

## PERFORMANCE OF GROWER CROSS BRED RABBITS OF FED FONIO (*DIGITARIA EXILIS*) OFFAL AS FIBRE SOURCE

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### ABSTRACT

The over relying on wheat offal and in lesser cases maize or rice offal as fibre source in feed formulation particularly for monogastrics livestock threatens some locally available offals which perhaps could have provide alternatives. Therefore, to search for alternative, this study was conducted to determine the performance of grower rabbits of cross breed fed fonio (*Digitaria exilis*) offal as fibre source. Five diets (designated as T1, T2, T3, T4, and T5) were formulated. The content of wheat offal (WO) was replaced with fonio offal (FO) by 0%, 25%, 50%, 75% and 100%, respectively. The 0% (T1) served as control. Twenty five (25) grower rabbits of cross breed at 5 weeks old were used. They were distributed randomly into the five diets. Each diet had 5 rabbits and each rabbit represents a replicate. Rabbits fed on T5 had highest ( $p<0.05$ ) total weight gain (TWG), daily weight gain (DWG) and best feed conversion ratio (FCR) than those fed on T4, T3, T2 and T1. Similarly, those fed on T4 and T3 had higher ( $p<0.05$ ) weight gains and FCR than those fed on T2 and T1 while those fed on T2 had similar ( $p>0.05$ ) with those fed on T1. Total feed intake and daily feed intake were similar ( $p>0.05$ ) among treatments. There was no mortality. It may be concluded that FO can totally replace WO in grower rabbits' diet without negative effect performance. Therefore, FO is recommended as alternative for WO.

**Keywords:** fonio offal, Fibre source, Performance, Grower rabbits, Wheat offal.

### INTRODUCTION

Rabbits consume many kinds of feeds satisfactorily including green feeds, dry roughages, and concentrate feeds (NAS, 2019; Owoleke *et al.*, 2016). Rabbits have preference to the green feeds because of the high succulent and palatability but most green feeds (grasses and legume) are usually seasonal (NAS, 2019). A high carbohydrate concentrate added to roughages increases energy density while high protein supplement helps in meeting the recommended protein requirements (NAS, 2019). Like ruminants, the presence of fermentation vat in rabbits though distal the digestive tract make it possible to utilize high dietary fibre (Zsolt *et al.*, 2011). Zsolt *et al.* (2011) reported that dietary fibre constitutes 40-50% of total diet of rabbits. The high proportion of dietary fibres in the diet and the lesser cost of fibre resources make cost of feed of rabbit lower in comparison to poultry and swine's feeds. Studying the potentials of locally available resources would provide more alternatives and sustain growing interest particularly in rabbit production. One of such locally ingredients is fonio offal. Fonio offal is a by-product of fonio (also known as hungry rice) grains (*Digitaria exilis*) obtained when producing fonio flour or preparing other fonio foods. Two varieties of fonio are found in Nigeria and are natively called "acha" (*Digitaria exilis*) and "iburu" (*Digitaria iburua*) (Gyang and Wuyep, 2005). Folio affal contains 11.02% crude fibre (Sudik and Gofwan, 2017) similar to 11% of wheat offal (USDA, 2012). An FAO e-conference on 'food waste to animal feed' stressed the need to convert food wastes to animal feed (Thieme and Makkar, 2016). The aim of this study is; to determine the performance of grower rabbits of cross breed fed fonio (*Digitaria exilis*) offal as dietary fibre source.

### MATERIALS AND METHODS

The experiment was conducted at the Plateau State College of Agriculture, Garkawa. Garkawa is located in the Southern Zone of Plateau State, coordinated within latitude 8.8955°N and longitude 9.4537°E. It is characterized of Guinea Savanna climatic condition and vegetation patterns (Wikipedia, 2019).

The test ingredient was collected from fonio (acha) milling house in Bogoro town of Bogoro Local Government Area of Bauchi State, Nigeria. Five diets (T1, T2, T3, T4, and T5) were formulated. The

content of wheat offal (WO) in the diets was replaced with fonio offal (FO) by 0%, 25%, 50%, 75% and 100%, respectively. The 0% diet served as control. The diets were formulated to meet the nutrient requirements of grower rabbits described by Zsolt *et al.* (2011). Twenty five (25) grower rabbits of cross breed at 5 weeks old were purchased from a reputable Rabbit Farm in Jos, Plateau State. They were randomly divided into 5 treatments. Each treatment had 5 rabbits and each rabbit represent a replicate because each hutch could not accommodate more than one rabbit. The rabbits were individual housed in a 60 cm by 45 cm hutch equipped with feeder and drinker. They were served with their respective dietary treatments and drinking water *ad libitum*. They were dewormed with ivermectin in the first week of the experiment and coccidiostat was occasionally administered as prophylactic against coccidiosis. The experiment lasted for 42 days.

At the beginning of the study the rabbits' weights were taken using a sensitive scale graduated in 0.001 to determine the initial weights and thereafter, at weekly interval to determine weekly live weight. The difference in weight between two consecutive weeks gave the weekly weight gain. Daily weight gain was determined by dividing the cumulative weekly weights by 42. Feed intake was monitored daily using the same sensitive scale by subtracting the left-over from the quantity of feed supplied the previous day. Daily feed intake was determined by dividing the cumulative daily feed consumed by 42. Feed conversion ratio (FCR) was derived as the ratio of feed consumed to weight gain.

Data generated was analyzed using one-way analysis of variance (ANOVA) of the SPSS version 25.0 and significance of differences among treatments was determined using Duncan multiple range test of the same software.

**Table 1: Composition and calculated nutrients (%) of experimental diets**

| <b>Ingredients</b> | <b>T1</b> | <b>T2</b> | <b>T3</b> | <b>T4</b> | <b>T5</b> |
|--------------------|-----------|-----------|-----------|-----------|-----------|
| Maize              | 32.50     | 32.50     | 32.50     | 32.50     | 32.50     |
| Wheat offal        | 45.00     | 33.75     | 22.50     | 11.25     | 0.00      |
| Fonio offal        | 0.00      | 11.25     | 22.50     | 33.75     | 45.00     |
| Soybean            | 15.50     | 15.50     | 15.50     | 15.50     | 15.50     |
| Groundnut cake     | 5.30      | 5.30      | 5.30      | 5.30      | 5.30      |
| Limestone          | 1.70      | 1.70      | 1.70      | 1.70      | 1.70      |
| Salt               | 0.50      | 0.50      | 0.50      | 0.50      | 0.50      |
| Protein %          | 16.00     | 16.11     | 16.25     | 16.33     | 16.42     |
| ME(kcal/)          | 2500.79   | 2510.47   | 2522.67   | 2536.36   | 2544.14   |
| Crude fibre        | 10.00     | 10.08     | 10.10     | 10.12     | 10.13     |
| Lysine             | 0.65      | 0.67      | 0.69      | 0.70      | 0.73      |
| Methionine         | 0.45      | 0.45      | 0.47      | 0.48      | 0.50      |
| Calcium            | 0.40      | 0.40      | 0.41      | 0.41      | 0.42      |
| Phosphorus         | 0.22      | 0.23      | 0.24      | 0.25      | 0.25      |

ME = metabolizable energy.

## RESULTS

Table 2 shows the performance of grower rabbits of cross breed fed fonio (*Digitaria exilis*) offal as fibre source. Rabbits fed on T5 and T4 ( $p < 0.05$ ) had highest final weights while those fed on T1 and T2 had lowest. Rabbits fed on T5 had highest ( $p < 0.05$ ) total weight gain (TWG) and daily weight gain (DWG) than those fed on T4, T3, T2 and T1. Similarly, rabbits fed on T4 and T3 had better ( $p < 0.05$ ) weight gains than those fed on T2 and T1 while those fed on T2 had similar ( $p > 0.05$ ) with those fed on T1. Total feed intake and daily feed intake were similar ( $p > 0.05$ ) among treatments. Also, rabbits fed on T5 had best ( $p < 0.05$ ) feed conversion ratio (FCR) than those fed on T4, T3, T2 and T1; those fed on T4 and T3 had better ( $P < 0.0$ ) than those fed T2 and T1 while those fed T2 had similar ( $p > 0.05$ ) with those fed on T1. There was no record of mortality.

## DISCUSSION

The significant ( $p < 0.05$ ) superior performance of the grower rabbits fed on 100% FO in regard to weight gain and FCR is an indication that FO would completely replace WO without compromising

performance. This further indicates that FO may perhaps contain some nutrients that support growth and feed conversion ratio which are lacking in WO. This corroborated with the report of Sudik and Gofwan (2017) that FO contains higher level of sulfur amino acids (methionine and cysteine) than most cereal offals. Methionine helps liver to process fat and is a methyl donor capable of giving off its molecules needed for a wide variety of chemical and metabolic reactions inside the body, including the manufacture of the amino acid taurine (EFRT, 2000). Cysteine is a major constituent of the proteins, that make up hair, nails, and skin and is involved in major processes in the body (EFRT, 2000). The non-record of mortality buttressed that AO may be converted into feed without negative effect. This support the report of Thieme and Makkar (2016) and FAO (2015) that food wastes make excellent animals' feed resources.

**Table 2: Performance of grower rabbits of cross breed fed acha offal as fibre source**

| Parameters             | T1                      | T2                      | T3                      | T4                       | T5                      | Level of significant |
|------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|----------------------|
| Initial weight (kg)    | 1.80±0.07               | 1.83±0.03               | 1.81±0.03               | 1.84±0.06                | 1.81±0.07               | NS                   |
| Final weight (kg)      | 2.85±9.14 <sup>c</sup>  | 2.90±7.55 <sup>c</sup>  | 2.94±6.99 <sup>b</sup>  | 3.03±3.67 <sup>a</sup>   | 3.09±4.28 <sup>a</sup>  | *                    |
| Total weight gain(kg)  | 1.05±0.31 <sup>c</sup>  | 1.07±0.51 <sup>c</sup>  | 1.13±0.34 <sup>b</sup>  | 1.19±0.26 <sup>ab</sup>  | 1.28±0.18 <sup>a</sup>  | *                    |
| Daily weight gain (g)  | 25.00±3.53 <sup>c</sup> | 25.36±3.16 <sup>c</sup> | 26.79±4.12 <sup>b</sup> | 28.33±3.72 <sup>ab</sup> | 30.36±3.81 <sup>a</sup> | *                    |
| Total feed intake (kg) | 6.30±0.15               | 6.33±0.21               | 6.31±0.22               | 5.96±0.41                | 5.92±0.55               | NS                   |
| Daily feed intake (g)  | 150.10±10.12            | 150.04±11.32            | 146.45±8.34             | 142.61±7.44              | 141.43±8.16             | NS                   |
| Feed conversion ratio  | 6.00±0.10 <sup>a</sup>  | 5.76±0.13 <sup>a</sup>  | 5.64±0.21 <sup>b</sup>  | 5.01±0.13 <sup>b</sup>   | 4.64±0.17 <sup>c</sup>  | *                    |

Means in the same column with different superscripts differed significantly, but similar superscripts did not differ significantly: \* significantly (P<0.05); NS= Non- Significant (P>0.05).

## CONCLUSION

In this study no problems were encountered by a total replacement of WO with FO in regards to the growth and feed conversion ratio of rabbits. Therefore, FO is recommended as alternative dietary fibre source in grower rabbit's diets.

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