Comparative Evaluation of Three Commercial feeds on the performance of Broilers

Martin Chukwuma Uchegbu., Nkiruka Maureen Irechukwu, Apeh Akwu Omede., Chibuzo Hope Nwaodu., George Akalefu Anyanwu., Ifeanyi Charles Okoli and Adive Boniface Ikeli Udedibie

Department of Animal Science and Technology, PMB 1526
Federal University of Technology, Owerri,
Imo State, Nigeria.
jabulaniapeh@yahoo.com; muchim2002@yahoo.com

Abstract: An 8-week study was carried out to compare the quality of three commercial feeds in order to ascertain the extent to which they meet the nutritional requirements of broilers. One hundred and twenty (120) Hybro broilers were raised for one week on the same brand of commercial starter feed. A formulated Starter and Finisher control feeds (CF) and commercial VF, GF and NF feeds were respectively fed to four groups of broilers, each divided into three (3) replicates of ten birds in a Completely Randomized Design (CRD) experiment. Feed and water were provided *ad-libitum.* The result obtained indicated that CF, VF and NF performed better than GF in terms of daily weight gain, both in the starter and finisher phases. However, birds on CF achieved highest daily weight gain in the starter phase but lower values than birds on VF and NF in the finisher phase. VF and NF indicated a better balance in nutrients than GF among the commercial feeds. Feed conversion ratio was similar ($p>0.05$) in the starter phase for all the treatment groups but birds on GF recorded the highest FCR in the finisher phase. However, VF was the cheapest in terms of feed cost/kg meat produced, amounting to ₦118.60 and ₦160.38 for starter and finisher respectively, when compared to the other commercial feeds and the control diet. The varied performance of the birds on the different commercial feeds is an evidence of variability in nutrient composition of the commercial feeds; and this is an important factor to be considered by farmers in the choice of feeds for broiler production. [Report and Opinion. 2009;1(4):84-89]. (ISSN: 1553-9873).

Key words: broilers, commercial feeds, feed cost, nutrient value, performance.

1. Introduction

The general objective of poultry nutrition is to maximize the economic production performance of birds. Diets are formulated to provide specific level of nutrients that are needed for optimum performance. The main production criteria looked into are feed conversion ratio, growth rate, health of the birds and their body conformation. The major determinants of these are the energy, protein and amino acids contents of the diets. For broilers, diets of high energy content promote fast growth, and therefore their metabolizable energy (ME) contents should generally not be less than 12.2MJ/kg (Whitehead,2002).

Oyediji (2001) reported that feed accounts for not less than 70% of the cost of production in livestock enterprises. Therefore there is the need to focus on efficient feed utilization, in order to maximize profits and avoid losses.

Given the increasing number of people venturing into poultry business, there is no doubt, that there is a high demand for commercial feeds. There is now the tendency for feed manufacturers to produce substandard feeds, especially as the quality control agencies in Nigeria are non-existent or non-functional (Okoli *et al.,* 2007; Omede, 2008., Okoli, et al., 2009). It appears that the farmer, consumer and the public at large are left at the mercy of commercial feed millers and feed raw materials producers and processors.

Ordinarily, it appears that most poultry feeds are similar in composition and as such will meet the nutrient requirements of the birds to which they are fed. However, the feeds offered to birds are varied mixtures of ingredients, and considering the tendency of feed producers to maximize profit, there might be differences in the quality of the manufactured feeds sold in the market. It is important therefore, to ensure that quality compound feeds with appropriate nutritional values capable of achieving efficient production performance are patronized by the farmers.

The objective of this study therefore is to compare the performance of broilers fed different commercial feeds coded VF, GF, and NF and to evaluate the economic implication of using these feeds.

2. Materials and Methods

Experimental Materials and Diets

The feeds used for this experiment were different commercial broiler feeds produced by different feed manufacturing companies in Nigeria, bought from their various distributors in Owerri, Imo State, Nigeria. Treatment 1 (T_1) was the formulated control feed (CF) while treatments 2, 3 and 4 were commercial feeds

manufactured in Nigeria coded VF, GF and NF, respectively. The composition of the feeds are given in Tables 1,2 and 3.

Experimental Birds

One-Hundred and twenty (120) Hybro broiler chicks bought at day old from Owerri were fed on a commercial broiler starter feed for a period of one week before the commencement of the experiment. The birds were randomly divided into 4 treatment groups, each group was further divided into 3 replicates of 10 birds each. The four groups were randomly assigned to the experimental diets in a completely randomized design (CRD) experiment. Starter diets were fed for the first 4 weeks after which finisher diets were fed for another 4 weeks.

The birds were housed in a deep litter system and subjected to the same experimental and management conditions. Water and feed were provided *ad-libitum*. The experiment lasted for 8 weeks. (4 weeks each for starter and finisher phases).

Data Collection and Statistical Analysis

Data were collected on initial body weight and final body weights, weight gain and feed intake. Data on feed intake and weight gain were used to calculate feed conversion ratio (FCR).Feed cost/kg and feed cost/kg weight gain were calculated based on the prevailing market prices of the feed ingredients and the commercial feeds.

Data collected were subjected to analysis of variance (ANOVA) and the difference among means were compared using Duncan's New Multiple Range Test (Steel and Torrie, 1980)

3. Results and Discussion

Chemical composition of experimental diets

The chemical composition of the experimental diets is presented in Table 1.

The metabolizable energy values of the starter diets VF and GF ranged from 2700- 2800 Kcal/kg for starter broilers and 2850-2900Kcal/kg for finisher broilers. The crude protein values for all the commercial feeds ranged from 18.50-21.00% for starter diets and 18-19% for finisher diets. The crude fibre values of 4.40-5.55 % for starter broilers and 5-5.55 % for finisher broilers were recorded for the commercial feeds. There is a slight difference between some of this declared nutrient values and the recommended nutrient requirement. According to Obioha (1992), the recommended ME,CP and CF values for starter broilers are respectively 2850 Kcal/kg, 22%, 5%, and 2900 Kcal/kg, 20%, 5.5% respectively, for finisher broilers. Aduku (2005) reported 2800Kcal/kg ME and 3000Kcal/kg ME requirement for starter and finisher broilers, respectively.

The general nutrients recommended for broiler starter are 2800-3000 Kcal/kg ME, 22-24 % CP and ≤ 5% CF; for finisher broilers it is 2800-3000 Kcal/kg ME, 19-21% CP and ≤ 5% CF. It can be seen that the ME value (2700 Kcal/kg) of GF is below the recommended level (2800-3000 Kcal/kg) and its crude protein (21%) slightly below the recommended level (22-24% CP).The crude fibre (4.40%) of GF is within the recommended value (≤ 5%). But for the slight drop in CP (21%) from the recommended value, Vital feed had a ME value (2800Kcal/kg) that met the recommended ME value (2800-3000Kcal/kg).The crude protein value (18.50%) of NF is quite lower than the recommended value (22-24%) for starter broilers. The ME value for NF was not reported. Apart from NF with 18% CP, crude protein values of other diets met the recommended values (18-21%).The energy values of GF (2850Kcal/kg) and VF (2900Kcak/kg) met the recommended level (2800-3000Kcal/kg). NF had no ME value indicated on its label for finisher broilers.

Performance of Experimental birds

Data on the performance of the experimental birds are shown in Tables 2 and 3.

Feed Intake of Starter/Finisher Broilers

In the starter phase, feed intake of birds on diet VF, although lowest numerically, was similar ($p > 0.05$) to those on diets GF and NF, but significantly ($p < 0.05$) lower than those on the control feed. In the finisher phase, birds on diet VF also recorded the lowest feed intake which however was similar ($p>0.05$) to those on diet CF and GF. Birds on diet NF consumed significantly ($p < 0.05$) more feeds than those on other treatments. The low feed intake of birds on VF relative to those on GF and NF might have resulted from the higher ME value of diet VF, as birds eat to satisfy their energy requirement (Leeson and Caston, 1993). It has also been reported that birds overeat under moderate protein insufficiency, which is not necessarily a craving for protein per se, but a compensatory increase in feed intake in response to the deficient essential nutrients (Lipstein and Bronstein, 1975).

Growth rate of Starter/Finisher Broilers

The growth rate of VF, GF and NF starter birds were similar ($p>0.05$) and significantly ($p<0.05$) lower than those on the control (CF).

The lower performance of the broilers observed at the starter phase with commercial feed (VF, GF and NF) could be a reflection of the stringent requirement for essential nutrients (Protein and energy at this stage of life). It has been reported that birds on high fibre diets are unable to completely satisfy their energy and protein intake due to limitation imposed by the fibre in the diet(Hocking, 2006,Newcombe and Summers, 1985).

At the finisher phase, there was a general improvement in the growth rate of the birds placed on the commercial feeds. Birds on VF, NF and CF had significantly ($p<0.05$) higher growth rate than those on GF. This implies that but for GF; all the other feeds (CF, VF and NF) met the nutrient requirement of the birds.

Feed Conversion Ratio for Starter/Finisher Broilers

At the starter phase, the feed conversion ratio of birds on CF, VF and NF were similar ($p>0.05$) and significantly ($p<0.05$) lower than those on GF. At the finisher phase, birds on CF, VF and NF also recorded similar ($p>0.05$) and significantly lower FCR than those on GF. This implies that among the commercial feeds, VF and NF are better utilized than GF. This may have resulted from the likelihood that the manufacturers of VF and NF used better and utilizable feed raw materials for compounding their feeds.

Mortality

There was no mortality in the CF, but one mortality each was recorded for the other treatments at the starter phase. There was no record of mortality at the finisher phase.

Feed cost

The result shows that in the starter phase, the cheapest commercial feed was VF (N 54.40/kg feed). NF recorded the highest feed cost (N 58.00/kg feed) for starter feeds. For the finisher diets, CF was the cheapest (N 52.22/kg feed) while NF had the highest feed cost (N 56.00/kg feed). In terms of cost of feed per kg broiler meat produced, VF achieved the least cost (N 118.60) .GF recorded the highest cost (N 165.80) for the broiler starter diets. In the finisher diets, VF achieved the least cost (N 160.38/kg broiler). GF also recorded the highest cost (N 322.38/kg broiler). From the economic point of view, it seems that GF would increase production cost for the poultry meat producer considering that already feeding is known to take up to 70% production cost in livestock production.

Table 1: Gross Composition of experimental diets

Ingredients	Broiler Starter diets (%)				Broiler Finisher diets (%)			
	CF	VF	GF	NF	CF	VF	GF	NF
Maize	60.00	N/S	N/S	N/S	60.00	N/S	N/S	N/S
Soybean	24.00	N/S	N/S	N/S	16.00	N/S	N/S	N/S
Palm kernel cake	2.00	N/S	N/S	N/S	4.00	N/S	N/S	N/S
Wheat offal	3.00	N/S	N/S	N/S	10.00	N/S	N/S	N/S
Fishmeal	4.00	N/S	N/S	N/S	3.00	N/S	N/S	N/S
Blood meal	3.00	N/S	N/S	N/S	3.00	N/S	N/S	N/S
Bone meal	2.00	N/S	N/S	N/S	2.00	N/S	N/S	N/S
Oyster shell	1.00	N/S	N/S	N/S	1.00	N/S	N/S	N/S
L-Lysine	0.25	N/S	N/S	N/S	0.25	N/S	N/S	N/S
L-Methioinine	0.25	N/S	N/S	N/S	0.25	N/S	N/S	N/S
Vit/Min premix	0.25	N/S	N/S	N/S	0.25	N/S	N/S	N/S
Salt	0.25	N/S	N/S	N/S	0.25	N/S	N/S	N/S
Total	100	N/S	N/S	N/S	0.25	N/S	N/S	N/S
Nutrient Composition of Experimental diets (%)								
ME(Kcal/kg)	2932.31	2800.00	2700.00	N/S	2887.01	2900.00	2850.00	N/S
ME (MJ/kg)	12.27	11.72	11.30	N/S	12.08	12.13	11.92	N/S
Crude Protein	21.59	21.00	21.00	18.50	20.48	19.00	19.00	18.00
Crude Fibre	3.80	5.00	4.40	5.50	4.24	5.40	5.00	5.55
Ether Extract	3.86	8.50	7.00	N/S	4.12	8.60	5.00	1.00
Calcium	-	1.20	1.00	1.00	-	1.20	1.10	-
Phosphorus	-	0.45	0.65	N/S	-	0.41	0.60	-

N.B. Nutrient composition for CF is based on calculated values while those of the commercial feeds (VF, GF and

NF) are based on values declared by manufacturers on their feed labels. N/S = Not stated.

Table 2: Performance of Starter Broilers fed different Commercial Diets

Parameters	CF	VF	GF	NF	SEM
Initial body wt(g)	125.00[b]	135.00[ab]	145.00[a]	129.00[b]	4.36
Final body wt (g)	1279.00[a]	807.78[b]	807.50[b]	874.40[b]	113.57
Daily wt gain (g/day)	41.21[a]	24.02[b]	23.66[b]	26.62[b]	4.17
Daily feed intake (g/day)	89.00[a]	52.47[b]	69.20[ab]	68.20[ab]	7.50
Feed conversion Ratio (g feed/g gain)	2.16[b]	2.18[b]	2.92	2.56[ab]	0.18
Mortality (No)	--	1	1	1	
Feed cost (₦/kg)	55.00	54.40	56.80	58.00	
Feed cost/kg wt. gain (₦)	118.80	118.60	165.86	148.48	

[ab] Means within a row with different superscript are significantly ($p<0.05$) different.

Table 3: Performance of Finisher Broilers fed differently Commercial Diets

Parameters	CF	VF	GF	NF	SEM
Initial body wt(g)	1279.00[a]	807.78[ab]	807.50[b]	874.40[b]	113.57
Final body wt (g)	2510.42[a]	2381.38[a]	1649.72[b]	2412.50[a]	198.52
Daily wt gain (g/day)	43.97[ab]	56.20[a]	30.10[b]	54.93[a]	6.07
Daily feed intake (g/day)	165.50[b]	166.90[b]	179.70[ab]	199.00[a]	7.53
Feed conversion Ratio (g feed/g gain)	3.81[b]	2.97[b]	5.97[a]	3.62[b]	0.66
Mortality (No)	2	1	1	1	
Feed cost (₦/kg)	52.22	54.00	54.00	56.00	
Feed cost/kg wt. gain (₦)	198.96	160.38	322.38	202.72	

[ab] Means within a row with different superscript are significantly ($p<0.05$) different.

4. Conclusion

GF seems to be the poorest from results obtained in this study especially in terms of weight gain and feed utilization. VF was the cheapest of the three commercial feeds while GF is the costliest in terms of the cost of feed used to produce 1kg of broiler meat. The farmer, who depends on commercial feeds and who wants his birds to reach market weight at the shortest possible time should consider VF and NF feeds. However, the only possible explanation to significantly poor performance of commercial diets in comparison to the control diet could be that feed manufacturers are only interested in profit maximization than meeting the needed requirements for their products. Variability in the nutrient contents of commercial feeds appeared to be an important factor that resulted to performance differences observed in this study.

Correspondence to:
1. Martin C. Uchegbu,
Department of Animal Science and Technology,
Federal University of Technology,
PMB 1526,
Owerri, Imo State,
Nigeria.
Cellular phone: +2348034647316
Email: muchim2002@yahoo.com,

2. Apeh A. Omede
Department of Animal Science and Technology,
Federal University of Technology,
PMB 1526,
Owerri, Imo State,
Nigeria.
Cellular phone: +2348038903899;
Email: jabulaniapeh@yahoo.com

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