ISSN 1682-8356
ansinet.org/ijps

INTERNATIONAL JOURNAL OF

POULTRY SCIENCE

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

International Journal of Poultry Science 5 (4): 381-384, 2006
ISSN 1682-8356
© Asian Network for Scientific Information, 2006

Replacement Value of Bambaranut *Voandzeia subterranea Sievate* for Soyabean Meal *Glycin max* on the Performance of Finisher Broiler Chicken

B.U. Ekenyem and C.P. Onyeagoro
Department of Animal Science and Fisheries, Imo State University, P.M.B. 2000, Owerri, Nigeria

Abstract: One hundred and sixty 4-week old broiler chicks were used in a 28-day feeding trial in a completely randomized design, to evaluate the performance of finisher broiler chicks fed varying replacement values of Bambaranut sievate (BNS) *Voandzeia subterranea* for soyabean meal (SBM) *Glycin max*. The four dietary treatments were further replicated four times. Treatments having 0%, 5%, 10% and 15% BNS replaced corresponding weights of SBM in the diets. Feed and potable water were supplied *ad libitum* while vaccination and medication were appropriately applied. The initial weight, final weight, weight gain, feed intake, feed conversion ratio, feed cost per kg gain were measured. Results show that birds on 0% and 5% BNS with weights 1.85kg and 1.83kg respectively were significantly ($P<0.05$) heavier than those on 10% and 15% BNS weighing 1.68kg and 1.65kg respectively. This trend was also observed for weight gain where birds on 0% and 5% BNS were superior ($P<0.05$) to those on 10% and 15% levels respectively. However, the initial weight and feed intake were not statistically different ($P>0.05$), feed conversion ratio and feed cost/kg gain were significantly ($P<0.05$) different between their various treatment means. BNS was found to appreciably reduce cost of broiler chick production and could be included up to 15% in chicks diets.

Key words: Bambaranut sievate, soyabean meal, finisher broiler chicks, performance

Introduction

The animal protein intake by most Nigerians and people of developing countries has consistently declined in recent years. This phenomenon is sequel to the declining trend in livestock production occasioned by high cost of feed materials which Agbakoba *et al.* (1995), and Madubuike and Ekenyem (2001), rated at 70-80% of the cost of monogastric animal production. The high cost of feed is blamed on the competition between man and his livestock for the available grains, Tegbe *et al.* (1994); Madubuike, (1992), resulting from inadequate production of farm crops to meet human and livestock needs (Babatunde *et al.*, 1990).

Consequently, Esonu *et al.* (2001) stated that more than 50% of Nigeria's poultry farms have closed down and another 30% forced to reduce their production capacity. Ekenyem *et al.* (1999), had advocated cheaper feed ingredients to reduce the production cost and make the product affordable for the people while Esonu *et al.*, (2003) have called for cheaper and readily available sources of animal protein.

This trial seeks to evaluate the replacement value of Bambaranut *Voandzeia subterranea sievate* (BNS) for soyabean meal in finisher broiler chick diets with a view to reducing production cost, thereby making poultry products affordable for consumers. However, like most other pulses, the bambaranut contains some anti-nutritional factors and which Ensiminger *et al.* (1990) listed as Cyanogens, flatulence factors, Tannins and trypsin inhibitors. Liener, (1980) has stated that anti-nutritional factors are thermo-labile and for which BNS was toasted to detoxicate the product and make nutrients available to the birds. Thus, with 15.75% crude protein, moderate energy 2478.63, crude fibre 6.75% and good mineral and amino acid profiles (Table 1), the BNS appears to possess the potentials as good replacement for soyabean meal in finisher broiler chick diets.

Table 1: Proximate composition of toasted Bambaranut sievate

Nutrient	Composition (%)
Moisture	9.91
Crude protein	15.75
Crude fibre	6.75
Ether extract	4.75
Ash	1.95
NFE	60.89
Gross Energy (Kcal/kg)	2478.63

Materials and methods

Sitting of the experiment: The trial was conducted at the Poultry unit of the Imo State University Teaching and Research Farm, Owerri, Nigeria, situated on longitude 7°01' 0 6'E and 7°03' 00'E and latitude 5°28' 24°N and 5°30' 00'N.

Procurement and processing of bambaranut sievate: BNS was derived by grinding whole seed (decorticated) in a hammer mill and manually sieving the flour through a 2mm mesh size sieve to get the Bambaranut meal for human food. The sievate is assembled by the processor

Table 2: Nutrient composition of the BNS based broiler chick diet

Ingredients	Inclusion Levels			
	0% BNS	5% BNS	10% BNS	15% BNS
Maize	35	35	35	35
Groundnut cake	15	15	15	15
Soya bean meal	15	10	5	0
Bambaranut sievate	0	5	10	15
Palm kernel cake	10	10	10	10
Wheat offal	9	9	9	9
Fish meal	9	9	9	9
Blood meal	3	3	3	3
Bone meal	3.2	3.2	3.2	3.2
Salt	0.3	0.3	0.3	0.3
Vitamin premix	0.5	0.5	0.5	0.5
Calculated Nutrient Composition				
Crude protein	25.43	24.12	22.81	21.49
Crude fibre	4.87	4.88	4.89	4.90
Ether extract	9.69	9.75	9.82	9.88
Calcium	0.20	0.19	0.18	0.17
Phosphorus	0.27	0.24	0.19	0.18
Lysine	0.17	1.10	1.03	0.95
Methionine	0.36	0.35	0.34	0.33
ME (kcal/kg)	2708.53	2647.46	2586.39	2525.32

Premix supplied per kg of feed: Vit. A 10,000 iu

Vit D_3 2000 iu, vit E. 5 iu, vit k 2mg, riboflavin 4.20mg, vit B_{12} 0.01mg, panthotenic acid 5mg, micotinic acid 20mg, folic acid 0.5mg, chlorine 3mg; mg 55mg, Fe 20mg; cu 10mg; Zn 50mg, Co 125mg, iodine 0.8mg.

as BNS. This by-product was bought from a hammer mill where they are sold at the low prize of N5.00 per kg. The sievate was toasted in an aluminium frying pan over fire for about 20 minutes at average temperature of 70°C during which period thorough stirring was done to ensure homogenous heating until sievate turned brown, producing desirable aroma. It was then removed from the frying pan, spread on concrete floor for cooling for one day and subsequently incorporated as feed ingredient at levels 0%, 5%, 10% and 15% to replace soyabean meal weight for weight (Table 2).

Proximate analysis of toasted Bambaranut sievate was conducted before compounding the feed (Table 1). The feed was also analyzed at the animal nutrition laboratory of the Federal University of Technology, Owerri, Nigeria according to AOAC, 1995) (Table 2).

Procurement, brooding and rearing of experimental birds: Two hundred day old Anak 2000 broiler chicks procured from a commercial dealer were brooded in the chick brooder house of the Imo State University Teaching and Research Farm for four weeks of age according to Omeje and Ekenyem (1999).

At the end of the brooding, 160 four-week old birds were selected on the basis of good health and strong physical disposition and divided into four groups (Treatments) which were further replicated four times in a completely randomized design. They were fed the finisher ration containing 0%, 5%, 10% and 15% levels of BNS which replaced corresponding levels of soya bean meal (SBM). Feed and potable water were supplied *ad libitum* while medication and vaccination were appropriately applied in scrupulous clean and disinfected pens.

Data collection: Initial liveweight of the birds were taken at the start of the experiment with a salter weighing scale and weekly measured thereafter. This was used to calculate the weight gain as final weight – initial weight. Daily feed intake was also measured by subtracting the feed remains from the amount of feed supplied. The feed conversion ratio was also calculated as follows:

$$\text{Feed conversion ratio} = \frac{\text{Feed intake}}{\text{Weight gain}}$$

Cost analysis was carried out at the end of the experiment to determine the cost per kg of feed taken by each bird. All the data were subjected to one way analysis of variance (Steel and Torrie, 1980) while differences in the treatment means were separated using the Duncan's Multiple Range test as outlined by Onuh and Igwemma (1998).

Results and Discussion

The results of performance of finisher broiler chicken on partial replacement of BNS for SBM (Table 3) is presented below.

Results of the experiment show non-significant different

Table 3: Result on the performance of finisher broiler chick fed diets on partial replacement of BNS for SBM

Parameters	Treatments with % BNS				
	T_1 0%	T_2 5%	T_3 10%	T_4 15%	SEM
Initial weight (kg)	0.73[a]	0.73[a]	0.72[a]	0.73[a]	0.03
Final weight (kg)	1.85[a]	1.83[a]	1.68[b]	1.65[b]	0.02
Weight gain (kg)	1.12[a]	1.10[a]	0.96[b]	0.92[b]	0.04
Feed intake (kg/day)	0.16[a]	0.17[a]	0.17[a]	0.17[a]	0.001
Feed conversion ratio	4.07[c]	4.29[c]	4.82[ab]	5.12[a]	0.17
Feed cost/kg gain (N)	7.80[a]	6.20[b]	5.60[b]	310[c]	0.12

NB: US $1 = N140.00. abc:means within same row with different superscripts are significantly different (P<0.05).

(P>0.05) between treatments for initial liveweight of the chicks, attributable to the fact that they were brooded under similar conditions. The final live weights of birds on control diet 0% BNS, 1.85kg and that of 5% BNS 1.83kg were statistically similar (P>0.05) but both had significantly (P<0.05) superior weights to birds on 10% and 15% BNS which weighed 1.68kg and 1.65kg respectively. The results agreed with those of Onyimonyi and Okeke (2002) which used 0%, 5%, 10% and 15% levels of Bambaranut offal to evaluate the performance of weaner pigs and reported significant (P<0.05) differences between treatments on final body weight, feed conversion ratio. Feed cost/kg reported significant (P<0.05) in feed intake.

Similarly the apparent increase in feed intake of toasted BNS based diets is probably caused by improved palatability arising from the toasting of BNS. Increasing levels of the BNS reduced performance but appreciably reduced the cost of producing the birds. This is sequel to the very low price of the by-product thus reducing the cost of poultry production and making the product affordable to consumers. The results also agree with Liener (1980) that anti-nutritional factors are themo-labile in which toasting the BNS possibly enabled the birds on the BNS perform well in growth parameters.

The decreasing performance with additional levels of BNS agree with Opara, (1996) and Iyayi (2001) which observed that higher crude fibre levels in diets depressed weight gain. However, despite the difference in performance, the birds on BNS actually performed well, finishing 8 weeks at the weight of 1.63kg. This falls within a normal range of broiler performance at 8 weeks of age, (Obioha, 1992). The methionine also added to the diets may have helped in the bio-availability of nutrients in the BNS. It compliments the reports of Onwudike and Eguakun (1994) that feeding toasted Bambaranut offal with synthetic methionine effectively enhanced birds utilization of 30% BNO. The significant (P<0.05) differences observed in the feed cost/kg portrays a considerable reduction in the cost of feed of broilers as higher levels of BNS was added thereby achieving the major objective of this trial which is to produce broiler chicks at cheaper/affordable cost.

Conclusions and recommendations: From the results of the experiment, BNS can partially replace SBM in broiler finisher diets up to 15% without any deleterious effect. Increasing the levels of BNS even up to 15% in broiler chick diets reduced cost of production with appreciable results. Toasting BNS improved feeds palatability and acceptability to the birds thus increasing feed intake. Though birds on 0% and 5% BNS were significantly (P<0.05) heavier than those on 10% and 15% BNS, the reduction in the cost of feed was also significantly cheaper (P<0.05) in 10% and 15% BNS diets which adequately compensates for the differences in final weights. Further experiments should be conducted with higher levels of BNS to determine the optimal inclusion levels. Further studies should also be conducted to compare untreated BNS with those given various heat treatment methods.

References

Agbakoba, A.M., A. Udealor, E.C. Onwubu, C.U. Amalu, 1995. Evaluation of optimum supplementation level of poultry growers mash with sweet potato leaves in Rabbit feeding. 10th Annual Farming Systems Research and Extension Workshop NRCRI Umudike, Nigeria.

A.O.A.C., 1995. Association of official analytical chemists. Official methods of analysis. 7th edition. Washington D.C.

Babatunde, G.M., W.G. Pond and E.R. Ped Jr., 1990. Nutritive value of rubber seed. Hevea brasilienses meal. Utilization by growing pigs fed semi purified diets in which rubber seed meal partially replaced soya bean meal. J. Anim. Sci., 68:392-397.

Ekenyem, B.U., S.I. Omeje and F.N. Madubuike, 1999. An estimation of feed intake, feed efficiency and water intake of broiler and breeder genotypes of exotic chicken. J. Agri. Tec. Edu., 4: 11-14.

Ensminger, M.E., J.E. Old Field and W.W. Heinemann, 1990. Feeds and Nutrition. The Esminger publishing company, California, U.S.A.

Esonu, B.O., O.O. Emenalom, Abi Udechibie, U. Herbert, C.F. Ekpor, I.C. Okolie and F.C. Iheukwumere, 2001. Performance and blood chemistry of weaner pigs fed raw mucuna (velvet bean). Trop. Anim. Prod. Invest., 4: 49-54.

Esonu, B.O., F.C. Iheukwumere, T.C. Iwuji, N. Akanu and O.H. Nwugo, 2003. Evaluation of *Microdesmis puberula* leaf meal as feed ingredient in broiler starter diets. Nig. J. Anim. Prod., 30: 3-8.

Iyayi, E.A., 2001. Cassava leaves supplement for feeding weaner swine. Trop. Anim. Prod. Invest., 4: 141-150.

Liener, I.E., 1980. Significance for human of biological active factors in soya beans and other food legumes. Jacoes, 56: 121-129.

Madubuike. F.N., 1992. Briding the animal protein gap for rural development in Nigeria: The potential for pigs. J. Agri. Rural Dev., 5: 5-12.

Madubuike, F.N. and B.U. Ekenyem, 2001. Non-ruminant livestock production in the tropics. Gust Chuks Graphics, Owerri, Nigeria, pp: 185.

Obioha, F.C., 1992. A guide to poultry production in the tropics. Acene Publications, Enugu, Nigeria, pp: 86-100.

Omeje, S.I. and B.U. Ekenyem, 1999. Growth and Biometrical assessment of layer and broiler type baby chicks. J. Agri. Tec. Edu. 4: 22-26.

Onuh, M.O. and A.A. Igwemma, 1998. Applied statistical techniques for business and basic sciences. Skillmark Media Ltd, Owerri, Nigeria, pp: 324.

Onwudike, O.C. and A. Eguakun, 1992. The effect of heat treatment on the composition trypsin inhibitory activity, metabolisable energy and mineral bio-availability of Bambara groundnut meal with poultry. In: Proc xix world Poultry Congress Amsterdam, the Netherlands, 20th-24th September 1992, pp: 508-513.

Onyimonyi, A.E. and G.C. Okeke, 2002. Performance of weaner pigs fed varying dietary levels of Bambaranut sievate *Voandzeia subterranea* thorns waste. In: Proc. 7th Ann. Conf. Anim. Sci. Assoc. of Ni., (ASAN) Sep. 16-19, 2004. University of Agriculture, Abeokuta, Nigeria, pp: 85-87.

Opara, C.C., 1996. Studies on the use of Alchornia cordifolia leaf meal as fed ingredient in poultry diets. M.Sc. thesis, Federal University of Technology, Owerri, Nigeria.

Steel, R.G.D. and J.H. Torrie, 1980. Principles and procedures of statistics a biometrical approach. 2nd edition. McGraw Hill Books Company, New York, 633pp.

Tegbe, T.S., B. Attah and J.O. Jegede, 1994. Utilization of Agro Industrial by-products (Rice and wheal offal) on diets of pigs. 9th Ann. Conf. Nig. Soc. Anim. Prod., UNN.