

## Comparative Evaluation of Different Commercial Feeds on the Growth Performance of Broiler Chickens in Federal Capital Territory, Abuja, Nigeria

Anorue Daniel Nnadozie

Department of Animal Science, University of Abuja

**Corresponding Author:** Anorue Daniel Nnadozie; [Anorued@gmail.com](mailto:Anorued@gmail.com)

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### ABSTRACT

A comparative evaluation of different commercial feeds on the growth performance of broiler chickens in Federal Capital Territory, Abuja, Nigeria was carried out using a total of 200 unsexed day old Cobb-500 broiler chicks were randomly distributed into 4 groups each with 50 birds. Each group was further sub-divided in to five replicates each. Four Starter and finisher diets of different selected commercial brands were purchased and labeled as diet A, B, C and D which was fed for treatment 1, 2, 3 and 4 respectively in a completely randomized design which lasted for 42 days. Starter diet was fed between 0- 21 days while birds received finisher mash between 22 - 42 days. Feed and water were offered ad libitum. Crude protein value of starter feed varied from 22.86 - 23.05 %, crude fibre (3.12 - 3.36 %), ether extract (3.98 - 4.02 %), calcium (1.78 - 1.81 %), phosphorus (0.71 - 0.72 %) and energy (3006.1 - 3100.5 kcal/kg while those of finisher feed: Crude protein (20.88 - 21.11 %), crude fibre (4.76 - 4.97 %), ether extract (4.08 - 4.18 %), calcium (1.90 - 1.92 %), phosphorus (0.78 - 0.81 %) and energy (3200.2 - 3216.5 kcal/kg). Outcome of the study showed that average daily weight gain, average daily feed consumption and feed conversion ratio were not influenced ( $p>0.05$ ) by the treatment in both the starter and finisher phase. In conclusion, all the commercial feed used for this study contained adequate nutrient necessary for the growth of birds and their nutritional composition were within the recommended standard by Nutritional Research Council

## INTRODUCTION

Broiler meat is succulent, tasty and highly digestible. It is consumed with little or no restrictions especially in our locality (Obioha, 2016). In addition to the supply of meat, the faeces of poultry are used as organic manure or fertilizer, they are also used as experimental animals in standardization of drugs. Poultry industry offers marketing outlets to the local manufacturers of feed, poultry equipment and serves as raw material for food processing industries (Alagbe, 2017b). However, competition between man and poultry for conventional feedstuff coupled with the rising cost of feedstuff, inadequate supply and non-availability of conventional feedstuff make the feed miller to increase the quantities of low quality components to enable them break even (Alagbe, 2017a). The provision of good quality food amongst other factors remains an important factor in good performance of poultry (Babatunde, 1980; Olatunji et al., 2016).

Previous research by Mu'azu et al. (2020) revealed that feeding different commercial feed to broiler chickens improved ( $p < 0.05$ ) their final body weight and feed conversion ratio. Zickovic et al. (2018) reported that increasing protein level to 18 - 22 % improves weight gain of broilers. Lillie and Dento (2016) suggested that increasing the supply of protein or energy yielding nutrient in the diet of broiler chickens can lead to an improvement in growth and feed efficiency. Alagbe (2017a,b) recommended about 23 % protein level for starter and 20.8 % for finisher, National Research Council (1994) recommended 23 % crude protein for starter and 21.0 % finisher and 3200 kcal/kg ME for both phases of growth. Olomu and Offiong (2000) recommended 23% crude protein and energy level of between 2800-3000 kcal/kg ME for starter ration and 20% protein level and energy 3000 kcal/kg ME for finisher ration. Similarly, Alagbe (2016); Olatunji et al. (2016) recommended between 28000-3000 kcal/kg ME for crude protein level of 23-24 % for starter and 19-21% for finisher.

## LITERATURE REVIEW

### *Location of the Experiment and Ethical Approval*

This experiment was carried out at NYSC Members' Farm, Kubwa, Federal Capital Territory, Abuja, Nigeria which lies within latitude 080 51 and 090 37 North and longitude 0070 20 and 0070 51 E. Annual rainfall is about 1000-1500mm. Temperature generally fluctuates between 280 C- 470 C in the dry season and 23°C- 360 C in the cold season. Relative humidity of 75 % at 0900 GMT (percent). Experimental procedures were designed and approved at the Department of Animal Production, Federal University of Technology, Minna.

### *Management of Experimental Birds and Design*

A total of 200 unsexed day old Cobb-500 broiler chicks were purchased from a commercial hatchery, located in Jos, Nigeria. Upon arrival, chicks were unboxed and their average initial body weight ( $50.11 \pm 1.10$  g) was recorded using a digital weighing scale before it was randomly distributed into 4 groups each with 50 birds. Each group was further sub-divided in to five replicates consisting of 10 birds each. Prior to the commencement of the experiment, battery cages were thoroughly cleaned, disinfected. Four Starter and finisher diets of different selected commercial brands were purchased and label as diet A, B, C and D which was fed to treatment 1, 2, 3 and 4 respectively in a completely randomized

design which lasted for 42 days. Starter diet was fed between 0- 21 days while birds received finisher mash between 22 - 42 days. Feed was offered ad libitum and water was made available at all times. The chicks were vaccinated against Newcastle disease and Gumboro on the 8th and 14th day respectively. Weekly weight was monitored and recorded to determine growth trend that may be attributed to the dietary treatments. Weekly weighing was done before feeding in the morning. Final body weight was taken at the termination of the feeding trial. Feed intake was determined by difference between the feed offered and the left-over on a weekly basis. Feed conversion ratio was determined by dividing the average feed consumed by the average body weight gain.

Diet A = Starter (0 - 21d) and Finisher mash (22 - 42 d) -----Treatment 1

Diet B = Starter (0 - 21d) and Finisher mash (22 - 42 d) -----Treatment 2

Diet C = Starter (0 - 21d) and Finisher mash (22 - 42 d) -----Treatment 3

Diet D = Starter (0 - 21d) and Finisher mash (22 - 42 d) -----Treatment 4

## METHODOLOGY

### *Proximate Analysis of Experimental Diet*

Proximate analysis of each experimental diet was carried out using KPM Analytics NIR Spectroscopy Analyzers (Model 3800F, China). 100 g of feed sample was poured into the rotary reflecting dish and set at a spectral range of 1400 - 2500 nm for optimal measurement.

### *Statistical Analysis*

Data collected were analyzed by using the general linear model (GLM) procedures of SAS, by employing one-way analysis of variance (ANOVA). Significant differences between treatment's means were separated by Duncan's multiple range test (Duncan, 1955)

## RESULTS AND DISCUSSION

Result on the proximate composition of branded starter commercial feed is presented in Table 1. Crude protein value of starter feed varied from 22.86 - 23.05 %, crude fibre (3.12 - 3.36 %), ether extract (3.98 - 4.02 %), calcium (1.78 - 1.81 %), phosphorus (0.71 - 0.72 %) and energy (3006.1 - 3100.5 kcal/kg). Proximate composition of commercial branded finisher feed is presented in Table 2. Crude protein value ranged from 20.88 - 21.11 %, crude fibre (4.76 - 4.97 %), ether extract (4.08 - 4.18 %), calcium (1.90 - 1.92 %), phosphorus (0.78 - 0.81 %) and energy (3200.2 - 3216.5 kcal/kg). Crude protein range observed in both the starter and finisher commercial feed in this study was similar to the results of a study by Doma et al. (2001); Hussain et al. (2006) who discovered that the crude protein of locally compounded feed in Bangladesh contained 22.70 - 23.00 % for starter mash and 20.0 - 21.00 % (finisher mash). The crude protein (3.12 - 3.36 %) in starter diet was higher than those presented by Loar and Corzo (2011) who found that formulated pallet feed for broilers contained 2.71 - 3.10 %. Ether extract, calcium and phosphorus range observed in this study were similar to those reported by Sanusi et al. (2015) who compared self-formulated feed with commercial feed. Energy level of 3006.1 - 3100.5 kcal/kg and 3200.2 - 3216.5 kcal/kg in the starter and finisher diet were within the range reported by

Uchegbu et al. (2009) who did a comparative analysis on three commercial-feed. However, all values observed in this study were within the recommended range by NRC (1994) for birds.

Growth performance of broiler chickens fed different branded commercial feed is presented in Table 3. Average daily weight gain, average daily feed consumption and feed conversion ratio in both starter and finisher phase were not influenced ( $p>0.05$ ). Average daily weight gain range and average daily feed consumption (starter phase) range 56.04 – 56.96 g/b and 70.78 – 71.34 g/b respectively was similar to the results of Dairo et al. (2010) who found out that broilers fed varying levels of protein and energy levels had average daily body weight (50.00 – 58.03 g/b) and average daily feed consumption (75.00 – 72.00 g/b). Similarly, in the finisher phase, feed consumption and body weight gain range 3520.8 – 3559.1 g/b and 1708.7 – 1740.7 g/b was similar to the results of a study by Aftab and Jiang (2006) when high and lower energy and protein were fed high and low protein levels. The result on average daily weight gain among the group suggests that the commercial feeds (A-D) were rich in all available nutrients necessary for the growth of birds. This result is in agreement with the reports of Dairo et al. (2010). The feed conversion ratio observed in this study were similar to those observed by Akinmoladun et al (2015) who found that the feed conversion ratio of broiler chickens fed a diet consisting of 23.0 % crude protein ranged from 1.90 – 2.17. This result is also similar to the results obtained by Aletor et al. (2000) who showed that low protein amino acid- supplemented in broiler chickens produced a feed conversion ratio which ranged from 1.71 – 2.11.

Table 1. Proximate Composition of Different Branded Commercial Starter Feed Assigned to Each Treatment

Constituents (%)	Diet A	Diet B	Diet C	Diet D
Crude protein	23.04	22.86	23.05	22.90
Crude fibre	3.33	3.12	3.14	3.36
Ether extract	4.02	3.95	3.98	4.00
Calcium	1.78	1.81	1.80	1.79
Phosphorus	0.71	0.73	0.71	0.72
Energy (Kcal/kg)	3009.1	3100.5	3010.3	3006.1

Table 2. Proximate Composition of Different Branded Commercial Finisher Feed Assigned to Each Treatment

Constituents (%)	Diet A	Diet B	Diet C	Diet D
Crude protein	20.88	20.91	21.11	21.03
Crude fibre	4.97	4.84	4.80	4.76
Ether extract	4.10	4.08	4.13	4.18
Calcium	1.90	1.91	1.90	1.92
Phosphorus	0.81	0.80	0.79	0.78
Energy (Kcal/kg)	3200.2	3201.4	3216.5	3205.2

Table 3. Growth Performance of Broiler Chickens Fed Different Branded Commercial Feed

Parameters	A	B	C	D	SEM
Initial body weight (g/b)	50.40	51.21	50.93	50.11	1.10
Final body weight (g/b)	2408.2	2405.6	2411.2	2400.6	63.11
Body weight gain (g/b)	2357.8	2354.39	2360.27	2350.49	57.73
Average daily weight gain	56.04	56.07	56.20	56.96	0.06
Feed consumption (g/b)	1486.4	1488.3	1491.2	1498.3	23.08
Average daily feed consumption	70.78	70.87	71.00	71.34	0.94
Feed conversion ratio	1.92	1.91	1.91	1.91	0.01
Finisher phase (22 - 42d)					
Body weight gain (g/b)	1740.7	1708.7	1711.6	1715.3	20.80
Average daily weight gain	82.89	81.37	81.50	81.68	0.97
Feed consumption (g/b)	3520.8	3551.1	3558.2	3559.1	71.07
Feed conversion ratio	2.08	2.07	2.07	2.07	0.01

SEM: Standard error of the mean

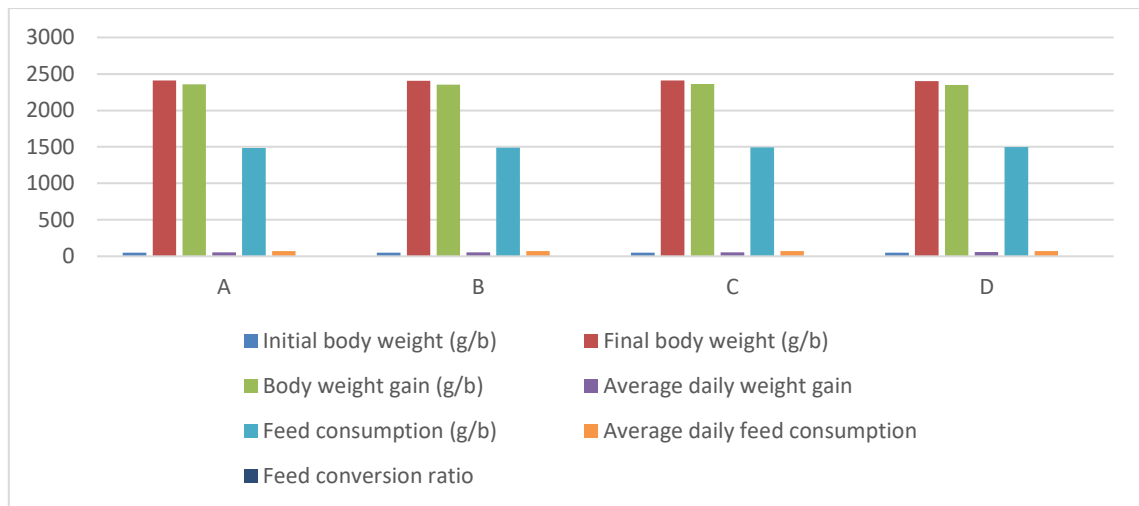


Figure 1. Performance of Broilers Fed Different Commercial Feed (Starter Phase)

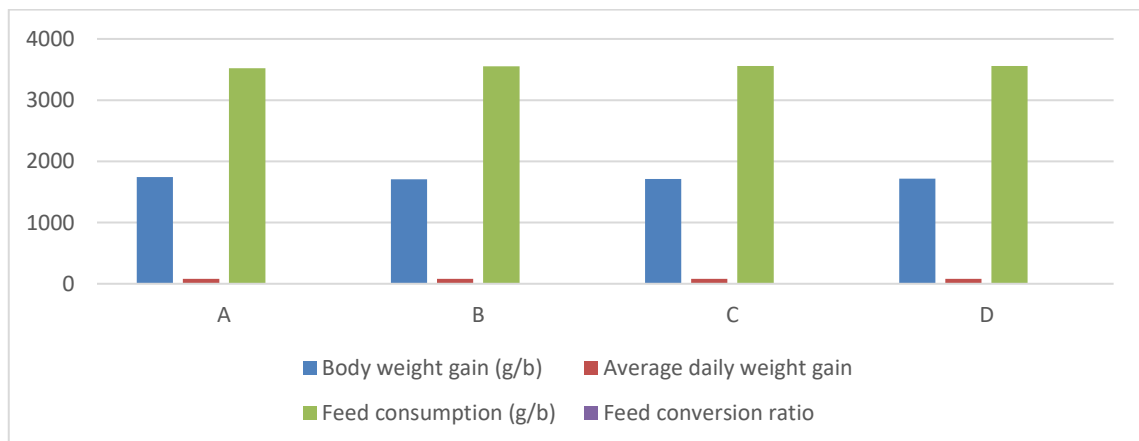


Figure 2. Performance of Broiler Chickens Fed Different Commercial Feeds (Finisher Phase)

## CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the four commercial feeds that was purchased in FCT, Abuja, showed that it contained enough nutrients necessary for the growth of broilers. Proximate analysis of these feeds indicates that their values were within the recommended range for birds according to Nutritional Research Council. These further showed that the quality of feed ingredients were not compromised.

## FURTHER STUDY

This research still has limitations, so it is necessary to conduct further research related to the topic of Comparative Evaluation of Different Commercial Feeds on the Growth Performance of Broiler Chickens in the Federal Capital Territory, Abuja, Nigeria in order to perfect this research and increase insight for readers.

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