Trop. J. Anim. Sci. 2003 Vol. 6 No. 2: 121-126

Some Chemical Compositions of Commercial Poultry Feeds sold in Minna, Niger State, Nigeria.

A. Adetutu*, O.A. Owoade*, O.A. Adeleke J.A. Olowe and O.S. Amuda[3]

**Departement of Biochemistr□, Facult□ of Basic Medical Sciences,*
Ladoke Akintola Universit□ of Technolog□ Ogbomoso,
e-mail. Wale_83b@ hotmail.com.
#Department of Environmental Science, Universit□ of Strathchl□de Scotland, U.K.
+ Department of Pure and Applied Chemistr□,
Ladoke Akintola Universit□ of Technolog□, Ogbomoso.
~Department of chemistr□, Universit□ of Ibadan, Ibadan,

Target Audience: Feed Manufacturer, Poultry Farmers.

Abstract

Chemical anal□sis of poultr□ feed samples from four commercial producers (designated A, B,C and D) were determined. Crude protein content, ether extract, crude fibre content, ash content, percent phosphorus and calcium contents were ascertained for chick mash, growers mash, la□ers mash, broilers starter and broilers finishers mash for all the producers. The results obtained were compared with the manufacturers' purported values. The result of this stud□ shows that there are variations in the parameters determined and the stated values on labels b□ the manufacturers. The result will serve as a nudge for the appropriate organ of Government to be more intensive in their qualit□ control exercise. Consequentl□, manufacturers will be stimulated to improve their product.

Keywords: Chemical Analysis, Poultry feeds, Quality control.

Introduction

Apart from the genetic merit of animals, nutrition is the major factor that determines productivity. Traditional management of poultry is characterized by free ranging, a situation where birds roam about freely, feeding in this system is limited to what the poultry can find by themselves (seed, kitchen waste inclusive).

The results of inadequate feeding are poor hen day production by layers, slow rate of growth by broilers and considerable losses before market weight is attained (1) However, modern poultry farming obeys precise and vigorous rules that include the use of a complete feed prepared commercially under conditions, which have been subject of intensive research (1;2;3) The quality of the poultry produced is a reflection of the quality of feed offered the birds.

Nigeria today is suffering from a serious shortage of feed ingredients such as wheat, groundnut cake, cotton seed cake and soya beans among others because of the rapid increase in human population coupled with inadequate production. Olomu (10) observed that high cost and poor quality finished feeds caused tremendous economic losses in commercials poultry holdings. This in turn has forced many farmers out of production, while those remaining live under constant fear of unfavourable feed input process, poor quality feed, unsatisfactory productivity of stock and a concomitant reversal of their projected economic returns.

In view of the downward trend on the economy and the unfavourable Government policies, the Nigeria feed millers have series of problem which range from lack of capital to lack of qualified personnel and lack of quality control laboratory to analyze feed ingredients and finished feed products, so as to ascertain their actual quality. These have led to the production of adulterated feed, which are of low quality. The objective of this study is therefore to determine

the nutrients content of feeds from some feed mills in Minna, Nigeria.

Materials and Method

Sample source

Poultry feed samples (layers, growers, chicks, broiler starters and finishers) were collected from four commercial feed millers (labeled A, B, C and D) in Minna, Niger state, Nigeria.

Chemicals and Analysis of feeds

All chemicals used are of analytical grade and crude protein, ether extracts, crude fibre and ash contents of al the poultry feed samples were determined using methods of the Association of official Analytical Chemists (5). The method of Gbodi *et al.,* (1973) was used to determine the moisture content and ether extract.

Determination of calcium content

Calcium content was determined using Atomic Absorption spectophotometer (AAS). A weighted sample, (0.2g) of each sample was carefully put into kjelahl flask. 1ml of suphuric acid, 5ml of nitric acid and 1ml of perchoric acid (27%) were added.

It was then digested for about one and half hours. This is was then cooled and transferred to 100mc volumetric flask and 100ml of lanthanum solution (0.4%) was added and made up to volume with distilled deionized water.

A blank solution without the sample was prepared as described for sample preparation. The AAS was calibrated using the method of Milliner and Whiteside (1981) after which the concentration of the sample was read directly in part per million (PPM) from the ASS and the percentage calcium calculated.

Posphorus determination

Sample preparations for percentage phosphorus determination was done using colorimetric method. Two grams (2g) of the sample were ashed to 600°C and transferred into beakers quantitatively. Four-milliliter (40ml) of 25% HCl and served drops of concentrated HNO_3 were added.

It was then transferred to 200ml volumetric flask and diluted to volume with distilled water. The solution was then filtered and the aliquot containing 0.5 to 1mg phosphorus was placed in 100ml volumetric flask. 20ml of molybdonavadate reagent was added to the solution and volume made up to the mark. It was allowed to stand for ten minutes and then percentage transmittance at 400mm was read. The result was calculated from the standard curve using method of Gbodi *et al* (1973).

Analysis of data

Data collected from the study were subjected to analysis of variance (Sokal and Rohlt, 1973) and test of significance was carried out at 5% level of probability.

Results and Discussion

The results of chemical analysis of poultry feed samples from four producers in Minna are shown in tables 1-5. The values obtained for chick mash for all the four manufacturers varied from 17.3 to 8.55% for crude protein, 5.2 to 8.55% for ether extract and 2.37 to 14.5% for crude fibre content for calcium and phosphorus contents, the results ranged from 0.9 to 1.4% and 0.64 to 0.95 respectively. Most of the experimental values were in agreement with their respective manufacturer's values except the values obtained for crude fibre content for manufacturer B and manufacturer C, that were not in line with their stated values (Table 1). Since chicks are not equipped to use much of fiber it excess in feed ration may cause energy deficiency (8) Hence adequate and precise chemical composition of feed is necessary for rapid and healthy growth of chick since reduction in quality and quantity of feed consumption will affect their growth and performance.

Table 2 shows the chemical composition for grower mash. With the exception of crude fibre content, all the values obtained were not significantly different from the manufacturers' values.

The results for the layers mash revealed that there was no significant ($p<0.05$) difference for calcium and phosphorus and the manufacturers values (Tables 3). These results were in agreement with the obtained and recommended by Klis *et al,* (9) for layers. This is high desirable and encouraging for poultry farmers, since about 40% of the eggshells are phosphorus and calcium. Therefore the source and quality of phosphorus and calcium in layer diet can affect their eggshell quality (12, 13) As a result, satisfactory egg shell that will not crack during handling will be

Table 1: Some Chemical Composition of Chick Mash otained from Four Feed Manufacturer in Minna.

	Manufacturer			
Parameters	A	B	C	D
Crude protein	19.0 ± 0.40 (18.5)	17.3 ± 2.0 (18.0)	19.5 ± 3.0 (19.9)	17.75 ± 4.0 (18.0)
Ether extract	8.5 ± 0.50[a] (3.8)	8.0 ± 0.90[a] (6.0)	5.6 ± 1.5[a] (4.5)	5.2 ± 0.6[a] (7.0)
Crude fibre	2.7 ± 0.40[a] (3.5)	8.25±0.75[b] (3.5)	14.5±3.5[c] (3.0)	2.37±0.13[a] (3.0)
Ash content	8.6 ± 0.80[a] (7.0)	7.57 ± 1.5[b] (9.5)	12.25 ± 2.0[c] (7.0)	12.05 ± 2.0[c] (10.0)
Phosphorous	0.82 ± 0.07[a] (0.7)	0.95 ± 0.1[b] (0.8)	0.64 ± 0.0[c] (-)	0.95 ± 0.1[b] (-)
Calcium	1.2 ± 0.43[a] (1.8)	1.0 ± 0.0[b] (1.0)	1.4 ± 0.2[c] (0.8)	0.9 ± 0.1[b] (1.0)

Manufacturers' values are in parentheses (-) indicates manufacturers' values are not stated.
Values with the same letter in the row are not significantly different ($p<0.050$.

Table 2: Some Chemical Composition of Grower Mash obtained from Four Feed Manufacturer in Minna.

	Manufacturer			
Parameters	A	B	C	D
Crude protein	15.25 ± 3.0 (15.0)	14.5 ± 3.0[b] (14.0)	14.08 ± 2.5[a] (15.4)	14.00 ± 2.0[b] (15.2)
Ether extract	4.06 ± 0.52[a] (3.0)	8.28 ± 2.3[b] (5.0)	8.5 ± 3.0[b] (-)	7.16 ± 2.5[b] (5.0)
Crude fibre	3.8 ± 0.1[a] (5.5)	5.0 ± 0.2[b] (7.5)	3.75 ± 0.2[a] (-)	5.7 ± 1.6[a] (-)
Ash content	8.54 ± 2.0[a] (9.0)	10.65 ± 3.0[b] (9.4)	13.8 ± 0.5[c] (-)	8.75 ± 0.9[a] (0.8)
Phosphorous	0.64 ± 0.1[a] (0.6)	1.15 ± 0.1[b] (-)	1.04 ± 0.0[b] (0.8)	0.75± 0.1[a] (0.5)
Calcium	0.96 ± 0.1[a] (1.2)	1.02 ± 0.01[b] (1.0)	1.04 ± 0.0[b] (1.05)	1.24 ± 0.11[c] (1.0)

Manufacturers' values are in parentheses (-) indicates manufacturers' values are not stated.
Values with the same letter in the rew are not significantly different ($p<0.05$).

Table 3: Some Chemical Composition of Layers Mash obtained from Four Feed Manufacturer in Minna.

	Manufacturer			
Parameters	A	B	C	D
Crude protein	25.00 ± 0.60[a] (16.5)	15.00 ± 3.5[b] (16.5)	17.10 ± 0.1b (16.6)	14.25 ± 3.5[c] (16.0)
Ether extract	3.65 ± 0.2[a] (3.5)	8.83 ± 3.0[b] (5.0)	3.40 ± 0.21[a] (-)	6.66 ± 0.4[c] (4.5)
Crude fibre	3.75 ± 0.3[a] (4.5)	4.40 ± 0.11[a] (5.0)	3.75 ± 0.62[a] (5.0)	5.55 ± 0.12[c] (-)
Ash content	13.33 ± 4.0[a] (12.5)	17.25 ± 0.06[b] (-)	19.29 ± 3.0[b] (-)	7.62 ± 0.00[c] (-)
Phosphorous	0.80 ± 0.10[a] (0.60)	1.95 ± 0.10[b] (-)	1.05 ± 0.10[c] (0.6)	0.85 ± 0.1[a] (0.65)
Calcium	3.86 ± 0.51[a] (4.00)	3.72 ± 0.2[b] (3.5)	3.64 ± 0.1[b] (3.59)	3.48 ± 0.5[b] (3.5)

Manufacturers' values are in parentheses (-) indicates manufacturers' values are not stated. Values with the same letter in the row are not significantly different ($p<0.05$).

obtained and which meet market requirement (4,8,11). Similarly, for the crude protein content, ether extract, ash content and crude fibre content there were non- significant ($p>0.05$) difference in the values obtained from the four fed millers and the experimental values.

The chemical composition of broilers starter mash obtained from the four mills were also consistent with those given by the manufacturers (Table 4) except, for percentage calcium obtained which were significantly different from the stated values. Table 5 shows the chemical composition of broiler finisher mash. The values obtained B, C, and D were in line with the values stated in their tables. However, the values stated by the manufacturer A is significantly different from experimental values.

For crude fibre content all the values obtained in this experiment were not in line with the manufacturers values. Homer (10) attributed the level of fibre to the bulkiness of feed ingredient used and its excess in the diet of the broiler may hinder quick growth. All other chemical compostion analyzed were in comformity with the values stated by the manufacturers.

The overall result showed that all the feed samples from the four produced have some of their experimental values not in agreement with their stated values especially the value obtained for crude fibre content.

Table 4: Some Chemical Composition of Broiler Staters Mash obtained from Feed Manufacturer in Minna.

	Manufacturer			
Parameters	A	B	C	D
Crude protein	20.75 ± 5.5[a] (22.0)	27.25 ± 4.0[b] (21.0)	22.37 ± 5.0 (20.8)	21.87 ± 0.05[d] (20.0)
Ether extract	6.83 ± 0.5[a] (3.8)	7.96 ± 0.3[b] (6.0)	6.8 ± 1.0[a] (5.0)	7.00 ± 1.5[a] (4.5)
Crude fibre	11.95 ± 2.6[a] (3.5)	3.95 ± 0.2[b] (5.0)	9.57 ± 3.5[c] (-)	10.4 ± 0.18[c] (5.0)
Ash content	8.29 ± 2.2[a] (8.0)	11.59 ± 2.8[b] (-)	12.7 ± 2.0[b] (5.0)	15.12 ± 0.0[c] (-)
Phosphorous	0.74 ± 0.01[a] (0.85)	0.85 ± 0.10[b] (-)	0.75 ± 0.10[a] (0.80)	0.75 ± 0.25[a] (-)
Calcium	1.38 ± 0.10[a] (1.4)	2.18 ± 0.35[b] (1.0)	1.46 ± 0.40[c] (0.9)	1.84 ± 0.20[d] (1.0)

Manufacturers' values are in parentheses (-) indicates manufactures' values are not stated.
Values with the same letter in the row are not significant different ($p<0.05$).

Table 5: Some Chemical Composition of Broiler Finishers Mash obtained from Four Feed Manufacturer in Minna.

	Manufacturer			
Parameters	A	B	C	D
Crude protein	26.25 ± 0.40[a] (19.0)	20.75 ± 4.0[b] (18.0)	19.62 ± 3.7[b] (17.9)	19.25 ± 3.0[b] (18.0)
Ether extract	6.60 ± 0.01[a] (4.0)	8.4 ± 2.0[b] (6.0)	7.06 ± 1.0[c] (-)	8.30 ± 2.1[b] (6.0)
Crude fibre	10.5 ± 53.0[a] (3.0)	2.33 ± 0.2[b] (6.0)	11.30 ± 1.0[c] (4.0)	7.8 ± 2.7[d] (3.5)
Ash content	8.5 ± 2.5[a] (7.5)	7.45 ± 1.5[b] (-)	12.37 ± 2.7[c] (6.0)	10.62 ± 1.4[d] (6.0)
Phosphorous	1.05 ± 0.20[a] (0.85)	1.05 ± 0.05[a] (-)	0.43 ± 0.02[b] (-)	0.95 ± 0.1[c] (0.8)
Calcium	0.98 ± 0.00[a] (1.0)	1.26 ± 0.20[c] (1.0)	1.04 ± 0.1[b] (0.86)	1.04 ± 0.2[b] (1.0)

Manufactureres' values are in parentheses (-) indicates manufactures' values are not stated.
Values with the same letter in the row are not significantly different (p⊠0.05)

Conclusion and Recommendation

1. Therefore, the result of this experiment will serve as a guide for poultry farmers in the selection of feed for their birds.
2. Similarly, the result will stimulate the manufacturer to improve their feed products.
3. On the other hand, it will serve as a nudge for the appropriate organ of the government to efficiently monitor the standard specifications set for the manufacturing of poultry feed.
4. I hereby recommend that there should enforced law for the establishment of quality control laboratory at feed units of all manufacturers. This will permit the screening of feed ingredients and finished feed product.

References

1. Ralph, R.S. (1987): "Preparation of Feeds". Manual of poultry production in the Tropics. Published by C.A.B. International alling Ford N.K. pp56.
2. Hooge D.M. (1995). Poultry feeds and feeding: ways to improve profits. *Poultry digest* 54 8,12-19.
3. Senthilkumar, N., Kadirvel, R., Viayakumar, R, (1996): The nutritive composition of Dried yeast sludge. Indian Journal of poultry science. 31 (3)220-229.
4. Olomu, J.M. (1980). Feed Quality Standard in Nigeria. Key parameters, Problem and Prospects. In: Animal Nutrition seminar at Institute of Agriculture Research and Training, University of Ife, Nigeria.
5. A.O.A.C. (1990): Association of official Analytical Chemist (A.O.A.C.). Official Method of analysis of the AOACW. Hortwitz. Editor Fifth Edition AOAC, Washington D.C.
6. Gbodi; T.A. Lakugburu, O.A. and Shanbe, A (1973): Laboratory manual. Federal Veterinary Research (Biochemistry section) Vom Jos pg 14.
7. Milner, B.A. and whiteside, P.J. (1981): *Introduction to Atomic Absorption Spectrophotometry.* Published by pye Unican Limited 2nd Edition Cambridge England pp45.
8. Oluyemi J.A. and Roberts, A. (1970): *Poultry Feed and Feeding Requirements.* Oxford University Press pp 76-90.
9. Klis, J.D., Vander, Versteegh, H.A.J., Vander, K.J.D. Garnsworthy, P.C. (ed):, Haresign, W. (1996): *Phosphorus Nutrition of Poultry. Recent Advances in Animal Nutrition 71-83.*
10. Homer, P. (1980). Feed and Nutrition. Grander Publishing Ltd. Pp 1–20, 50.
11. Mongin, P and Sauveor, B. (1979): Plasma, inorganic phosphorus concentration during egg-shell formation. Effect of the physical form of the dietary calcium. *British Poultry science.* 20 40-42.
12. K.N. Boorman and S.P. Guanaratne (2001): Dietary phorphorus supply eggshell deposition and plasma inorganic phosphorus in laying hen. British Poultry Science, 42: 81-91.
13. V., Ramasubba Raddy (2003): Relative Bio availability and utilization of phosphorus fertilizers as source of phosphorus in broilers and layers. *British Poultry Science* 44: 96-103.
14. Sokal, R.R. and Rohit, F.J. (1973): Introduction to analysis of variance: In Kenny D. park RB (eds) "Introduction to Biostatistics" San Francisco; Freeman, pp 134-160.