"Garden City 2013"

NIGERIAN SOCIETY FOR ANIMAL PRODUCTION (NSAP)

Proceedings of

38TH ANNUAL CONFERENCE & 40TH Anniversary

THEME

ANIMAL AGRICULTURE: A TOOL FOR SUSTAINABLE ECONOMIC TRANSFORMATION

DATE: 17TH - 20TH MARCH, 2013

HELD AT:

DEPARTMENT OF ANIMAL SCIENCE
FACULTY OF AGRICULTURE
RIVERS STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY,
PORT HARCOURT.

Edited by:
B. M. Oruwari, J.P. Alawa,
U.I. Oji, O. J. Owen and O. S. George

ISBN: 1596-5570

FELLOWS OF THE SOCIETY AND YEAR OF INDUCTION

Professor V. A. Oyenuga (Late)	1987
Professor A. A. Ademosun	1989
Professor J. M. Olomu	1994
Professor S. Nuru	1994
Professor G. M. Babatunde	1995
Professor F. C. Obioha	1995
Professor I. F. Adu	1997
Professor M.C.Njike	1998
Professor P.C. Njoku	1998
Professor E.A. Adebowale	2000
Professor O.A. Osinowo	2000
Professor (Dr.) C.C. Nwosu	2001
Professor E.B. Sonaiya	2002
Professor A. B. I. Udedibie	2002
Elder U. Amogu	2003
Professor U. J. Ikhatua	2004
Professor L.O. Eduvie	2005
Professor T. A. Adegbola	2006
Professor S. N. Ibe	2006
Professor O. A. Akinsoyinus	2008
Professor J.O. Gefu	2008
Professor M. M. Abubakar	2009
Professor C. F. I. Onwuka	2009
Professor J. A. Agunbiade	2010
Professor L. O. Longe	2011
Dr. G. O. Oyediji	2011

BOARD OF TRUSTEES

Professor G. M. Babatunde (FNSAP)

Professor J. M. Olomu (FNSAP)

Professor F. C. Obioha (FNSAP)

Professor M. C. Njike (FNSAP)

Professor M. M. Abubakar (FNSAP)

THE NATIONAL EXECUTIVE COUNCIL

Prof. C.F.I. Onwuka	**President**
Dr. A.O. Ani	**Vice President**
Dr. F.O. Abeke	**Secretary**
Dr. (Mrs) L.A.F. Akinola	**Assist. Sec.**
Dr. O.A. Adeyemi	**(Editor-in-Chief)**
Dr. O.J. Babayemi	**(Dp.Editor-in-Chief)**
Dr. O.A. Abu	**Publ. Sec.**
Dr. S.B. Abdu	**Treasurer**
Prof. U. Herbert	**Ex-Officio**

ISSN 1596-5570

The proceedings of the Annual Conference of the Nigerian Society for Animal Production presents papers on research relevant to animal production, views expressed in the proceedings are not necessarily those of the Society of the host institution but of the authors of respective papers.

Proceeding produced by: Department of Animal Science, Rivers Sate University of Science and Technology, Port Harcourt.
Formatting and design by : George, O. S.

Published by:
The Nigerian Society for Animal Production

Printed by : Tokins Graphics
Copies of the Proceedings may be purchased or ordered from the National Secretariat, Nigerian Society for Animal Production (NSAP) C/O National Animal Production Research Institute, Shika, Zaria.

HAEMATOLOGY AND SERUM BIOCHEMISTRY OF BROILERS FED GRITS FROM THREE CASSAVA VARIETIES AS REPLACEMENT FOR MAIZE

O. A. Abu, Adesola A. Popoola, P. Kulakow* and O. O. Tewe

Department of Animal Science, University of Ibadan,
** Tuber and Root Improvement Programme, International Institute of Tropical Agriculture, Ibadan*

ABSTRACT

An eight-week feeding trial was conducted to investigate the effect of 50% replacement of maize with grits prepared from three cassava varieties; TME 419, TMS 01/1371 and TMS 30572 as the major sources of energy on the haematology and serum biochemistry of broilers. Four experimental diets were formulated in which cassava grits replaced maize at 0% for T1 (control diet) and 50% of each treatments T2, T3 and T4 of TME 419, TMS 01/1371 and TMS 30572 cassava varieties, respectively. The replacements were same for starter and finisher phases. One hundred and ninety-six day-old chicks of Abor acre strain were randomly allotted to four dietary treatments with seven replicates of seven birds per replicate in a completely randomized design. Haematology and serum biochemistry showed no significant differences ($P > 0.05$) at the end of the experiment. However, MCH, MCV and AST levels showed significant differences. Inclusion of grits made from whole roots of the three cassava varieties replaced 50% maize in broiler diets without detrimental effect on haematology and serum biochemistry.

INTRODUCTION

Nigeria is the largest cassava (*Manihot spp*) producing country in the world therefore efforts should be intensified to diversify its use. Approximately 60-80% of poultry production cost is tied to feed with around 60% of the ration made from maize (Al-Ruqaie *et al.*, 2011), out of which energy sources constitute between 45-60% of compounded finished concentrate feeds for monogastrics is maize (Tewe and Egbunike, 1993; IAASTD, 2009). The prices of most feed ingredients, especially cereals, are high as a result of stiff competition for them directly by humans and industrial usage resulting in inadequate supply for livestock. It is estimated that the world will require 1 billion tonnes of additional cereal grains to 2050 to meet food and feed demands (IAASTD, 2009). Out of the one billion tonnes maize alone constitutes about 45% which mostly is channelled to feeding monogastrics. Nigeria produces about 40% of the total poultry meat in the West African sub-region (ILRI, 2000) but despite this the intake of meat is low comparable to well developed economies. There is a need to seek ways of reducing cost of poultry production through improved feed cost reduction. Blood parameters have been reported to be positively related to the nutritional status of animals (Babatunde *et al.*, 1992). This study was therefore aimed at assessing the haematology and serum biochemistry of broilers fed three varieties of cassava as an indirect way of monitoring the nutritional status of the chickens.

MATERIALS AND METHODS

Whole cassava root varieties of TME 419, TMS 01/1371, TMS 30572 and TME 08/0893 were from cassava plots of the International Institute of Tropical Agriculture (IITA), Ibadan. The varieties were processed into cassava grits. Four experimental diets were formulated in such a way that each variety of cassava was to substitute for maize. Diet 1 has 100% maize; Diet 2 has 50% maize and 50% TME 419; Diet 3 has 50% maize and 50% TMS 01/1371 and Diet 4 has 50% maize and 50% TMS 30572. The experimental diets for starter and finisher stages are shown in Tables 1 and 2.

Experimental animals and design

A total of one hundred and ninety six (196) one day-old chicks of Arbo acre strain were used for this study. They were purchased from a reputable hatchery in Ibadan, Oyo State. The chicks were randomly allotted into four (4) treatment groups, replicated seven (7) times with seven (7) birds per

replicate in a Completely Randomised Design (CRD) and fed *ad libitum* for 56 days.

Proximate Analysis

The proximate composition of the ingredients and test ingredients were determined according to A.O.A.C (1995).

Haematological and Serum biochemical analysis

At the end of the feeding trial blood samples were collected into two sets per bird into test tubes containing and devoid of anti-coagulant. Packed cell volume (PCV), red blood cell counts (RBC), and white blood cell counts (WBC) were determined using standard methods. Mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MHCH) were calculated. The serum was transferred into another bottle using a micro-pipette. The serum biochemical indices are examined total protein by Biuret method (Reinhold, 1953), albumin by Bromocresol Green method (Peters *et al.*, 1982), globulin values were obtained by subtracting albumin values from the total proteins. Glucose (Cooper *et al.*, 1970), alanine aminotransferase (ALT) and Aspartate amino transferase (AST) by spectrophotometric method.

Statistical analysis

All data collected was analysed using Analysis of Completely Randomised Design and analysed with SAS (1999)

RESULTS AND DISCUSSION

Table 3 shows the effect of diet on haematology values of birds. No significant differences (P >0.05) were observed among the varieties for most of the blood parameters investigated. Results of serum parameters are shown in Table 4. The ALT value was highest in T4 and lowest in T3 while the AST value was highest in treatment 3 and lowest in T2. The aspartate transaminase and alanine transaminase activities were however not significant for the dietary treatments. The value for total protein therefore implied adequacy in the use of protein as confirmed by Iyayi and Tewe (1998). Although cassava tubers deficient in protein replacement of 50% of the maize by grits made from whole cassava tuber did not affect the protein use in the diets. Proximate analyses also did not reveal significant variation among the three varieties of cassava grits and this may account for results obtained.

CONCLUSION

Whole cassava tubers, irrespective of the varieties, when processed into grits can replace 50% of maize without affecting the haematology and serum parameters of broilers.

ACKNOWLEDGEMENT

The authors wish to acknowledge the International Institute of Tropical Agriculture, Ibadan for the supply of the three varieties of cassava roots used in this study and also for the provision of facilities for processing of cassava roots into grits.

REFERENCES

Al-Ruqaie I.M., Swillam S.A., Al-Batshan H.A., Shafey, T.M. (2011). Performance, Nutrient Utilization and Carcass Characteristics and Economic Impact of Broiler Chickens Fed Extruded Bakery Waste. *Jour. of Anim. and Vet. Advances* Vol. 10 Issue: 16 Page No: 2061-2066.

AOAC (2000). Official Methods of Analysis 16th Ed Assoc. Official. Anal. Chem., Washington, DC.

Babatunde, G. M., A. O. Fajimi and A. O. Oyejide (1992). Rubber seed oil versus palm oil in broiler chicken diets. Effects on performance, nutrient digestibility, haematology and carcass characteristics. *Anim. Feed Sci. Tech*. 133-146.

Cooper, G. R. and McDaniel, V. (1970). Standard methods in Serum enzyme activity. Clinical Chemistry, Vol 6 pg159.

IAASTD (2009).International Assessment of Agricultural Knowledge, Science and Technology for Development. Agriculture at a crossroads. Global Report. Pp 606 pages.

ILRI (2000). International Livestock Research Institute. Handbook of livestock statistics for developing countries. Socio-economics and policy research

working paper No. 26. ILRI, Nairobi, Kenya. 299 pp.

Iyayi, E. A. and Tewe, O. O. (1998). Serum total protein, urea and creatinine levels as indices of quality of cassava diets for pigs. *Trop. Vet. Med*, 28: 1-5.

Peter, T., G. T. Biamonte and B. T. Doumas (1982). Protein in serum. In: Selected methods of clinical chemistry. G. W. R. Faulkner and S. Meites (Eds). Am. Assoc. Clin. Chem.

Reinhold, J. G. (1953). Standard methods of clinical chemistry, M. Reiner (Ed). Vol 188, Academic Press.

SAS (1999). Statistical Analysis for Science Users' Guide SAS Institute, Inc, NC, USA.

Tewe O.O. and Egbunike G. N. (1993). Utilisation of Cassava in Non-Ruminant Livestock Feeds, Available on www. agtr.ilri.cgiar.org.

Table 1: Composition (%) of Experimental Diet (Starter)

Ingredients	T1 (Control)	T2 (TME 419)	T3 (TMS 01/1371)	T4 (TMS 30572)
Maize	52.00	26.00	26.00	26.00
Cassava grit	-	26.00	26.00	26.00
Soyabean meal	35.00	35.00	35.00	35.00
Wheat offal	7.73	7.70	7.70	7.70
DL- Methionine	0.15	0.18	0.18	0.18
L-Lysine	0.06	0.06	0.06	0.06
Oyster shell	0.50	0.50	0.50	0.50
Palm oil	2.50	2.50	2.50	2.50
Dicalcium phosphate	1.50	1.50	1.50	1.50
Premix	0.25	0.25	0.25	0.25
Avatec	0.06	0.06	0.06	0.06
Table salt	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**
Calculated ME				
ME (kcal/kg)	3010.11	2923.79	2923.79	2923.79

Table 2: Composition (%) of Experimental Diet (Finisher)

Ingredients	Diet (Control)	T2 (TME 419)	T3 (TMS 01/1371)	T4 (TMS 30572)
Maize	54.00	27.00	27.00	27.00
Cassava grit	-	27.00	27.00	27.00
Soyabean meal	23.50	23.50	23.50	23.50
Wheat offal	16.23	16.20	16.20	16.20
DL-Methionine	0.15	0.18	0.18	0.18
L-Lysine	0.06	0.06	0.06	0.06
Palm oil	2.50	2.50	2.50	2.50
Dicalcium phosphate	1.50	1.50	1.50	1.50
Oyster shell	0.50	0.50	0.50	0.50
Avatec	0.06	0.06	0.06	0.06
Table salt	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25
Total	**100.00**	**100.00**	**100.00**	**100.00**
Calculated ME				
ME (kcal/kg)	3053.40	2963.70	2963.70	2963.70

Table 3. Changes in haematology of broilers fed grits prepared from three varieties of cassava

Parameters	T1	T2 (TME 419)	T3 (TMS 01/1371)	T4 (TMS 30572)	SEM
PCV (%)	28.21	29.5	29.5	27.5	0.47
RBC (x 10^6/mm^3)	4.56	4.27	4.47	4.66	0.09
WBC (x 10^3/mm^3)	24.7	25.8	23.4	25.0	4.10
Lymphocytes (%)	60.36	60.00	58.27	58.08	1.53
Heterophils (%)	32.79	32.79	35.55	35.67	1.35
Monocytes (%)	2.86	2.57	2.36	2.83	0.21
Eosinophils (%)	4.14	4.36	3.91	4.58	0.33
Basophils (%)	0.4	0.14	0.00	0.17	0.05
Haemoglobin (g/100ml)	9.40	9.83	9.84	9.16	0.16
MCHC (%)	33.33	33.32	33.33	333.33	0.001
MCH (*pg*)	20.91^{ab}	23.99^{a}	22.43^{ab}	19.84^{b}	0.64
MCV (*fl*)	62.37^{ab}	72.00^{a}	67.28^{ab}	59.17^{b}	1.92

a, b, Means in the same row with different superscripts are significantly different (P < 0.05)

Table 4. Changes in serum parameters of broilers fed grits prepared from three varieties of cassava

Parameters	T1 (Control)	T2(TME 419)	T3 (TMS 01/1371)	T4 TMS 30572)	SEM
Glucose (mg/dl)	250.73	250.43	275.27	273.84	6.7
ALT (iu/l)	9.05	10.50	8.85	10.78	0.4
AST (iu/l)	67.54^{b}	52.71^{a}	68.07^{b}	68.07^{b}	2.4
Total protein (g/dl)	5.17	3.79	4.46	4.36	0.36
Albumin (g/dl)	1.35	1.45	1.29	1.58	0.53
Globulin (g/dl)	3.81	2.34	3.17	2.07	0.30

a, b, Means in the same row with different superscripts are significantly different (P < 0.05)