BERKELEY PUBLICATION
AND RESEARCH INTERNATIONAL
09.30.2020
Journal of Med., Biological and Pharm. Sci. Vol. 13 No. 3

GROWTH PERFORMANCE OF BROILER FEED USING SOYA BEAN MEAL (*Glycine max)* ON FOUR WEEKS OLD CHICKEN (GROWER)

MAMOON M.; GAMBO J. B.; & IMHOAPERAMHE T.
The Department of Applied Biology, College of Science and Technology Kaduna Polytechnic P. M. B 2021 Kaduna, Nigeria.

ABSTRACT

Broiler feed using soya bean meal for four weeks old chicken (Grower)) was produced using locally sourced resources (Soya bean, Groundnut cake and Palm kernel) by Pearson square method producing a 21% crude protein and Metabolizable energy ME 2827Kcal/Kg of feed, the proximate analysis was carried out using Association Of Analytical Chemistry 2004. The result shown to have the following result Crude Protein 21% ,Crude Fibre 6.0%, Ash content 4.25%, Moisture 2.9%, Fat 13.5 and Carbohydrate 52.35%. Experimental birds used are two broiler strains (50 Cobbs and 50 Marshalls). There is a significant effect (P<0.05) of the formulated and commercial feed intake on the two broiler strains Cobbs and Marshall showing (P value 0.04) using Statistical analysis using (SPSS). There was significant effect based on the feed utilization, showing that the formulated has more effect based on the weight with a

Introduction:

Poultry farming is one of the profitable business in the world, can be as equally lucrative and a legitimate money making ventures in Nigeria. This type of livestock farming has the potential to generate high profit within a short time frame, due to the fact that chicken mature very quickly. In Nigeria poultry farming is experiencing significant growth due to the fact that an increasing number of people are moving away from consumption of smuggled poultry products and red meat due to health worries, which has led to the result of high demand for chickens (Afolayan *et al.,* 2009). Poultry production, particularly broiler is the quickest way to increase availability of high quality protein for human

ISSN: 1211-4401

(MSE 0.036) as against the commercial control (MSE 0.250.).The specific growth rate of formulated was minutely higher than the commercial. The formulated feed also has a better performance than the commercial feed (P<0.05) was considered significant.

Keywords: *Metabolizable energy, Broiler strains, Pearson square, Crude protein, MSE (Mean Square Error)*

Consumption. (Olomo *et al.,* 2001).

Feed for poultry production are composed largely of grains such as corn, wheat or barley, oil cake meal, (originating mainly from oil producing seeds such as soybeans), sunflower seeds, peanuts, cotton seed and protein products of animal origin such as; fish meal, meat meal, bone meal, slaughter house offals, and feather meal (Ahmad *et al*., 2006). Since this feeds are expected to be sources of nutrition of the birds, they usually contain essential mineral and vitamin additives (Adamu *et al*., 2005).

According to (Baghel and Pradhan, 2010), Poultry feed are essential source of energy needed to generate heat and to support the chemical reactions in which all physiological process depends. Many of these reactions are catalyzed by vitamins or some in organic elements, hence must be provided in the diet (Pond *et al*., 2003).

Aim and Objectives

The aim of the research is to formulate a feed for 4 weeks olds grower chicks using pearson square method and determine the specific growth rate.

MATERIALS AND METHOD

The research was conducted at the poultry section in the Biological garden of Applied Biology Department Kaduna Polytechnic, Kaduna State. The milling was carried out and packaged at Glory Agro services company at Station round about Kaduna south LGA, Kaduna state Nigeria. The required ingredients were purchased from a reputable dealer and weighed according to the required formulation based on the table 3 using Pearson

square method. The grains were first cleaned and picked before it was milled.

The grains were milled to form a compound feed using a milling machine and were weighed into 25Kg each after milling, it was packaged inside a bag. The bags were sealed with a sealing machine to keep away from contamination

ENERGY SOURCE

Table 1: Ratio for Maize and Maize Bran 4:1 in Favor of Maize.

Ingredient	Maize	Wheat offal
Ratio	4	1

Maize: 4/5* 8.9 (CP of Maize) = 7.12% CP

Wheat offal: 1/5 * 15.61 (CP of wheat offal) = 2.3%CP

Total sum of the energy source is 10.24%CP

PROTEIN SOURCE

Table 2: Ratio for Soya Bean Meal SBM, Groundnut Cake GNC, and Palm Kernel Cake PKC 4:2:1 irrespectively

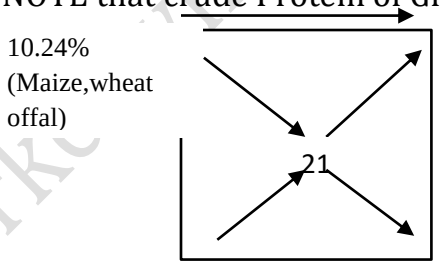
Ingredient	SBM	GNC	PKC
Ratio	4	2	1

The combined crude protein soybeans meal

4/7 * 44 (CP of SBM) = 25.14

Groundnut cake: 2/7 *45 (CP of GNC) = 12.85 Palm kernel cake: 1/7 *18.8 (CP of PKC) = 2.69 Total sum of the Protein source is 40.68%

NOTE that crude Protein of Grower feed is 21%



= 30.44%CP

T40.68%SBM,G l value for energy fc(10.76% CP of SBM)

C NC,pkc) of maize and Whea ed ingredient

ude protein

ISSN: 1211-4401

19.68 *70.75 = 45.74
30.44
1. Maize value: 4/5 * 45.74 =36.59kg
2. Wheat offal value: 1/5 * 45.74 =9.15kg
Total sum of energy source in kg = 36.59 + 9.15 = 45.74kg

PROTEIN SOURCE

Formula

Combined CP of maize and Wheat offal * 75-fixed ingredient
Total crude protein

10.76 *70.75 = 25.01kg
30.44
1. Soya bean meal value: 4/7 *25.01= 14.29kg
2. Groundnut cake: 2/7 * 25.01 = 7.15kg
3. Palm kernel cake value: 1/7 *25.01 =3.57kg Total sum of protein in kg = 14.29 + 7.15 + 3.57 = 25.01kg
Therefore summation of the two sources in kg = 45.74+25.01 =70.75kg
TOTAL CP = 21CP (Stephinie, 2010).

Table 3. 21%CP Compounded Grower Feed Component and Their Quantities (Kg) Using Pearson Square Method for 75Kg

INGREDIENTS	QUANTITY(Kg)
Maize	36.59
Soya beans meal	14.29
Wheat offal	9.15
Groundnut cake	7.15
Palm kernel cake	3.57
Bone meal	2.0
Lime stone	1.50
Premix	0.1875
Toxin binder	0.1125
Salt	0.225
Super liv	0.0375

Methionine	0.1125
Lysine	0.075
Total	75kg

PROXIMATE ANALYSIS

The proximate composition of raw poultry feeds such as moisture content, crude protein, crude fiber, fat content and ash content were analyze according to Association Of Analytical Chemist,(AOAC, 2004).

EXPERIMENTAL BIRDS

Fifty (50) Cobbs strains and fifty (50) Marshall strains broiler chicks were purchased at Ambuvets chicks and feeds at independent way Kaduna south, Kaduna state Nigeria. The chicks were brought to the poultry house. The Cobbs strains and Marshall broiler birds were randomly assigned to the experimental feeds from week 5- week 6. In order to acclimatize them the birds were housed inside the poultry house in the biological garden of Applied science department Kaduna polytechnic.

The birds were subjected to the same experimental and management conditions, water and feed was provided ad- libitum. The experiment lasted for two weeks.

GROWTH MEASUREMENT

The following parameters/characteristics were measured at random and data obtained were recorded

BODY WEIGHT (BW)

The experiment took 14 days of feeding. The weights of birds were taken at random daily using analogue weighing balance and weights recorded were in kilogram (Kg).

GROWTH PARAMETERS

- **FEED INTAKE**

This was done by determining the differences between the feed supplied and the left over on a daily basis. The efficiency of the feed was observed in their growth response.

Feed intake = feed supplied –left over.

- SPECIFIC GROWTH RATE (SGR)

This was done by determining the differences between final weight (Kg) and the initial weight (Kg) x 100 on any given time interval.

SGR= final weight – initial weight * 100
14 days

STATISTICAL ANALYSIS

All data obtained from determinations of percentage mean value standard deviation is computed for the feed parameter and the values were presented in table. SPSS was carried out to determine the significant amount of variability using paired sample t-test. P value less than 0.05 were considered to be significant.

RESULT

Determining The Proximate Analysis For The Grower Formulated Feed.

The (Table 4) Shows the Nutritional composition of experimental feed from the above (Table 1.3) formulated, moisture content to be 2.9%, Crude Protein 21%, Fat content 13.5%, Crude Fibre 6.0%, Ash content 4.24% and Carbohydrate 52.36%.

Table 4: Proximate Composition of Grower Feeds and Commercial.

Nutrients	Grower formulated	Commercial
Crude protein %	21.00	19.5
ME(Kcal/Kg)	2827	3100
Lysine	1.21	1.2
Crude fibre	6.0	3
Fat	13.5	3.8
Metheonine	0.115	0.5
Tryptophan	0.19	-
Calcium	1.64	-
Phosphorus	1.04	0.44

.

Table 5 shows the mean value for Formulated feed 2.6936, standard deviation 0.49458 and standard error mean 0.13218 while the Commercial feed 1.7750, 0.95510 and 0.25526. The P-value (0.04) is less than α- value (0.05) concludes that there is significance difference in the feed intake of broilers fed with both feed.

Table 5: The Significant Difference in Feed Intake of Commercial and Formulated Feed.

Group Statistics						
	FEED INTAKE	N	Mean	Std. Deviation	Std. Error Mean	Sig. .004
PERFORMANCE	Formulated feed	14	2.6936	.49458	.13218	
	Commercial feed	14	1.7750	.95510	.25526	

Determining The Efficiency Of Feed Utilization On Broiler Based On Weight For The Two Broiler Strains.

Table 6 and 7 shows the Commercial MSE (0.250) is greater than MSE Formulated (0.036) we therefore conclude that Formulated is most efficient on broiler based on weight for the two broiler strains.

Table 6: Feed Utilization by 4-Weeks Old Chickens for the Commercial Feed.

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	.059	1	.059	1.640	.224[b]
	Residual	.430	12	.250		
	Total	.489	13			

Table 7: Feed Utilization by 4-Weeks Old Chickens for the Formulated Feed.

Model		Sum of Squares	Df	Mean Square Error	F	Sig.
	Regression	.069	1	.069	.277	.609[b]
	Residual	3.003	12	.036		
	Total	3.072	13			

FIGURE 1 shows that the Specific growth rate in the fifth week is 0.42 fed with commercial feed had an increase in weight 1.08kg and by the sixth week is 0.5, 1.5kg also in the fifth week, for formulated the SGR 1.5, it increased 1.6kg and on the sixth week 1.6, 1.7kg in weight.

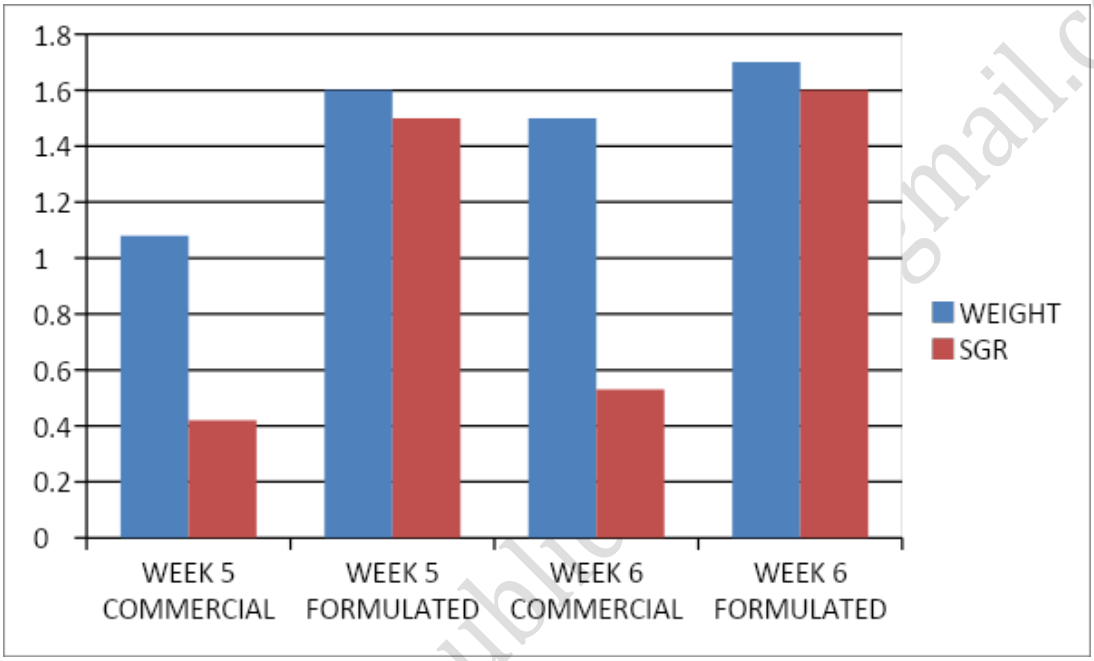


Fig 1: showing the Specific Growth Rate of the broiler strains of Cobbs Fed with formulated feed and Marshalls fed with commercial feed for two weeks 5-6 weeks.

DISCUSSION AND CONCLUSION

DISCUSSION

The Proximate composition of the experimental feeds represented in Table 4 showed that the metabolizable (ME) energy values of the grower feed and commercial were 2827 kcal/kg and 3100 kcal/kg. The crude protein (CP) value for the experimental grower feed was 21% while the commercial feed had a crude protein of 20%. The crude fibre (CF) value of the experimental feed grower was 6.0% while the crude fibre value of the commercial feed 3%.The result is in agreement with findings of Obioha (2001), recommending ME, CP and CF values of broilers grower 2800kcal/kg a 23%, 5.5% broilers and Aduku (2005), reported

3000kcal/kg ME requirements for grower broilers. Aviagen (2005), reported that the general standard nutrients recommend is 2800-3000kcal/kg ME, 19-21% CP and CF <5% values for grower broilers.

Based on the result obtained in (Table 5), since the P-value (0.04) is less than α- value (0.05) therefore the null hypothesis (H_0) is rejected and conclude that there is significance difference in the intake of broilers fed with commercial and formulated feed consumption for 50 birds and 50 Cobbs. This is may be due to the different in the genetic improvement and makeup of the strains used for the experiment as reported by (Olomo *et al.,* 2001).

The low feed intake of Cobbs strain in feed relative to those of the formulated feed is as a result from the higher energy ME value of the feed, as birds eat to satisfy their energy requirement (Leasson and Bronstein, 2005). It has also been reported that birds over eat under moderate protein insufficiency which is not necessarily a craving for protein per second, but a compensatory increase in feed intake in response to the deficient essential nutrients (Lipstein and Rickie, 2001).

The mean difference indicates that broilers fed with formulated are a minutely heavier than commercial feed. The specific growth rate of broilers fed with formulated was 82% which is significantly alright. The crude protein for of the formulated and commercial meal all met the recommended value (18-21%).

According to (Ahmad *et al.,* 2005), Chickens meant for meat production require feed with a higher content of Digestible Crude Protein (DCP), from the first to the fourth week, the chicks requires feed with a DCP content of between 22-24%. From the fourth to eight week, the chick requires feed with a protein content of 21-22% crude protein. The ME for the experimental grower feed excellently met the recommended values.

According to (Ali *et al.,* 2008), formulating feed ideally requires in-depth knowledge of several parameters such as the energy level to be maintained in the diet, balancing the amino acid profile and electrolyte of feed e.t.c. which otherwise, if not properly monitored, could negatively influence the performance and profitability of the business.

The crude fibre 6.0 of the experimental feed is slightly above the recommended values (P<5%). This is a little bit higher than the Aviangen (2005) reported recommended nutritional standard. The Crude Fiber (CF) content should also be well maintained especially for the chicken (the more fibrous the feed, the less is digested by the bird) though we need to reduce it slightly for the growers.

It should however be noted that the Crude Fiber (CF) content should not be higher than the 7% Max mark (the more fibrous the feed is, the less is digested by the bird) hence we need to reduce it slightly for the growers and the layers. The observed lower performance of the broilers fed with formulated feed is a reflection of the stringent requirement for essential nutrients. 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 intake diets (Hocking, 2006).

In order to determine the most efficient feed utilization based on weight, the feed with the minimum Mean Square Error (MSE) is most efficient.

From the above result (Table 6 and Table 7), MSE Commercial (0.250) is greater than the MSE Formulated (0.036) we therefore conclude that Formulated is most efficient in the utilization of feed based on weight than the commercial. Formulated 1.7kg, the feed intake for formulated feed shows P-value (0.04), the mean value 26.936kg, and standard deviation 0.49458 and means standard error 0.13218 while the Commercial 1.7750kg, standard deviation 0.95510 and mean standard error 0.25526, feed utilization base on weight, Commercial MSE (0.250), Formulated MSE (0.0360)

CONCLUSION

The experimental feed formulated was more effective compared to the commercial feed from the results obtained in this study especially in terms of growth performance. The high content of fat and fatty acid in soya bean is the main explanation for the significant heavy weight of the birds while they fed on the formulated feed as observed during the study, this method should be adopted by farmers whom wish to have a cost friendly and good feed for their chicks from locally sourced ingredients.

REFERENCE

Aduku, A.O., (2005). Tropical Feedstuff Analysis Table. Department of Animal Science.Faculty of Agriculture, Ahmadu Bello University, Zaria, Nigeria.

Adamu, H.M., Fernandez, S.R., and Baker, D.H., (2005). Maintenance lysine requirement and efficiency Of using lysine for accretion of whole-body lysine and protein in young chicks. *Poultry Science* 1999; 78:1412-1417.

Afolayan, M., Datwang, H., Omage, J.J., (2009), Performance of Brioler Fed on Farm versus commercial fees. *Nigerian Journal of Animal Production*. 36(1):41-51.

Ahmad,T, Sarwar M, Mahr-U.N., Ahsan,Ul.Haq and Hasan, Z.U., (2005). Influence of varying sources of dietary electrolytes on the performance of broiler reared in a high temperature environment. *Animal Feed Science Technology*., 120-298.

Ahmad, T., Mushtaq, T., Mahr,U.N., Sarwar, M., Hooge, D.M and Mirza, M.A., (2006). Effect of different non-chloride sodium sources on the performance of heat-stressed broiler chickens. *Broiler Poultry Science*, 47:249-256.

Ali, M., Siddique, T., Shah, H., and Anjum, A. D., (2008). Effect of different feed additive on the hematological values on broilers. *Journal Animal Science Pakistan*. 11: 17-22. AOAC, (2004). Association of Analytical Chemist 13th ed Washington D.C.p.21-47

Aviagen, (2005). Ross 308 broiler management guide.

Aviagen, (2009). Ross 308 broiler management guide.

Baghel, R.P., and Pradhan, K., (2010). Energy protein and limiting amino acid requirements of broilers at very high ambient temperature. *Broiler Poultry Science*, 30: 295-304.

Elkin, R.G., Freed, M.B., Hamaker, B.R., Zhang, Y. and Parsons, C.M. (2012), Condensed tannins are only partially responsible for variations in nutrient digestibilities of sorghum grain cultivars. *Journal Agricultural Food Chemistry*, 44:848-853.

Hashemi, S.R. and Davodi, H., (2011). Herbal Plants and their derivatives as growth and health promoters in animal nutrition. *Veterinary Research Community*, 35: 169-180.

Hocking P.M, (2006). High fibre pelleted rations decrease water intake but do not improve physiological indexes of welfare in food-restricted female broiler breeders.*British Poultry Science*, Volume 47, issue 1 February (2006). Pg. 19-23.

Lipstein, F.T. and Ricke, S.C., (2001). Observations on the history of the development of antimicronbials and their use in poultry feeds. *Poultry Science*, 82:613-617.

Leason, S., H. and Brostein, S., (2005). The replacement of soybean meal by the limiting amino acid in practical broiler diets, 2: Special addition of methionine and lysine as partial substitute for protein in finisher diets. *British Poultry Science* (2005), 16:189- 200.

Leason, S. and Summers, J.D. (2001). Scott's Nutrition of the chicken, 4th ed Notingham UK, *Nottingham university press.*

Obioha, F.C., (2001). *A guide to poultry production in the tropics*. Acne publishers. Enugu, Nigeria.

Olomo, S.B., Waziri, Y.D., and Abbotor, F.I., (2001). The use of different energy sources on the performance of broiler chickens under semi-arid environment. *Proceeding of the 6thannual conference of animal science association of Nigeria*, September 17-19, 2001, Maiduguri, Nigeria.

Pond, W.G, Church, D.C.,and Pond, K.R., (2003). *Basic animal nutrition and feeding* 2003, John Wiley and Sons, Inc, Canada.

Stephinie, H.W. (2010). Extension service of Missisipi State University Cooperating with U.S. Department of agriculture published in further of acts of congress, may 8 and june 30, 1914, Joe street interim director (POD-10-10).