

## COMPARATIVE EVALUATION OF SELF-FORMULATED AND THREE COMMERCIAL DIETS ON THE GROWTH PERFORMANCE OF BROILER STARTER

<sup>1</sup>Adamu, M. O., <sup>1</sup>Bello, K. M., and <sup>2</sup>Muazu, M. S.

<sup>1</sup> Department of Animal Production, Abubakar Tafawa Balewa University Bauchi State, Nigeria

<sup>2</sup> Department of Animal Production Technology, Bauchi State college of Agriculture, Bauchi

Corresponding author email: shiramusa1@gmail.com  
+ 2348065166682

### ABSTRACT

An experiment was conducted to evaluate the performance of broiler chickens fed self-formulated and three different commercial diets. A total of 240-day old Cobb broiler chickens from a reputable hatchery were fed a self-formulated diet and 3 different commercial feeds for duration of 21 days to compare their growth performance. Daily feed intake of the dietary groups differed significantly ( $P < 0.05$ ). T2 dietary group showed high trend of feed consumption (99.27g) while the lowest feed intake was recorded on diet 3 (91.41g). The daily body weight gain was highest (58.60g) on diet 5 ( $P < 0.05$ ) which was statistically different ( $P < 0.05$ ) with value obtained on diets 2 (54.50). Lowest body weight gain was observed on diet 3 (35.91g) which was statistically similar with the value obtained on diet 1 (38.29). Higher FCR level ( $P < 0.05$ ) was observed on T3 dietary group which indicated low feed conversion efficiency. The result of the experiment from biological responses of birds gave an impression that commercial feeds of the feed mills T2 and T4 were found to be better than that of T3 and the self-formulated diet. The study recommended diet 4 for broiler starter production.

**Keywords:** Self-formulated, Performance, Commercial diets, Broiler starter

### INTRODUCTION

The production of poultry meat safe for human consumption is dependent on many factors which include suitable environment, breeds, nutrient requirement and health status of the birds. Among these factors, meeting the nutritional requirement of the animals with the objective to optimize digestibility and absorption of nutrients is certainly one of the most important elements. Onabanjo *et al* (2018).

Efficiency of production of any animal depends on the provision of adequate protein, energy, vitamins and minerals in the right proportion in their diet. In broiler nutrition, energy and protein level are of great importance. Presently, poultry occupies a unique position in the livestock sector of Nigeria Kareem *et al* (2015).

Expansion of the industry depends to a large extent on the availability of good quality feed at affordable price. An overview of the poultry industry in Nigeria shows that majority of the producers are small scale holder farmers that rely on commercial feed millers for the supply of feed. Olarinmoye *et al* (2009).

Poultry feeds are made up of many ingredients which are broadly grouped into providers of energy (fat and carbohydrates), protein (amino acids), vitamins, minerals and feed additives. Cereal grains such as maize, sorghum, wheat and millet provide energy while soya beans and groundnut provide protein. These ingredients are combined in such a way as to provide energy, protein, vitamins and minerals for poultry through the process of feed formulation. However, several factors may affect both feed quality and feed manufacturing parameters. (Loar and Corzo, 2011).

The nutritional value of grains used in poultry feed varies with the grain cultivars, its chemical characteristics and non-starch polysaccharide content, diet physical form, availability of energy and bird category (Gutierrez-Alamo *et al.*, 2008). These factors in addition to the choice of feedstuffs and quantity incorporated in the finished feed by different feed manufacturers has given to variation in the nutritive value of manufactured feeds and performance of birds fed different brands of feeds.

### Materials and Methods

The experiment was conducted at the Poultry Unit of Bauchi State Agricultural development programme (BSADP). Bauchi State occupies a total land area of 49,119 km<sup>2</sup> representing about 5.3% of Nigeria's total land mass and is located between latitudes 9° 3' and 12° 3' North and longitudes 8° 50' and 11° East (BSD, 2009).

A total of two hundred and forty (240) broiler chicks were used for the experiment. They were randomly divided into five treatment groups of 60 chicks per group in a completely randomized

design (CRD) consisting of four replicates of 20 birds each. Birds were reared on a deep litter, with feed and water provided *ad libitum*. Left over feed and body weight of birds were monitored on a weekly basis for the starter phase of the experiment and routine vaccines were given as recommended. All feed not consumed were removed, weighed and deducted from feed given daily to get the daily feed intake.

A self- formulated and three (3) broiler starter diets of different selected commercial brand were purchased and label as diet 1, 2, 3 and 4 which were given to treatment groups 1, 2, 3 and 4 respectively. All these feeds differ in composition of energy, crude protein, crude fibre, ether extract among others.

### Results and Discussions

The daily feed intake values ranged between 99.42g on diet 2 and 91.41g on diet 2 which is similar with the result of Kareem *et al* (2015) who reported a range of between 80.36 and 62.20g in his work titled studies on performance, haematology and serum biochemistry of broilers fed three types of commercial feed.. The daily weight gain value of 58.60g on diet 4 was observed to be highest followed by 54.50 on diet 3 while the lowest daily weight gain was 35.41g on diet 3 which was statistically ( $P<0.05$ ) with 38.29g on diet 1. These levels are in conformity with levels of Opoola *et al* (2015) who reported daily weight gain values of between 36.48 and 41.56g in performance of broiler chicks fed dietary levels of tryptophan and commercial diet. Feed conversion ratio was significantly affected by the dietary treatment. The result is similar to what was obtained by Sanusi *et al* (2015). Birds on diet 4 were having better feed conversion ratio of 1.65 which differed significantly ( $P<0.05$ ) with 1.82, 2.43 and 2.55 levels of dietary treatment groups 2, 1 and 3 respectively.

The highest feed cost/kg is recorded on diet 4 and 2 (164 and N160/kg) while diet 3 had relatively low feed cost of N148/kg and the lowest feed cost was recorded on the self-formulated diet (N128//kg}. The feed cost/gain ranged between 200.70 and N409.49 on diet 1 and 4.. This result differs with the values of between N124.67 and N190.29 reported by Sanusi *et al* (2015).

### Conclusion and Recommendation

Birds on diets 4 and 2 performed better than those on diets 1 and 3. And low feed cost/gain was recorded to be lowest on the self-formulated diet (diet 1) while broiler chickens on diet 4 had the highest feed cost/gain of N409.49 during the experiment. Diets 2 and 4 were therefore recommended for production broiler starter.

**Table 1: Composition of control diet fed to Broiler Chickens at starter phase**

| Feed ingredients             | Percentage |
|------------------------------|------------|
| Maize                        | 47.98      |
| Soya beans                   | 33.82      |
| Fish meal                    | 4          |
| Wheat offal                  | 10         |
| Limestone                    | 1.5        |
| Bone meal                    | 2          |
| Salt                         | 0.25       |
| Premix                       | 0.25       |
| Mrthionine                   | 0.1        |
| Lysine                       | 0.1        |
| <b>Total</b>                 | <b>100</b> |
| <b>Calculated analysis</b>   |            |
| Crude protein                | 23         |
| Crude fiber                  | 5.0        |
| Ether extract                | 4.0        |
| Metabolizable energy (MJ/kg) | 11.88      |

**Table 2: Nutrient composition of three different commercial diets fed to broiler chickens at the starter phase**

| <b>Composition (%)</b>       | <b>Commercial diets</b> |           |           |
|------------------------------|-------------------------|-----------|-----------|
|                              | <b>T2</b>               | <b>T3</b> | <b>T4</b> |
| Crude protein                | 20.00                   | 22.00     | 22.00     |
| Crude fibre                  | 3.00                    | 4.30      | 5.00      |
| Ether extract                | 6.00                    | 5.10      | 4.50      |
| Calcium                      | 1.00                    | 1.20      | 1.10      |
| Phosphorus                   | 0.45                    | 0.45      | 0.50      |
| Methionine                   | 0.45                    | 0.56      |           |
| Lysine                       | 1.10                    | 1.30      | 1.33      |
| Metabolizable energy (MJ/kg) | 12.08                   | 12.50     | 12.50     |

**Table 3: Growth performance of broiler chickens fed self formulated and three different commercial diets at starter phase**

| <b>Parameters</b>      | <b>T1</b>             | <b>T2</b>            | <b>T3</b>            | <b>T4</b>             | <b>SEM</b> |
|------------------------|-----------------------|----------------------|----------------------|-----------------------|------------|
| Initial body weight    | 277.78                | 288.89               | 286.11               | 280.55                | 7.86 NS    |
| Final body weight      | 1081.96 <sup>c</sup>  | 1433.33 <sup>b</sup> | 1040.28 <sup>c</sup> | 1511.11 <sup>a</sup>  | 29.12*     |
| Body weight gain       | 804.17 <sup>c</sup>   | 1144.44 <sup>b</sup> | 754.17 <sup>c</sup>  | 1230.57 <sup>a</sup>  | 26.98*     |
| Daily body weight gain | 38.29 <sup>c</sup>    | 54.50 <sup>b</sup>   | 35.91 <sup>c</sup>   | 58.60 <sup>a</sup>    | 1.29*      |
| Total feed intake      | 1955.11 <sup>ab</sup> | 2084.61 <sup>b</sup> | 1919.64 <sup>b</sup> | 2032.47 <sup>ab</sup> | 55.04*     |
| Daily feed intake      | 93.10 <sup>ab</sup>   | 99.27 <sup>a</sup>   | 91.41 <sup>b</sup>   | 96.79 <sup>ab</sup>   | 2.62*      |
| Feed conversion        | 2.43 <sup>a</sup>     | 1.82 <sup>b</sup>    | 2.55 <sup>a</sup>    | 1.65 <sup>c</sup>     | 0.53*      |

<sup>abc</sup> means on the row with the same superscript are not significantly different (P>0.05)

NS = Not Significant Difference

SEM = Standard Error of Mean

**Table 4: Economic analysis of broiler chickens fed self-formulated and three different commercial diets at starter phase**

| <b>Parameters</b>      | <b>T1</b> | <b>T2</b> | <b>T3</b> | <b>T4</b> |
|------------------------|-----------|-----------|-----------|-----------|
| Total FI (kg)          | 1.96      | 2.08      | 1.92      | 2.03      |
| Feed cost (N/kg)       | 128       | 160       | 148       | 164       |
| Total feed cost (N)    | 250.88    | 332.80    | 284.16    | 332.92    |
| Total weight gain (kg) | 0.80      | 1.14      | 0.75      | 1.23      |
| Feed cost gain (N)     | 200.70    | 379.39    | 213.12    | 409.49    |

**T1 = Self formulated diet**

**T2 – T4 = Commercial diets**

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