

COMPARATIVE PERFORMANCE OF BROILER FINISHER CHICKENS FED TWO PROTEIN SOURCES

*ONIMISI, P.A.; DASPAN M.A.; GAJI, Z.M.

Department of Animal Science, Ahmadu Bello University Zaria, *onimisiphil@gmail.com; +234 805 722 8486

ABSTRACT

An experiment was conducted to evaluate the comparative performance of broiler finisher chickens fed soybean cake (SBC) and groundnut cake (GNC) as protein sources. A total of 216 four weeks old broiler chickens were allocated to three dietary treatments in a completely randomized design. Each treatment had four replicate with 18 birds per replicate. Treatment diets were; T1 SBC based diet, T2 (SBC and GNC based diet in a ratio of 50:50) and T3 GNC based diet. Treatment diets and clean water were supplied *ad libitum* for the four weeks of the experiment. Growth parameters taken include; initial weight, final weight, weekly weight gain, weekly feed consumption, while feed to gain ratio, feed cost in ₦/kg and feed cost/kg gain were computed for each treatment. Nutrient digestibility study was carried out at the end of the experiment. Feed consumption decreased significantly ($P<0.05$) from the SBC based to the GNC. Body weight gain was similar for SBC and SBC/GNC diets which were significantly ($P<0.05$) higher than the GNC diet. Feed to gain ratio followed a similar trend. Feed cost in ₦/ kg was significantly lowest for GNC diet (₦62.59) and highest for SBC diet (₦75.30). However, feed cost per Kg gain (₦/Kg gain) was significantly lowest for SBC/GNC diet (₦147.92), and highest for SBC based diet (₦166.62). Percent digestibility of CP differed significantly ($P<0.05$) but digestion was similar ($P>0.05$) for CF, EE, ASH, and NFE. It can therefore be concluded that GNC at 50 % in the diet as protein source significantly decreased cost of production while producing similar weight gain compared to SBC.

Keywords: Soya beans cake, Groundnut cake, Broiler chickens, Growth performance.

INTRODUCTION

Broiler chickens provide most of the world production and consumption of poultry meat. Broiler chickens have been bred especially for rapid growth so that they will on average reach a weight of 2kg at six weeks of age having consumed less than 3kg of food for each kg of life. For a broiler to attain such a body weight, it needs to be given the necessary nutrient in the right proportion according to their requirement (Robert and Thomas, 2004). A major challenge in broiler chicken feeding is the cost and nutrient bioavailability of feedstuffs used to meet the requirements in such a short time. The frequently used feedstuffs are often inadequate and expensive while the nutrients in some feedstuffs that would have been relatively cheaper are sometimes unavailable for the animal, perhaps due to the presence of anti-nutritional factors in feedstuff among other factors. In United States, SBC is used as a protein source for broiler ration because GNC is considered an inferior protein supplement. Outside the United States GNC is widely used as a less expensive source of plant protein in animal ration (Anderson, 1982). GNC is relatively cheaper and can be processed locally and made available in local markets as compared to soybean cake that has complex processing procedures that

has to be done industrially. Groundnut cake and corn based diets are deficient in certain amino acids these deficiencies may be overcome however by supplementing with synthetic amino acids. This work was therefore aimed at evaluating SBC and GNC as protein sources on the performance of broiler finisher chickens. The specific objective is to evaluate growth performance and nutrient digestion of broiler finisher chickens fed SBC and GNC as protein sources in the diet.

MATERIALS AND METHOD

The Study Area

The study was conducted at the livestock unit of the Department of Animal Science, Ahmadu Bello University, Samaru, Zaria, Kaduna state located within latitude 11°9' 45" N and longitude 7° 38' S Zaria in the northern guinea savanna zone of Nigeria, at altitude of 610 above sea level (Ovimaps, 2014).

Experimental birds and Management

Two hundred and sixteen (216) four weeks old Ross broiler chickens were used in a completely randomized design consisting of three dietary treatments and four replicate per treatment. Each treatment had eighteen birds per replicate, reared on a deep litter system. Routine management

practices including vaccination and drug administration where necessary were observed.

Experimental Diet

Three treatment diets were formulated to meet standard nutrient requirements of broiler finisher chickens.

T1: Maize + SBC based diet; T2: Maize + 50 % SBC and 50 % GNC based diet; T3: Maize + GNC based diet. The treatment diets and water were supplied *ad-libitum* for the period of the experiment.

Data Collection

Initial weight and final weight of birds were taken at the beginning and end of the experiment. Feed consumption and weight gain were measured weekly. Feed to gain ratio and feed cost per kg gain were computed for each treatment.

Digestibility Study

At eight weeks of age, two birds representing the average weight were taken from each replicate to digestibility cages for digestibility trial. Each cage was equipped with a feeder and a drinker. Collection trays were placed under each cage for the collection of excreta. Birds were left for five days in order to adapt to the new environment. Total excreta were collected for five consecutive days. Feathers and other foreign particles were carefully removed from the excreta. The excreta collected were then taken for oven drying. The samples were subjected to proximate analysis at the Biochemical Laboratory of Department of Animal Science, Ahmadu Bello University Zaria. The results obtained were used to calculate digestibility values for DM, CP, CF, EE and total ash.

Statistical Analysis

All data collected were subjected to analysis of variance (ANOVA) while different treatment means were separated for significance using Duncan multiple range test, as outlined by SAS (1995).

RESULTS AND DISCUSSION

Growth performance

Table 1 shows the growth performance of broiler finisher chickens fed two protein sources.

Feed Consumption and Feed conversion

Feed consumption was significantly different ($P<0.05$) among the treatments. Chickens fed SBC based diet (T1) had significantly ($P<0.05$) higher feed intake than GNC diet but is comparable to those fed on 50:50 of SBC:GNC. Chickens fed

SBC and SBC/GNC were superior in converting the feed than GNC as sole protein source. The energy and protein content of all the diets were similar but the higher fiber content in GNC may have caused the low feed intake and poor feed conversion among other possible factors.

Final weight and Weight Gain

Final weight and weight gain were similar for SBC and SBC/GNC diets but significantly ($P<0.05$) higher than the sole GNC diet which was the least. This result disagrees with that of Douglas and Harms (1957) who showed that when 50% of the soybean cake was replaced by groundnut cake, a significant reduction in growth rate occurred. The decrease in weight gain as the GNC dietary level increase in the diet may be linked to the better amino acids profile found in SBC than in GNC. Research reports have shown that GNC protein contains large amount of essential amino acids but its nutritive value tends to be limiting by its marginal lysine, tryptophan and threonine. The comparable performance of the SBC and SBC/GNC diets agrees with Adeniji, (2008) who reported that SBC is an excellent source of plant protein, with high nutrient value and balanced amino acid ratio that will argument whatever amino acid deficiencies observed in GNC.

Feed Cost and feed cost per Kilogram gain

The reduce feed cost at higher level of GNC in the diet shows that the higher price of SBC when compared with GNC is a factor that limits farmers in using SBC. For the mixture in the ratio of 50%, it has a cost reducing effect on the finished feed and consequent increases in profitability. The comparable efficiency of feed utilization justified the cost reducing effect of replacing SBC with GNC at 50%.

Nutrient Digestibility

Table 2 shows the digestibility parameters of broiler finisher chickens fed two different proteins source. The digestion of CP was significantly higher and better for SBC and SBC/GNC diets than the GNC. The digestion of all the other nutrients was statistically similar for all the treatments.

Conclusion

Groundnut cake in combination with soybean cake in a ratio of 50:50 can be used in broiler finisher chickens without any adverse effect on growth performance and nutrient digestion, with significantly lower cost of production compared to using only soya beans cake in the diet.

REFERENCES

- Adeniji, A.A (2008). Replacement value of soyabean meal with groundnut cake, with or without fishmeal supplemented in diets of pullet chicks *Journal of applied science research*, 4(10):1249-1252.
- Anderson, J.C. (1982). Peanut processing and product development. World peanut production utilization and research. University of Georgia collage of Agriculture experiment stations Athens Food science consideration.
- Dauglas, C.R., and R.H. Harms (1957). Peanut oil meals as a source of protein in broiler diet. *Poultry science* 38:786-79
- Ovimaps (2014). Ovi location map; ovi earth imagery June 10th 2014.
- Robert, E.T and Thomas, G. F (2004).Scientific farm animal production, an introduction to animal science. Upper saddle river, New Jersey 07458.*Journal of applied poultry research* 5:116.
- SAS (1995).Statistical Analysis System. Institute Inc. Users Guide Statistical Version 6th Ed. Cary North Carolina, U.S.A.

Table 1 Growth performance of broiler finisher chickens fed two protein sources

Parameters	SBC	SBC + GNC	GNC	SEM	LOS
Initial weight(g)	1130.11 ^a	997.61 ^b	631.26 ^c	40.13	*
Final weight(g)	2546.50 ^a	2412.00 ^a	1311.80 ^b	117.86	*
Weight gain(g)	1416.40 ^a	1414.50 ^a	680.60 ^b	84.09	*
Feed consumed(g)	3055.40 ^a	2899.20 ^a	1678.50 ^b	123.59	*
Feed/gain ratio(g)	2.21 ^{ab}	2.06 ^b	2.49 ^a	0.15	*
Feed cost (₦/kg)	75.30 ^a	68.23 ^b	62.59 ^c	0.65	*
Feed cost/gain (₦/kg)	166.62	147.92	156.63	0.96	NS

a, b, c, : means with different superscript within the same row differ significantly (P < 0.05); SEM- Standard error of means; LOS- Level of significance

Table 2 Digestibility Parameters of a broiler Finisher fed two different proteins source

Parameters	SBC	SBC + GNC	GNC	SEM	LOS
Crude Protein %	88.180 ^a	89.040 ^a	80.950 ^b	2.5483	*
Crude fibre %	46.993	54.533	55.718	6.3149	NS
Ether extract %	85.303	86.165	86.118	3.3706	NS
Ash %	75.118	96.058	69.863	3.9035	NS
Nitrogen -free extracts	79.190	96.130	75.473	4.7909	NS

a, b, c, : means with different superscript within the same row differ significantly (P < 0.05); SEM- Standard error of means. LOS- Level of significance