pulp can be incorporated into the diets of Japanese quails up to 20% as an energy source without any deleterious effect on the growth performance and carcass of the birds.

## INTRODUCTION

Poultry occupies a unique position in the livestock sector because they are highly prolific and good converters of feed to meat (Obioha, 1992 and Bot *et al.*, 2012). The domestic fowl has been one of the major sources of animal protein to the Nigerian populace, providing both meat and egg (Odunsi *et al.*, 2007). Emphasis has been on the domestic fowl production whereas nutritive and economic benefits can also be derived from quail production since quail is fast growing and resistant to many diseases than the domestic fowl (Oluyemi and Roberts, 2000). This shows that there is a problem of pressure on the domestic fowl which can be reduced by widening the scope of meat and egg supply through the population of relatively underutilized poultry species of which Japanese quail is one. Owen and Dike (2013) while reviewing the work of Ani *et al.* (2009) reported that the Japanese quail (*Coturnix coturnix japonica*) was introduced into Nigeria to expand the poultry sub-sector and help supplement the domestic chicken production through meat and eggs.

The largest single dietary need of an animal is for energy. In terms of total cost, energy is the most expensive item in animal diets because of the amount required (Olomu, 2011). Acute shortage and high cost of feed ingredients such as maize, millet and guinea corn have been identified as major hindrances to the expansion of the poultry industry in Nigeria and other developing countries (Fasuyi, 2005 and Bot *et al.*, 2012). Meeting the protein requirement of a developing country like ours will therefore require sourcing for cheaper feed ingredients for the increased production of these birds.

A cheaper and alternative source of feed ingredient for broiler with corresponding good performance could be the Africa locust bean (*Parkia biglobosa*) pulp (Kwari and Igwebuike, 2002). Locust bean pulp (LBP) which is the yellow pulp obtained from the African locust bean tree is called “Dorowa” in Hausa, “Igba” in Yoruba though it does not attract much attention like the beans. It is a potential source of energy because it is very high in carbohydrates and a cheaper source of energy (Afolayan *et al.*, 2012). Even though findings from literatures on the significant use of the African locust bean (*Parkia biglobosa*) pulp abound, there is however few or no reports on the use of locust bean pulp in quail feeding trial which is the main reason that informed the decision for this research.

## MATERIALS AND METHODS

### Experimental site

The study was conducted at the Poultry Research unit of the Department of Animal Science and Range Management, Modibbo Adama University of Technology, Yola, Girei Local Government Area, Adamawa state. It is located within the Guinea savannah Zone. It lies between latitude 9° and 11° North of the equator and longitude 11° and 14° East of the Greenwich meridian.

### Experimental diets

The African locust bean pulp was sourced from the local market to formulate the test diet. Five diets were formulated with the first diet as the control diet (maize based diet) while the rest of the test diets

replaced maize with African locust bean pulp at 0, 5, 10, 15 and 20% respectively as shown in Table 1.

#### Experimental design and bird's management

Forty-eight Japanese quails were assigned to each treatment in replicates of twelve quails each per replicate in a completely randomized design (CRD) and they were weighed and assigned to the five treatments designated as T1, T2, T3, T4 and T5. Throughout the period of the experiment, feed and water were provided *ad-libitum* and every other routine activity was strictly adhered to.

#### Data collection

During the study, the data collected includes the following: feed intake, body weight gain, feed conversion ratio and mortality. Other parameters include feed conversion ratio, age and weight of first egg.

Table 1: Composition of Starter/Grower Experimental Diets (2-6weeks)

| Ingredients         | T1       | T2       | T3        | T4        | T5        |
|---------------------|----------|----------|-----------|-----------|-----------|
|                     | (0% LBP) | (5% LBP) | (10% LBP) | (15% LBP) | (20% LBP) |
| Maize               | 50.00    | 47.50    | 45.00     | 42.50     | 40.00     |
| Locust bean pulp    | 0.00     | 2.50     | 5.00      | 7.50      | 10.00     |
| Soyabean meal       | 41.00    | 41.00    | 41.00     | 41.00     | 41.00     |
| Fish meal           | 2.00     | 2.00     | 2.00      | 2.00      | 2.00      |
| Maize offal         | 5.00     | 5.00     | 5.00      | 5.00      | 5.00      |
| Bone meal           | 1.25     | 1.25     | 1.25      | 1.25      | 1.25      |
| Methionine          | 0.25     | 0.25     | 0.25      | 0.25      | 0.25      |
| Salt                | 0.25     | 0.25     | 0.25      | 0.25      | 0.25      |
| *Premix             | 0.25     | 0.25     | 0.25      | 0.25      | 0.25      |
| Total               | 100.00   | 100.00   | 100.00    | 100.00    | 100.00    |
| Calculated analysis |          |          |           |           |           |
| Energy (ME kcal/kg) | 2872.09  | 2846.79  | 2821.49   | 2796.19   | 2770.89   |
| Crude protein (%)   | 24.72    | 24.58    | 24.44     | 24.30     | 24.17     |
| Crude fibre (%)     | 3.58     | 3.80     | 4.02      | 4.24      | 4.46      |
| Ether extract (%)   | 2.68     | 2.60     | 2.58      | 2.44      | 2.36      |
| Calcium (%)         | 0.70     | 0.71     | 0.73      | 0.74      | 0.76      |
| Phosphorus (%)      | 0.67     | 0.66     | 0.66      | 0.66      | 0.66      |
| Lysine (%)          | 1.35     | 1.35     | 1.35      | 1.35      | 1.35      |
| Methionine (%)      | 0.62     | 0.62     | 0.62      | 0.63      | 0.63      |

\*Vitamin-Mineral premix (Animal Care- Optimix poultry) provided per Kg the following: Vitamin A 10,000,000iu; Vitamin D<sub>3</sub> 2,000,000iu; Vitamin E, 10,000mg; Vitamin K<sub>3</sub>, 2000mg; Vitamin B<sub>1</sub>, 1500mg; Vitamin B<sub>2</sub>, 5000mg; Vitamin B<sub>6</sub>, 3000mg; Vitamin B<sub>12</sub>, 15mg; Folic acid, 1000mg; Niacin, 20,000mg; Calpan, 8000mg; Biotin, 50mg; Antioxidant, 125,000mg; Cobalt, 200mg; Selenium, 200mg; Iodine, 1,000mg; Iron, 20,000mg; Manganese, 60,000mg; Copper, 5,000 mg; Zinc, 50,000mg; Choline chloride 100,000mg

#### Proximate Analysis

The proximate composition of the test ingredients and the feedstuffs used for experiment was carried out to according to AOAC (2002).

#### Statistical Analysis

Data obtained from these study were subjected to analysis of variance (ANOVA) as described by Gomez *et al.* (1984) using the statistical package for social scientist (SPSS) version 20 (2011), and significant means were separated using Duncan's Multiple Range Test (1955).

#### RESULTS AND DISCUSSIONS

The results of the proximate composition of African locust bean pulp (test ingredient) are presented on Table 2 while the experimental diet is presented in table 1. The performance of Japanese quails fed African locust bean pulp is presented in table 3.

Table 2: Proximate Composition of African Locust Bean Pulp

| Nutrients                   | Percentage composition |
|-----------------------------|------------------------|
| Dry matter (Dm)             | 91.93                  |
| Moisture                    | 8.07                   |
| Crude protein (Cp)          | 6.49                   |
| Ether extract (EE)          | 5.04                   |
| Crude fibre (Cf)            | 11.27                  |
| Nitrogen free extract (NFE) | 61.59                  |
| Ash                         | 7.54                   |

The average daily weight gain of the birds has the same trend as the weight gain. It ranged from 3.34-3.36g. There was no significant ( $P>0.05$ ) difference across all the treatment groups. This is in agreement with Chantiratikul *et al.* (2010) who reported no significant difference in the daily weight gain of Japanese quails fed wolffia meal as protein source and reported a range of values of 3.08-3.32g. Makinde *et al.* (2013) on the contrary reported significant ( $P>0.05$ ) difference among the various treatment groups in their study with a range values of 2.74-3.41g. The average daily feed intake (ADFI) was not significantly ( $P>0.05$ ) different across the experimental treatments. The result is lower than the values from values reported by Iliya. (2008); Makinde *et al.* (2013) and Edache *et al.* (2013).

There was no significant ( $P>0.05$ ) difference on the feed conversion ratio (4.43-4.94). This shows that the dietary inclusion level of the African locust bean pulp did not have any detrimental effect or impair nutrient utilization in the growing quails. Generally, feed conversion ratio for quails was poor compared to other reports (Emiola *et al.*, 2003; Tuleun *et al.*, 2009). This poor feed conversion ratio has been reported by Weber and Reid (1967), Haruna *et al.* (1997) and Sobamiwa and Longe (1998) and cited by Tuleun *et al.* (2009) due to the quail being much less efficient in feed utilization than chicks and the greater feed wastage characteristics of the quails.

There was no significantly ( $P>0.05$ ) difference with age at first egg production across the dietary treatments which means that the dietary treatments had no detrimental effect on the maturity of the birds.

There was no significant ( $P>0.05$ ) difference observed among the experimental treatments on the weight of first egg laid.

Table 3: Growth Performance of Japanese Quails Fed Graded Levels of African Locust Bean Pulp at Starter Phase

| Parameters              | Graded levels of African locust bean pulp |        |         |         |         | SEM                |
|-------------------------|-------------------------------------------|--------|---------|---------|---------|--------------------|
|                         | T1(0%)                                    | T2(5%) | T3(10%) | T4(15%) | T5(20%) |                    |
| Initial weight (g/bird) | 53.61                                     | 51.31  | 55.02   | 55.05   | 52.92   | 1.37 <sup>NS</sup> |
| Final weight (g/bird)   | 155.99                                    | 152.11 | 151.36  | 150.81  | 146.48  | 2.50 <sup>NS</sup> |
| weight gain (g/bird)    | 102.38                                    | 100.80 | 96.44   | 95.70   | 93.56   | 3.11 <sup>NS</sup> |
| ADWG (g/day/bird)       | 3.66                                      | 3.60   | 3.45    | 3.42    | 3.34    | 0.11 <sup>NS</sup> |
| ADFI (g/day/bird)       | 16.15                                     | 16.43  | 16.57   | 16.53   | 16.45   | 0.26 <sup>NS</sup> |
| FCR                     | 4.43                                      | 4.57   | 4.81    | 4.87    | 4.94    | 0.15 <sup>NS</sup> |
| AAFE (days)             | 36.50                                     | 38.50  | 36.25   | 36.50   | 38.75   | 1.28 <sup>NS</sup> |
| WOFE (g/egg)            | 7.30                                      | 7.33   | 7.63    | 6.88    | 8.00    | 0.55 <sup>NS</sup> |
| Mortality (%)           | 0.00                                      | 0.00   | 0.00    | 0.00    | 0.00    | 0.00               |

SEM= Standard error of means, NS= Not significant

## CONCLUSION

Therefore, African Locust Bean Pulp can be incorporated into the diets of Japanese quails up to 20% as energy source without any adverse or deleterious effect on the growth performance of the birds.

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