COMPARATIVE PERFORMANCE OF BROILER CHICKENS FED COMMERCIAL AND ON-FARM FORMULATED DIETS

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ABSTRACT
An 8-week study was carried out to compare the performance and cost implication of broilers fed on-farm formulated (A1) and two commercial (A2 and A3) feeds marketed in Anyigba, Kogi State. Ninety (90) one-day-old chicks were procured and raised for one week on the on-farm starter diets. Thereafter, the birds were assigned to the three experimental diets (A1, A2 and A3) in a Completely Randomized Design arrangement for 3 weeks. Each treatment group comprised of 30 birds and 3 replicates. After 3 weeks, the birds were pooled together and fed formulated finisher diet for one week before being assigned to broiler finisher diets (A1 A2 and A3) in similar arrangement as during the starter phase. For starter phase, body weight and weight gain were significantly (P<0.01) higher with commercial feeds (A2 and A3) and so was feed intake (P<0.05). On-farm feed (A1) provided comparable feed/gain ratio with A3 but better (P<0.01) than A2. Feed cost/kg gain was significantly (P<0.01) better with on-farm feed. For finishers, body weight, weight gain and feed/gain ratio of birds were similar (P>0.01). However, on-farm feed resulted in numerically better feed/gain ratio and significantly (P<0.01) better feed cost/kg gain. Feed consumption of birds on A2 and A3 were higher (P<0.05) than A1. Gross margin was similar but birds on A1 had numerically higher gross margin. On-farm feed was relatively cheaper and resulted in a more profitable enterprise. It is recommended that poultry farmers should consult experts in feed formulation so as to benefit from these advantages.
Keywords: Broiler chicks, commercial feed, on-farm feed, performance

INTRODUCTION
Given the increasing number of people venturing into poultry business, and consequently the high demand for commercial feeds, there is increasing tendency for feed manufacturers to produce substandard feed. This may be so, as the quality control agencies in Nigeria are either less concerned or non-functional, it appears the farmer, consumer and the public at large are left at the mercy of commercial feed millers and feed raw materials suppliers and processors.

Feed accounts for at least 70% of the cost of production of poultry (Adebowale *et al.*, 1998 and Oyediji, 2001), depending on the region and season of production (Amir *et al.*, 2001). Invariably, this has escalated the price of poultry products beyond the reach of most people, and resulting in a drop in animal protein intake. In order to reduce production cost and also increase profitability in the poultry industry, there is the need to formulate practical rations that will still enhance high level performance in terms of growth rate, feed conversion, body composition, health (Adebayo *et al.*, 2002; Esonu, 2000) and livability. As a matter of fact, feed cost and feed quality are among the factors that dictate farmers' preference for commercial or self-compounded feeds (Adebayo *et al.*, 2002). The objective of this study was to compare the growth performance of broilers fed commercial and on-farm feed, and evaluate the cost effectiveness of feeding commercial and on farm feeds.

MATERIALS AND METHODS
Experimental location
The experiment was conducted in the Poultry Unit of the Teaching and Research Farm, Kogi State University, Anyigba. (Latitude 6º 15' and 7º 29' N and Longitude 7º 32' E) (Ifatimehin *et al.*, 2009).

Experimental diets
One on-farm feed each, was compounded for the starter and finisher phases, and coded A1 (Table 1). While two commercial feed brands, coded A2 and A3 (Table 1), were also procured during each of the phases. The treatments were A1, A2 and A3 in both the starter and finisher phases.

Experimental layout, birds and management
A total of ninety, one-day-old broiler chicks were purchased and used for the feeding trials. The birds were fed the control diet (on-farm feed) for one week. At one week old, the birds were randomly allocated to the three experimental diets in a Completely Randomized Design. Each treatment had 30 birds and 3 replicates. The birds were raised according to standard management procedures. After three weeks, the birds were pooled together and fed on-farm finisher diet for one week. At 5–weeks old,

the birds were again randomly assigned to the three experimental finisher diets for three weeks.

Data collection.

Samples of diets were subjected to proximate analysis (AOAC, 1995). Birds were weighed at the beginning of the starter and finisher phases, and weekly thereafter, and at the end of the starter and finisher phases. Performance indices computed were feed intake (consumption), weight gain and feed / gain ratio. At the end of the feeding trial the birds were starved overnight, after which; one bird per replicate was selected, weighed and sacrificed by severing the jugular vein for carcass evaluation. The parameters computed were dressing percentage (after de-feathering, evisceration, removal of the head and leg). Carcass cuts include thigh, drumstick, breast and the giblets (heart, liver and gizzard). Dressed weight was expressed as percentage of the live weight while other parts were expressed in grams per kilogram live weight. Economic indices that were computed were feed cost/kg, feed cost/kg, feed cost/kg gain (₦) and gross margin (₦).

Data analysis.

Data collected were subjected to One-Way Analysis of Variance (ANOVA). Means that were significantly different were separated using Fisher's Least Significant Difference (LSD) as outlined by Steel and Torrie (1980).

Results and Discussion

Table 2 shows the proximate composition of the experimental diets. Crude protein (CP) values of the broiler starter experimental diets were similar and ranged from 23.69 – 24.08%. However, in the finisher phase, CP values were not similar, and ranged from 17-81-20.88%. Crude fibre values of 3.51-4.76 and 3.44-3.96% were observed for the broiler starter and broiler finisher diets respectively. Proximate analysis result shows that all the diets (except finisher diets A1 and A2), met the recommended nutrients requirement of broiler (NRC, 1984). The observed CP values, especially for the broiler finisher diets are contrary to the report of Teguia and Beynen (2004) that protein values of calculated analysis were lower than proximate values. The performance of broilers fed the starter diets is presented in Table 3. Commercial feeds resulted in higher ($P<0.01$) body weight, weight gain and feed intake that on-farm feed. Feed intake may have been higher with the commercial feeds they were more palatable and acceptable to the birds or the birds consumed more to be able to satisfy their nutrient requirement. On–farm feed resulted in lower but better ($P<0.01$) feed cost/kg gain, and feed/gain ratio comparable with commercial feed A3 but better ($P<0.01$) than A2. The better performance observed for birds fed commercial feeds may be attributed to inclusion of other performance enhancers for which information was not provided by

Table 1: Composition of control diet (on-farm) (on as fed basis)

Ingredients (%)	Starter	Finisher
Maize	55.00	63.10
Groundnut cake	30.00	25.00
Blood meal	6.00	4.00
Maize offal	3.00	4.50
Bone meal	3.30	2.70
Palm oil	2.00	0.00
Methionine	0.20	0.20
Common salt	0.25	0.25
Premix	0.25	0.25
Total	100.00	100.00
Calculated Analysis		
% Crude protein	23.10	20.25
Energy (Kcal/KgME)	2989.00	2976.40
Ca%	0.25	0.30
P%	0.87	0.77
Methionine%	0.55	0.52
Lysine%	1.35	1.11

Table 2: Proximate composition of the experimental diets

	Starter			Finisher		
Nutrient (%)	A1	A2	A3	A1	A2	A3
Dry matter	91.92	93.93	92.58	92.57	92.76	92.79
Crude protein	23.88	24.08	23.69	17.81	18.75	20.88
Crude fibre	4.76	4.06	3.51	3.44	3.60	3.96
Ether extract	6.15	5.96	6.03	5.11	4.88	4.79
Ash	6.42	6.80	5.71	5.56	5.30	9.35
Nitrogen free extract	58.97	59.10	61.06	68.08	67.74	61.02

Table 3: Performance of starter broilers fed on-farm and commercial diets

Treatments	A1	A2	A3	SEM	LOS
Initial body weight (g)	96.70	100.00	96.70	2.22	NS
Final body weight (g)	726.70	890.00[a]	933.30[a]	24.08	* *
Weight gain (g)	630.00[b]	970.00[a]	836.67[a]	33.37	* *
Feed consumed (g)	1020.00[b]	1431.00[a]	1345.00[a]	68.17	* *
Feed gain ratio	1.62 [a]	1.81[b]	1.61[a]	0.04	* *
Feed cost/kg gain (₦)	112.61[a]	166.52[c]	134.96[b]	8.05	* *

abc = Means with different superscripts on the same row differ significantly (P<0.01)
NS = Not significant (P>0.01)
SEM = Standard error of mean
LOS = Level of significance
* = Significant at P<0.01

Table 4: Performance of finisher broilers fed on-farm and commercial diets

Treatments	A 1	A2	A3	SEM	LOS
Initial body weight (g)	1263.30	1280.00	1303.30	52.28	NS
Final body weight (g)	2350.00	2600.00.0	2420.00	93.93	NS
Weight gain (g)	1086.00	1320.00	1116.70	55.95	NS
Feed consumed (g)	2729.00[b]	3476.00[a]	3333.08[a]	139.88	NS
Feed/gain ratio	2.54	2.64	3.02	1.10	NS
Feed cost/kg gain (₦)	163.96[a]	242.57[b]	252.40[b]	14.84	* *
Gross margin (₦)	1240.20	1228.80	1172.10	53.66	NS
Mortality %	-	-	-	-	

ab = Means with different superscripts on the same row differ significantly (P<0.01)
NS = Not significant (P<0.01)
SEM = Standard error of mean
LOS = Level of significance
* * = Significant at P<0.01

Table 5: Carcass characteristics of broiler fed experimental diets

Parameters	A1	A2	A3	SEM	LOS
Live weight (g)	2.13	2.53	2.37	0.08	NS
Carcass weight (g)	1.50	1.87	1.68	0.07	NS
Dressing percentage %	70.30	73.70	68.90	0.96	NS
Breast (g/kg)	163.27	213.13	169.17	0.31	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	34.40[a]	26.70[ab]	21.93[b]	2.22	*

ab = 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
* = Significant at P<0.05

the manufacturers. Abeke *et al.* (2008) earlier reported that the current trend in feed manufacturing involves the use of bio-acids, enzymes, coccidiostats, toxin binders and anti-oxidants among others to enhance better nutrient utilization and therefore promote better performance of birds. The relative lower cost per kg and feed cost/kg gain observed in respect of on-farm feed agreed with the report of Adebayo *et al.* (2002) and Adeshinwa *et al.* (1998).

Table 4 summarizes the growth performance of birds fed the experimental broiler finisher diets. Growth performance of birds on the three diets were statistically similar (P>0.01) but the two commercial diets produced birds with numerically higher body weight and weight gain. However, birds fed on-farm feed attained more than the optimum 2155g body weight at 8 weeks (Dafwang, 2006). Birds on the two commercial feed had significantly (P<0.01) higher feed intake than those on the control. Feed/gain ratio was similar (P>0.01) for all the treatments. However, birds fed on-farm diet had numerically better feed/gain ratio and significantly (P<0.01) lower feed cost/kg gain. The appreciable performance of birds fed on-farm feed may be because the feed was fresher than the commercial feeds. It is expected therefore to possess more potent nutrients particularly vitamins and amino acids, as against commercial feeds whose nutrient potency may have deteriorated due to long period of storage before reaching the end users. The observed gross margin values showed that on-farm feed gave higher profits than commercial feeds.

The carcass and organ characteristics of the birds are shown in Table 5. Live weight, carcass weight and dressing percentage were statistically similar (P>0.05). In addition, there were no significant (P>0.05) differences in the weights of the breast, thigh, drumstick, liver and heart. This may suggest that the on – farm and commercial feeds promoted similar carcass characteristics. Thus, identical carcass and muscle developments are attainable by feeding all the diets. However, gizzard weight of the birds fed on-farm feed was significantly (P<0.05) higher than birds fed commercial diets.

CONCLUSION

Although the two commercial feeds used in study resulted in better performance of birds than on-farm feed, in terms of body weight and weight gain, the use of on-farm feed resulted in more profitable enterprise. This was so because the on-farm feed was cheaper and resulted in lower feed cost/kg gain.

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