# Response of Broiler Chickens fed on different commercial and on-farm formulated diets in Mubi and its Environs.

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## ABSTRACT

The research was conducted at the Teaching and Research Farm of the Department of Animal Production, Adamawa State University, Mubi. The aim was to evaluate the performances of Broiler birds fed on farm-formulated and three commercial feeds coded as treatments $T_1$, $T_2$, $T_3$ and $T_4$ respectively. A total of forty-eight (48) Anak 2000 broiler chicks were used in a six weeks' study. Each treatment was replicated three times with four birds per replicate making twelve birds per treatment. The control ($T_1$) being farm formulated diets were made for both the starter and finisher phases so also were purchased the commercial feeds for treatments $T_2$-$T_4$. Feeds and water were given to the birds' *ad libitum* throughout the experimental period. Daily feed intake and weekly weight changes were recorded. These were used to calculate daily feed intakes, weight gains, feed conversion ratios (FCR) and feed conversion efficiencies (FCE). There were highly significant ($P<0.001$) differences among treatment means of farm-formulated feed and the commercial feeds for daily feed intake and weight gains during both starter and finisher phases. The performances of the birds on commercial feed differed significantly ($P<0.05$). Feed conversion ratio and feed conversion efficiency were better for treatment $T_1$ than those of $T_2$-$T_4$. All the three commercial feeds ($T_2$-$T_4$) had similar ($P>0.05$) influence on the performances of the birds although that of treatment ($T_4$) was the poorest. The research revealed that in all the parameters for both the phases, the birds on farm-formulated feeds performed better than those fed on commercial feeds.

**KEYWORDS:** Broiler chickens, Commercial feeds, Farm-formulated, Performance, Diets.

## Introduction

Expansion of the poultry industry depends to a large extent on the availability of good quality feed at a price affordable by the poultry farmers (Adejinmi *et al*., 2011). Aji (2009) stated that although poultry feeds are far more complex than ruminants' feeds, it is possible to raise birds on diets formulated from few ingredients.

Broiler growth is dependent on optimal feed intake throughout the growing period. Optimal feed intake is dependent on factors such as diet, nutrient density and physical characteristics (Ekunseitan *et al*., 2012). Therefore, the ability to

judiciously manipulate feed ingredients to maximize productivity is central to the maintenance of stable poultry production enterprise (Jegede *et al*., 2009).

In recent times, it is observed that most commercial feeds failed to meet up with the nutritional requirements of birds (Patrick and Schaibile, 2001), resulting in delay in weight gain attainment of birds. In addition, the proliferation of feed mills with different trademarks has not adequately brought about economically viable competition for farmers (Ogunwolere and Onwuka, 2007).

Weibe (2002) reported that apart from the higher crude fiber values in some commercial feeds than recommended, crude protein levels are very low and adulterated with saw dust, sand and rice brands. That so far, there is no international standard dictating what should be acceptable. Dick (2002) recommended that there should be harmonization among nation so as to adopt the same standard.

Nweze (2008, stated that quality assurance in livestock feed particularly poultry feeds had not been given the needed attention in Nigeria, probably because of the limited existing laws regulating poultry feed compounding and dispensing in the country. The great scientific and technological development of poultry industry in recent years demands the evaluation of different birds' lines and handling techniques for improvement of production efficiency for proper decision making (Ojedapo *et al*., 2009).

It has been found that it is difficult for local farmers to analyze nutrients contents of commercial feeds they buy. Farmers therefore rely on feed composition data provided on feed labels by the manufacturers (Ogunwole and Onwuka, 2007). This experiment was therefore carried out to compare the difference in performances of birds fed bought in commercial feeds and farm-formulated one so as to make recommendations to local farmers in the research area.

## Materials and Methods

### *Experimental site*

The experiment was conducted at the Teaching and Research farm of the Faculty of Agriculture, Adamawa State University Mubi, Nigeria. Mubi is in the Northern Guinea Savanna zone of the country and lies between Latitude $10^{o}$-$15^{o}$ N and Longitude $13^{o}$ and $16^{o}$ East at an altitude of 696m above sea level (Saidu and Gadiga, 2004).

### *Experimental animals and Management*

Forty-eight (48) day-old Anak 2000 broiler chicks were purchased from a poultry farm in Mubi. The chicks originated from Tunike farms, Ibadan, Oyo State of Nigeria. The birds were brooded for one week and fed with commercial feeds prior to the commencement of the experiment to stabilize them before allocation to dietary treatments.

Prior to the arrival of the chicks, necessary sanitary measures were taken which included washing, disinfecting floors, windows, walls and equipments to remove potential sources of pathogens. The house was heated and maintained at an environmental temperature of $32^{0}$C throughout the brooding phase. During the brooding period, heat and light were provided by an electric bulb of 200 watts and charcoal stoves. Feeds and water were given to the birds *ad libitum.*

***Experimental Design and treatments***

The birds were allocated to four dietary treatments each replicated three times with four birds per replicate making a total of forty-eight experimental animals in a Completely Randomized Block Design (CRBD). The experimental diets consisted of on-farm formulated diet (treatment $T_1$) with $T_2$-$T_4$ being different commercial feeds bought.

Both commercial and on-farm formulated diets were subjected to proximate analysis according to AOAC (2005). The feed ingredients of the on-farm formulated diets and their proximate compositions are presented in Tables1 and 2. The proximate compositions of the starter and finisher diets of commercial feeds are presented in Tables 3 and 4.

***Parameters measured***

Parameters measured were proximate compositions of feed, daily feed intakes, weekly and daily weight gains. Experimental diets and water were fed *ad libitum* daily by weighing the feed before feeding and weighing the left over feed after every 24 hours to obtain daily feed intakes. The birds were weighed by replicates per treatment to obtain average weight of each bird in a treatment every week, in the first two weeks. Thereafter, they were weighed individually every week to obtain weekly and daily weight changes. These were used to calculate weight gains, feed conversion ratios and feed efficiency.

**Table 1:** Compositions of feed ingredients of the on-farm formulated Diets.

| Ingredients (%) | Starter | Finisher |
|---|---|---|
| Maize | 48.56 | 55.42 |
| Soybeans | 19.34 | 14.03 |
| Groundnut cake | 12.90 | 9.35 |
| Wheat offal | 10.00 | 12.00 |
| Fish meal | 5.00 | 5.00 |
| Limestone | 1.50 | 1.50 |
| Bone meal | 2.00 | 2.00 |
| Salt (NaCl) | 0.25 | 0.25 |
| Premix | 0.25 | 0.25 |
| Methionine | 0.10 | 0.10 |
| Lysine | 0.10 | 0.10 |

***Statistical analysis***

Data obtained were subjected to Analysis of Variance technique (ANOVA) as described by Steel and Torrie (1984). Where significant differences occurred among means, Duncan Multiple Range Test was used to separate them.

**Results and Discussions**

The compositions of Treatment diets for farm formulated and commercial feeds for both starter and finisher phases are presented in Table 1. The proximate nutrient compositions of the on-farm formulated diets are presented in Table 2

while Tables 3 and 4 show the proximate nutrients compositions of commercial feeds. All the feeds seemed to contain same nutrient compositions.

Results of the experiment on Growth Performance and Feed Utilization of Broilers Fed the Different Diets (0-8weeks) are presented in Table 5.

**Table 2:** Proximate Nutrients compositions of on-farm formulated Broiler diets.

| Nutrients (%) | Starter | Finisher |
|---|---|---|
| Dry matter | 89.45 | 88.47 |
| Crude Protein | 23.00 | 20.00 |
| Ether Extract | 8.53 | 8.60 |
| Crude Fiber | 4.04 | 5.23 |
| Calcium | 0.40 | 0.32 |
| Phosphorus | 0.21 | 0.21 |

**Table 3:** Proximate composition of Commercial Starter Diets.

| | DIETS | | | |
|---|---|---|---|---|
| Parameter | $T_1$ | $T_2$ | $T_3$ | $T_4$ |
| Dry matter (%) | 89.45 | 88.23 | 88.29 | 88.26 |
| Ash (%) | 11.23 | 10.16 | 10.63 | 10.19 |
| CP (%) | 23.00 | 23.00 | 23.00 | 23.00 |
| EE (%) | 8.53 | 8.29 | 8.51 | 8.49 |
| CF (%) | 4.04 | 4.63 | 4.83 | 5.23 |
| Ca (%) | 0.40 | 0.43 | 0.45 | 0.42 |
| P (%) | 0.21 | 0.23 | 0.24 | 0.20 |

**Table 4:** Proximate Compositions of commercial Finisher Diets

| | DIETS | | | |
|---|---|---|---|---|
| Parameter | $T_1$ | $T_2$ | $T_3$ | $T_4$ |
| Dry matter (%) | 88.47 | 89.25 | 89.21 | 88.11 |
| Ash (%) | 20.00 | 20.23 | 20.51 | 20.11 |
| CP (%) | 9.73 | 8.93 | 8.83 | 9.77 |
| EE (%) | 8.60 | 8.56 | 8.50 | 8.39 |
| CF (%) | 5.23 | 5.38 | 5.11 | 5.41 |
| Ca (%) | 0.32 | 0.35 | 0.34 | 0.32 |
| P (%) | 0.21 | 0.21 | 0.20 | 0.22 |

***Growth performance***

It was found that feed intake and weight gains of the birds manifested significant ($P<0.05$) differences among treatment means. The finisher had higher feed intakes and faster growth rate than the starter phase. This higher feed intake observed at finisher phase was an evidence of the growth and development of the chickens. The values of feed intakes (102.41- 150.60) in the starter phase found in this study were similar to (103.45-156.55) obtained by Anthony (2001). Jadhav

(2010) had earlier reported that the body of the day old chick is about 70% of the weight of an incubated egg. He also noted that the chick increases its day old weight 3 to 4 times within the first four weeks of age.

Average daily gains were similar (P>0.05) across treatments with treatment ($T_1$) (46.56g) the highest and $T_4$ (41.21g) the lowest in the starter phase. This followed the same trend in the finisher phase with $T_1$ (52.20g) the highest and $T_4$ (46.85g) the lowest. Treatment $T_4$ therefore, showed lower values in both phases. These findings were similar to 13.08-15.06g for broiler starter and 39.63-49.37g for finisher obtained by Abdullahi *et al*. (2008).

***Feed Conversion ratios and feed efficiency***

Feed conversion ratios and feed efficiencies were similar (P>0.05) in all the treatments except for treatment ($T_1$) which had significantly (P<0.05) lower feed conversion ratios and higher feed conversion efficiencies than the rest in both two phases. The feed conversion ratios in both starter and finisher phases were similar to 2.45-3.39 obtained by Onimisi *et al.* (2008). Miles and Jacob (1999) had earlier stated that feed conversion efficiency is a function of feed intake and weight gain. Nutrients intake in a feed is a function of amount of feed eaten and the nutrients levels in the diet. That growth rate (weight gain) requires extra feed intake above what is required for maintenance.

Faster growth rate means better feed conversion efficiency, especially in broilers because it makes more use of feed available for production (NRC, 1994). Therefore, the farm-formulated feed gave better performance than the three commercial feeds. The feed with the lowest quality is that of treatment $T_4$ which the lowest performance in all parameters in both phases of the experiment.

Based on the findings of this research, though the birds gave fairly same performances on treatments $T_1$-$T_3$, the performance on treatment $T_4$ was not encouraging. The use of commercial feed of treatment $T_4$ should not be encouraged in broiler production. Nweze (2008) while assessing commercial feeds from Nigerian Geo-political zones found that the nutrients contents of the feeds on the labels were entirely different from the actual contents.

**Table 5:** Growth Performance and Feed Utilization of Broilers Fed the Different Diets (0-8weeks).

| | DIETS | | | | |
|---|---|---|---|---|---|
| Parameters | T1 | T2 | T3 | T4 | SEM |
| **Starter Phase (0-5weeks)** | | | | | |
| Final weight (g) | 1575.60$^{c}$ | 1627.50$^{b}$ | 1504.85$^{d}$ | 1665.35$^{a}$ | 112.02 |
| Initial weight (g) | 51.00$^{a}$ | 49.00$^{b}$ | 52.00$^{a}$ | 48.00$^{b}$ | 2.02 |
| Weight gained (g) | 1524.60$^{b}$ | 1583.50$^{b}$ | 1452.85$^{c}$ | 1617.35$^{a}$ | 133.11 |
| ADG (g) | 46.56$^{b}$ | 45.10$^{a}$ | 43.51$^{b}$ | 41.21$^{a}$ | 1.02 |
| DMI (g) | 102.41$^{c}$ | 140.05$^{b}$ | 150.60$^{a}$ | 142.57$^{b}$ | 11.003 |
| FCR | 2.35$^{c}$ | 3.41$^{b}$ | 3.63$^{a}$ | 3.79$^{b}$ | 0.021 |
| FCE | 0.43$^{a}$ | 0.32$^{b}$ | 0.28$^{c}$ | 0.26$^{b}$ | 0.023 |
| **Finisher Phase (5-8weeks)** | | | | | |
| Final weight (g) | 2,729.80$^{a}$ | 2,625.84$^{b}$ | 2,565.56$^{c}$ | 2,649.20$^{a}$ | 122.34 |
| Initial weight (g) | 1575.60 | 1627.50$^{a}$ | 1504.85$^{c}$ | 1665.35$^{a}$ | 102.11 |
| Weight gained (g) | 1,154.20$^{a}$ | 998.34$^{b}$ | 950.60$^{c}$ | 983.85$^{b}$ | 98.32 |
| ADG (g) | 52.20$^{a}$ | 50.54$^{b}$ | 47.21$^{a}$ | 46.85$^{b}$ | 1.82 |
| DMI (g) | 121.82$^{d}$ | 127.45$^{b}$ | 132.63$^{a}$ | 134.51$^{c}$ | 11.23 |
| FCR | 2.33$^{c}$ | 2.52$^{a}$ | 2.80$^{b}$ | 2.86$^{a}$ | 0.012 |
| FCE | 0.42$^{a}$ | 0.37$^{b}$ | 0.36$^{b}$ | 0.35$^{b}$ | 0.0025 |

SEM=Standard Error of the Means

**Conclusion**

It is therefore concluded that commercial poultry feeds compounded in different parts of Nigeria do not usually meet up with the expected nutrients requirements for both starter and finisher diets.

It is recommended that the farmers should formulate feeds on the farm to ensure its quality. There is also need to constantly monitor the quality of the animal feeds by appropriate authorities such National Agency for Food and Drugs Administration and Control (NAFDAC) and Standard Organization of Nigeria (S.O.N).

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