# EFFECT OF ON–FARM FORMULATED AND COMMERCIAL DIETS ON THE PERFORMANCE AND CARCASS PRIME CUTS OF BROILER FINISHER CHICKENS

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**Abstract:** A three week experiment was conducted to assess the performance and prime cuts of broiler finisher chickens fed on-farm formulated and two popular commercial feeds marketed in Anyigba town, Kogi State. Five weeks old chicks of mixed sexes were employed for the study. A formulated finisher feeds (A1) and two finisher commercial feeds A2 and A3 were respectively fed to three groups of broilers finisher chickens. Each group was divided into three replicates of ten birds in a completely randomized Design (CRD) experiment. Feed and water were provided ad libitum. Results obtained for the study revealed that there was no significant (P>0.05) difference in terms of final body weight, weight gain and feed to gain ratio. However, A2 had numerically higher final body weight (2600.00 g) and weight gain (1320.00 g). Feed consumption was significantly (P<0.05) higher for A2 (3476.00 g) and A3 (3333.00) than A1 (2729.00). A1 had better feed to gain ratio. All the three test diets yielded no significant (P>0.05) difference in all the carcass prime cuts and organs of the broiler finisher chickens with the exception of the gizzard. The on farm formulated diet gave the highest gizzard value of 34.4 g/kg than 26.70 g/kg for diet A2 and 21.93 g/kg for diet A3. There was no mortality on any of the feeds. It is concluded from this study that the use of on-farm feeds resulted in a profitable enterprise. It is therefore, recommended that poultry farmers should consult expertise in feed formulation so as to benefit from these advantages.

**Keywords:** Broiler finisher chickens, commercial feed, on-farm formulated feed, performance, prime cuts.

## Introduction

The increasing number of people venturing into poultry business and the consequent high demand for commercial feeds has the tendency for feed manufacturers to produce substandard feeds especially as the quality control agencies in Nigeria are less concerned or non-functional. With this development, the farmer, consumer and the public at large are left at the mercy of commercial feed millers, raw feed materials suppliers and processors. This postulation is not an exaggeration considering the fact that feeding poultry alone accounts for not less than 70% of the cost of production (Adebowale *et al*., 1998 and Oyediji, 2001), depending on the region and season of production (Amir *et al*., 2001). This has invariably escalated the prices of poultry products out of the reach of the common man, and a resultant drop in animal protein intake. In order to increase profitability in the poultry industry, there is the need to formulate practical rations that will help in reducing the cost of production and still maintain high level of performance in the birds, (Adebayo *et al*., 2002). The general objective of poultry nutrition is to maximize the economic production performance of birds. Diets are formulated by least cost linear programme to provide the specific levels of nutrients needed for optimum performance. The main production criteria are growth rate, feed conversion ratio, health and body composition (Esonu, 2000). While the poultry farmers aspire to derive the most in terms of animal performance out of the feed and producing at the least possible cost, some feed millers undermine the efforts of the poultry farmers by presenting substandard feeds to unsuspecting farmers (Ogundipe, 1996). The problems associated with analyzing these feeds to find out their true chemical composition are numerous which includes lack of facilitates, cost implications and distance to the few analytical laboratories available. The effect of this is often poor animal performance: delay in the attainment of market weight of broilers, prolonging feeding period of layers before the first set of eggs and a laid and lower than expected levels of egg production (Asaniyan and Laseide, 2005). Many farmers change from one commercial feed to another in search of a better feed (Ogundipe *et al*., 1986) while a good number have decided to be producing their own feeds. As a matter of fact, feed cost as well as the quality of the feeds is among the factors which dictate farmer's preference for commercial or self-compounded feeds (Adebayo *et al*., 2002; Umeh and Odoh, 2002). Many farmers also believe that self made feeds are cheaper than the commercial feeds (Adesehinwa *et al*., 1996; Adebayo *et al*., 2002). It was therefore the objective of this study to compare the growth performance and carcass prime cuts of finisher broilers chickens and to evaluate the cost effectiveness of feeding commercial and on-farm feeds.

## Materials and Methods

### *Experimental location*

The experiment was conducted at the poultry unit of Teaching and Research Farm of the Department of Animal production, Kogi State University Anyigba, Kogi State, Nigeria. Anyigba lies on Latitude $6^{o}.0$ $7^{o}$ 15' and $7^{o}$ 29'N of the equator and longitudes $7^{o}11'$ and $7^{o}32'$E of the Greenwich meridian (Ifatimehin *et al*., 2009).

### *Experimental diets*

Three experimental diets were used for the study. The on-farm containing 20.25% CP for the finisher phase. The feeds were coded as A1 for the on-farm feed and A2 and A3 for commercial feeds and recognized as treatments T1, T2 and T3 respectively. The composition of on-farm feed A1 (T1) is shown in Table 1.

**Table 1: Ingredient Composition of the control diet for finisher broiler chickens**

| Ingredients | Finisher |
|---|---|
| Maize | 63.10 |
| Groundnut Cake | 25.00 |
| Bloodmeal | 4.00 |
| Maize offal | 4.50 |
| Bone Meal | 2.70 |
| Mathionine | 0.20 |
| Salt | 0.25 |
| Premix | 0.25 |
| Total | 100.00 |
| **Calculated analysis** | |
| CP (%) | 20.25 |
| Me (Kcal/kg) | 2976.40 |
| Ca (%) | 1.03 |
| P (%) | 0.77 |
| Meth.(%) | 0.52 |
| Lysine (%) | 1.11 |
| Feed Cost/kg (N) | 64.55 |

Premix contains the following/kg of diet:- vit. A, 100000 iu; vit. $D_3$ 2000 iu; vit. B, 0.75 mg; nicotinic acid 25 mg; Calcium, panthothenate, 12.50 mg; vit. $B_{12}$ 2.5 mg; vit. K, 2.5 mg; vit. E 25 mg; Cobalt 0.4 mg; Biotin, 0.50 mg; Folic acid, 1 mg; Cholin, chloride, 25 mg; Cu, 8.00 mg; Mg-64 mg; Fe, 32 mg; Zn, 4 mg; I, 0.80 mg; Flavomycin, 100 mg; Spiramycin, 5 mg; DL-methionine 50 mg; Se, 0.16 mg;

***Experimental layout and management of birds***

The house was thoroughly cleaned, washed, disinfected and allowed to dry before litter material was introduced. Ninety (90) five weeks old broiler chicks were randomly allocated in three replicates each to the broiler finisher dietary treatments. The finisher experiment lasted from 5-8 weeks feed and water were offered ad – libitum for 56 days.

***Performance Parameters***

***Carcass analysis***

At conclusion of the feeding trial, the birds were starved overnight after which one bird per replicate (3 birds per dietary treatment) was selected and weighted. The birds were sacrificed by severing the jugular vein. The carcasses were allowed to bleed finally for 10 min, scalded in 65$^{o}$C water for 15 seconds, manually de-feathered, eviscerated and washed in chilled (4$^{o}$C) portable water. The carcass was weighted to determine the dressing percentage after removal of head and feet. The weight of carcass cut up parts such as thigh, drumstick, breast and the giblets (heart, liver and gizzard) were also taken. Dressed weight was expressed as percentage of live weight while other parts were expressed in grams per kilogram live weight.

***Gross margin analysis***

This was computed by deducting the cost of feed from total expected revenue.

***Data collection***

The weekly feed intake and weight gain were used to compute the feed conversion efficiency, while the feed cost /kg diet (N) and feed /gain ration were used to compute the feed cost per kg gain (N). Samples of the feed used during the study were subjected to proximate analysis (AOAC, 1995).

***Data analysis***

At the end of the finisher broiler phase, the cumulative weight gain, feed intake, feed cost /kg gain, mortality rate were computed and subjected to analysis of variance (ANOVA). Carcass parameters expressed as g/kg live weight were equally subjected to ANOVA. Differences between means were separated using fisher's least significant difference (LSD).

**Results and Discussion**

***Proximate analysis of experimental diets***

The proximate compositions of the experimental diets are presented on Table 2. The crude protein values for the experimental diets ranged between 17.81-20.88%. The crude fibre values of 3.44-3.96% were recorded. The proximate analysis result shows that the diets were similar and met the recommended nutrient requirement for protein in the broiler finisher diets. The crude protein and crude fibre contents of the finisher diets were observed to be similar with values of 18-20% and 3.00 – 6.00 recommended for finisher broiler chickens by Olomu (2011).

**Table 2: Proximate composition of the finisher experimental Diets**

| Nutrient | Finisher Diets | | |
|---|---|---|---|
| | A1 | A2 | A3 |
| Dry mater | 92.57 | 92.76 | 92.79 |
| Crude Protein | 17.81 | 18.75 | 20.88 |
| Crude Fibre | 3.44 | 3.60 | 3.96 |
| Ether Extract | 5.11 | 4.88 | 4.79 |
| Ash | 5.56 | 5.03 | 9.35 |

***Broiler finisher experiment***

The growth performance for the broiler finisher chickens fed on-farm and two commercial diets is shown in Table 3. Values of growth performance on the three diets were not statistically different. Birds fed the two commercial diets however had body weight and weight gain that were numerically superior to birds fed the on-farm feed. Feed consumption was significantly ($P<0.05$) higher for the 2 commercial feeds (A2 and A3) with values of 3476.00 g/bird and 3333.00 g/bird, respectively. The feed to gain ratio were similar among the dietary treatments. The feed cost/kg gain was observed to be statistically ($P < 0.05$) affected by the dietary treatments. The on-farm formulated diet had the least feed cost/kg gain of ₦163.96 as against ₦242.57 and ₦252.40 for commercial diets A2 and A3, respectively. The gross margin for the on-farm feed (A1) was observed to be higher than values for the commercial diets (A2 and A3) thus making the on-farm feed to be more profitable.

**Table 3: Performance of Broilers finisher chickens fed on-Farm and two Commercial diets**

| Parameters | Treatments | | | | |
|---|---|---|---|---|---|
| | A1 | A2 | A3 | SEM | LOS |
| Initial Body Weight (g) | 1263.30 | 1280.00 | 1303.30 | 52.28 | NS |
| Final Body Weight (g) | 2350.00 | 2600.00 | 2420.00 | 93.93 | NS |
| Weight Gain (g) | 1086.00 | 1320.00 | 1116.70 | 55.95 | NS |
| Feed Consumed (g) | 2729.00b | 3476.00a | 3333.00a | 139.88 | x |
| Feed /Gain ratio | 2.51 | 2.63 | 2.99 | 01.10 | NS |
| Feed cost/kg gain (N) | 163.96a | 242.57b | 252.40b | 14.84 | xx |
| Gross Margin | 1228.80 | 1240.20 | 1172.10 | 53.66. | NS |
| Mortality (%) | - | - | - | | |

a,b=Means with different superscript on the same raw differ significantly ($P<0.05$); NS=Not significant ($P>0.05$); Sem=Standard Error of Mean; LOS=Level of Significance; X=Significant at $P<0.05$; XX=Significant at $P<0.01$

The similarity of performance in final body weight, weight gain and feed to gain ratio during the finishing phase is a reflection of the fact that older birds tend to perform well on feeds that do not have very wide variation in nutrient or energy levels. This conforms to the report of Steve (2000), who observed that a range of energy levels can be used for broiler without affecting growth rate. It also agreed with the findings of Afolayan *et al.* (2009) who reported that broiler finisher can perform well on diets with wide range of nutrients. Although, diet A2 had weight gain that is numerically higher than A1, the final body weight achieved in A1 (2350.00 g) agreed with the growth rate (2155.00 g) of broiler in Nigeria at 8 weeks (Dafwang, 2006). The reason could be that the on-farm feed contained fresh nutrients than the commercial diets. It is expected that the on-farm feed contain unaltered nutrients particularly vitamins and Amino-acids as against commercial feeds whose nutrients (vitamins and Amino-acids) must have deteriorated due to long period of storage before reaching the end users, the poultry farmers. The feed cost/kg and feed cost 1kg gain was by far lower in the on-farm feeds (P<0.01). Higher gross margin was squally obtained for on-farm diet (A1). This is of great advantage because feed cost/kg gain is the determinant of how much profit accrues to the farmer after harvest and sales. Also reduction in feed cost/kg in this study and mixing feed at the farm level can lower feed cost and by extension decrease the cost of producing finisher broiler chickens.

**Table 4: Carcass characteristics of broiler finisher fed on farm and two commercial diets**

| Parameters | Treatments | | | | |
|---|---|---|---|---|---|
| | A1 | A2 | A3 | SEM | LOS |
| Live Weight (kg) | 2.13 | 2.53 | 2.37 | 0.08 | NS |
| Carcass Weight (kg) | 1.50 | 1.87 | 1.63 | 0.07 | NS |
| Dressing Percentage (%) | 7.03 | 73.7 | 68.90 | 0.96 | NS |
| Breast (g/kg) | 163.27 | 213.13 | 169.17 | 10.31 | NS |
| Thigh (g/kg) | 140.17 | 116.37 | 108.83 | 6.12 | NS |
| Drumstick (g/kg) | 98.10 | 100.00 | 105.50 | 2.66 | NS |
| Liver (g/kg) | 23.47 | 21.60 | 21.67 | 0.86 | NS |
| Heart (g/kg) | 11.77 | 10.20 | 10.70 | 0.40 | NS |
| Gizzard (g/kg) | 34.40a | 26.70ab | 21.93b | 2.22 | x |

a,b=Means with different superscript on the same row differ significantly (P<0.05); NS=Not Significant (P>0.05); SEM=Standard Error of Mean; LOS=Level of Significance; X=Significant at P< 0.05

***Carcass characteristics of broiler fed the experimental diets***

All the carcass, organ and muscle characteristics measured are shown in Table 4. Live weight, carcass weight, dressing percentage, breast, thigh, drumstick, liver and heart were not affected (P>0.05) by the dietary treatments. This suggests that the on-farm and commercial diets promoted similar carcass characteristics. Thus, identical carcass and muscle developments are attainable by feeding the diets but the gizzard of the birds fed on farm feed was significantly (P<0.05) higher than the one fed commercial diets.

**Conclusion**

Although birds fed commercial feeds in this experiment performed better than those fed the on-farm feed in terms of body weight and weight gain, the use of the on- farm feeds did not yield adverse result on broiler finisher. The on-farm feed resulted in a more profitable enterprise. It is therefore recommended that poultry farmers especially those operating on small scale adopt the idea of compounding their feed on-farm so as to minimize the cost of producing broiler finisher and also increasing their profit margin.

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