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PROXIMATE AND AMINO ACID COMPOSITIONS OF SELECTED COMMERCIAL BROILER FINISHER FEEDS IN IBADAN, NIGERIA

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Abstract

In a bid to assess the proximate and amino acid compositions of selected commercial broiler finisher feeds in Ibadan, Nigeria, seven commercial broiler finisher feeds: A, B, C, D, E, F and G, were sourced from the market in Ibadan, and their proximate and amino acids compositions determined following standard procedures. Significant differences ($p<0.05$) were observed in the proximate composition of the feeds. The crude protein ranged from 10.09 to 18.10%, crude fibre from 2.50 to 15.77% and lysine from 0.24 to 4.93%. The amino acid also was either above or below the stipulated values for the finisher broiler chickens. Results implied that the feeds failed to comply with the requirements of poultry feeds by Nigerian industrial Standard and National Research Council. Regulatory bodies in Nigeria should enforce strict compliance of proprietary feed producers to formulate and produce feeds to meet the nutritional requirements of broiler chicken.

Keywords: Commercial feeds, Industry standards, Poultry feeding, Broiler finisher, Feed composition

Introduction

In poultry production, feed conversion ratio, health of the birds, growth rate and body conformation are to a large extent determined by the energy, amino acids and protein contents of the diets (Uchegbu *et al.,* 2009). In spite the crucial role played by poultry production in reducing the level of unemployment and malnutrition, the poultry sector is faced with numerous challenges such as poor finance, inconsistent policies, feed quality, diseases, inclement weather among others which mitigates efficiency of the industry. Poor feed quality either commercially or personally prepared was the most notable problem of poultry production (Umar and Fatima2019). Ordinarily, it appears that poultry feeds will meet the requirement of target birds because they appear similar in composition. Uchegbu *et al* (2009) reported that 10% reduction in productive rate of chicken was observed when birds were fed different feed brands. This implied there were differences in the nutritional compositions of the different commercial feed brands meant for the same class of poultry birds. Therefore, it is important that highly nutritious feed is supplied to the market by the commercial producers as improper nutrition (under- or overfeeding) would affect animal production and health. The present study was aimed at assessing the proximate and amino acid compositions of the different commercial broiler finisher feeds in Nigeria.

Materials and methods

Experimental site

The experiment was carried out at Animal Nutrition Laboratory, Department of Animal Science, Faculty of Agriculture. University of Ibadan, Nigeria. The study area lies between longitude 7°23.05 north and 3°54.59 of the Greenwich Meridian east at an altitude 200m above sea level. Average temperature and relative humidity of the location is between 23-42 °C and 60-80%, respectively (SMUI, 2022).

Experimental diets

Seven different commercial broiler finisher feeds were sourced from the market in Oyo state. The feeds brands were labelled A, B, C, D, E, F and G which represented treatment 1, 2, 3, 4, 5, 6 and 7 respectively.

Proximate and amino acid determination

Samples were analysed in triplicates for proximate composition (AOAC, 2000) and amino acids using spectrophotometric determination of amino acids using improved ninhydrin chemical method (Schroeder et al., 1990). Metabolizable energies (kcal/kg) of the different feed samples were estimated according to the procedure of Pauzenga (1985).

$$ME = 37\ x\ \%CP + 81\ x\ \%EE + 35.5\ x\ \%\ NFE$$

Where CP = crude protein, EE = ether extract, NFE = nitrogen free extract

Statistical analysis

Data were subjected to descriptive statistics and analysis of variance using SPSS package (2011) and the means were separated using Duncan multiple range test of the same software at $\alpha_{0.05}$

Results and discussion

The energy and proximate composition of the seven commercial broiler finisher feed brands in Nigeria are presented in Table 1. There were significant differences ($P<0.05$) in the proximate composition of the different commercial feeds. Percentage crude protein in brand A (17.00%), B (16.83%), C (15.77%), F (13.87%) and G (10.09%) were below the Nigerian international standard (NIS) 2018 recommended value of 18.00%. The crude fibre in brand A (7.60%), B (15.77%), D (12.10%) and G (10.13%) were way higher than 5.0% stipulated by NIS 2018. Although crude fibre is very beneficial during digestion, according to Montagne et al (2003) , it is noted that moderate inclusion of fibre in the broiler chicken diets may have positive effects on gizzard activity, gastrointestinal tract movement, gut health and growth performance of non-ruminant animals. Sklan et al (2003) observed reduced growth performance and impaired nutrient nutrition in birds fed diets with increased crude fibre levels of up to 9%. Also, diets high in fibre usually contain low energy density which may in turn decrease feed conversion ratio in broiler chickens, (Jha and Mishra 2021).

Table 1: Energy and Proximate Composition of the Seven Commercial Broiler Finisher Feed Brands in Nigeria

	PARAMETERS						
BRAND	DM	ME	Ash	CP	CF	EE	NFE
1	9.50^{c}	3235.88^{c}	4.95^{de}	17.00^{b}	7.60^{d}	2.30^{de}	68.15^{c}
2	10.73^{b}	2960.05^{d}	10.47^{a}	16.83^{bc}	15.77^{a}	3.23^{c}	58.39^{e}
3	10.30^{b}	3436.84^{a}	5.78^{c}	15.77^{d}	2.50^{f}	6.93^{a}	64.32^{d}

4	10.47^{b}	2970.67^{d}	7.89^{b}	18.02^{a}	12.10^{b}	2.23^{e}	59.76^{e}
5	10.90^{b}	3312.78^{b}	5.54^{cd}	18.10^{a}	3.87^{e}	1.50^{f}	71.00^{b}
6	11.48^{a}	3461.15^{a}	4.73^{e}	13.87^{e}	1.83^{g}	2.67^{d}	69.90a
7	10.55^{b}	3229.40^{c}	5.59^{cd}	10.09^{cd}	10.13^{c}	4.57^{b}	63.68^{d}
SEM±	0.07	3.82	0.09	0.11	0.05	0.05	0.17

Where= $^{abc...}$*means on the same column with different superscript are significantly different (p<0.05)*
S.E.M= *Standard error of means* DM= *dry matter*, ME= *metabolisable energy*, CP= *crude protein*, CF= *crude fibre*, EE= *ether extract*; NFE= *nitrogen free extract*

The amino acid compositions of the seven different commercial broiler finisher feed brands in Nigeria are presented in Table 2 . The determined amino acids all differed significantly (p<0.05) across the feed brands. Observed values for lysine were above the 0.85 % recommended NRC 1994 value. Cengiz et al (2008) also observed that excess lysine in broiler diets caused severe reduction in body weight gain and also, increasing lysine level in the diet without considering other amino acids may also limit performance if other essential amino acids are not in the right proportion.

Table 2: Amino Acid Composition of Seven Different Commercial Broiler Finisher feed Brands in Nigeria

Brand	ARG	ALA	VAL	GLU A	GLY	HIST	ISO	LEU	LYS	METH	PHEN	THRE	TRYP
1	1.58^{e}	003^{c}	0.01^{e}	0.62^{e}	0.45^{e}	0.15^{e}	0.03^{c}	0.03^{d}	1.54^{e}	0.16^{e}	0.15^{c}	0.05^{c}	0.02^{c}
2	3.85^{b}	2.90^{a}	0.01^{e}	3.04^{a}	2.40^{c}	2.62^{b}	2.07^{a}	2.13^{a}	2.89^{b}	4.39^{a}	1.45^{b}	0.79^{b}	0.42^{b}
3	0.24^{f}	0.08^{c}	0.02^{d}	0.35^{f}	0.19^{f}	0.28^{d}	0.13^{c}	0.21^{c}	0.24^{g}	0.17^{e}	0.17^{c}	0.11^{c}	0.10^{c}
4	0.26 ^{f}	0.14^{c}	0.03^{b}	0.24^{f}	0.16^{f}	0.44^{c}	0.14^{c}	0.13^{cd}	0.41^{f}	0.19^{e}	0.21^{c}	0.11^{c}	0.09^{c}
5	3.60^{c}	1.67^{b}	0.01^{f}	2.82^{b}	2.53^{b}	5.28^{a}	1.42^{b}	1.89^{b}	4.39^{a}	1.77^{b}	2.79^{a}	1.97^{a}	1.33^{a}
6	5.61^{a}	0.14^{c}	0.03^{c}	2.05^{c}	4.26^{a}	0.33^{d}	0.23^{c}	0.03^{d}	2.60^{c}	0.48^{c}	0.51^{c}	0.04^{c}	0.11^{c}
7	3.26^{d}	0.03^{c}	0.04^{a}	0.99^{d}	1.86^{d}	0.28^{d}	0.08^{c}	0.06^{cd}	2.44^{d}	0.26^{d}	1.05^{b}	0.12^{c}	0.02^{c}
SEM±	0.09	0.03	0.00	0.01	0.01	0.01	0.03	0.02	0.02	0.00	0.07	0.02	0.01

Where= $^{abc...}$*means on the same column with different superscript are significantly different (p<0.05)* S.E.M= *standard error of means;* ARG= *Arginine*; ALA= *Alanine*; VAL= *Valine*; GLU A *Glutamic acid*; GLY= *Glycine*; HIST= *Histidine;* ISO= *Isoleucine*;

LEU= *Leucine*; LYS= *Lysine;* METH= *Methionine;* PHEN= *Phenylalanine;* THRE= *Threonine*; TRYP= *Tryptophan;* A-G= *feed brand*

Conclusion

Differences observed in proximate and amino acid compositions of the different feed brands may imply that regulatory bodies do not monitor proprietary feed production adequately and this may adversely affect poultry producers as most producers rely on proprietary feeds. Regulatory bodies in Nigeria should enforce strict compliance of proprietary feed producers to formulate and produce feeds to meet the nutritional requirements of broiler chicken.

References

AOAC (2000). Association of Official Analytical Chemists. Official methods of analysis, 15th Edition, Washington, DC.

Cengiz. O., Onol A.G., Sevim, O., Ozturk. M., Sar, M. and Daskiran, M. (2008). Influence of excessive lysine and or methionine supplementation on growth performance and carcass traits in broiler chicks. Revue Med Vet., 159 (4): 230-236

Jha, R. and Mishra, P (2021). Dietary fiber in poultry nutrition and their effects on nutrient utilization, performance, gut health and on the environment: a review. *Journal of Animal Science And Biotechnology*. 12:51

IBM SPSS statistics for windows, version 20.0. Armonk, NY: IBM Corp

Montagne, L., Pluske, J. R., and Hampson, D. J.(2003). A review of interactions between dietary fiber and the intestinal mucosa, and their consequences on digestive health in young non-ruminant animals. *Animal Feed Science and Technology*, 108: 95–117

NIS (Nigerian Industrial Standard, 2018). Nutrient requirement for chicken (broiler): Standard for poultry feeds, standard organisation of Nigeria.

NRC (National Research Council) (1994). Nutrient Requirements of Poultry: Ninth Revised Edition. National Academy Press, Washington D.C

Pauzenga, U . 1985. Feeding parent stock. Zoo Technical International. 22-25

Schroeder, W. A., Kay, L. M. and Mills, R. S. (1990). Spectrophotometric analysis of amino acids using ninhydrin chemical reaction. Analytical Chemistry 22: 760

Sklan, D., Smirnov, A., and Plavnik, I. (2003). The effect of dietary fibre on the small intestines and apparent digestion in the turkey. *British Poultry Science*, 44: 735–740

SMUI. (2022). Satellite Map of University of Ibadan,https://latitude.to/articles-by country/ng/nigeria/15223/university-of ibadan

Uchegbu. M.C., Irechukwu, N. M., Omede A. A., Nwaodu, C. H., Anyanwu, G. A., Okoli, I. C and Udedibie, A. B. I. (2009). Comparative Evaluation of Three Commercial feeds on the performance of Broilers. *Report and Opinion*, 1(4)

Umar, A. D. and Tikau F.W. (2019). Proximate and Elemental Analysis of Some Selected Commercial Poultry Feeds in Nigeria. Caliphate Journal of Science & Technology (2): 148-153