EVALUATION OF RAW OR PARBOILED RICE OFFAL AS ENERGY SOURCE FOR FATTENING BUNAJI BULLS

R.T. SANI[1]*, O.S. LAMIDI[1] AND G.E. JOKHTAN[2].

[1] *National Animal Production Research Institute, Ahmadu Bello University, Shika - Zaria.*

[2]*National Open University of Nigeria, Kaduna State.geowife4life@gmail.com Tel :+2348038008759*

ABSTRACT

Feeding trial was conducted for 90 days using 20 Bunaji bulls with a live weight range of 210-249kg and aged 2-3 years to evaluate the feeding value of raw or parboiled rice offal as energy source for bull fattening. Four bulls per treatment were allotted to 5 dietary treatments in a 2x2 factorial arrangement with a common control. A concentrate and basal diets of *Digitaria smutsii* were offered at 2% body weight. The CP contents of the experimental diets varied between 19.69 and 20.44% while the ME ranged from 10.86 to 11.16MJ/kg DM. The crude fibre varied from 14.59 to 17.84%. The intake of concentrate, hay, total feed and daily live weight gain of the bulls were similar (P>0.05) with type and inclusion levels of rice offal. All the bulls in experiment attained an average weight gain of between 1.11Kg to 1.29Kg. Economic parameters like cost per Kg gain, net benefit (NB) and return to naira invested on feed (RIF) were similar (P>0.05) for bulls on both RRO and PRO. There was no significant (P>0.05) differences in the Value of weight gain (VWG), NB, RIF, Cost of feed and Cost per Kg gain for bulls on varying levels of inclusion of RRO or PRO. The inclusion of raw rice offal or parboiled rice offal lead to reduction in feed cost from N25,001.10 to a range of N22,115.50-N23,639.6 (about 5.45%-11.54% reduction in feed cost). It was concluded from this trial that rice offal can replace up to 30% of maize offal as source of energy.

Keyword: Bunaji bulls, energy, intake, rice offal, weight gain.

INTRODUCTION

Consequent from high cost of conventional feedstuffs, research efforts have been directed towards harnessing and enhancing the utilization of agricultural by-products and crop residues for livestock feeding. Rice offal is a by-product of one step process of paddy rice milling which produces only two products; the rice seeds ready for human consumption and the waste product which is made up of rice husk, rice bran, rice polishing and small quantities of broken grains. Present studies attempt to evaluate inclusion of rice offal as energy source in bull fattening.

MATERIALS AND METHODS

Fattening Trial and Animal Management

Fattening trial that lasted for 90 days was conducted using 20 Bunaji bulls with live weight range of 210-249kg, average weight of 220kg and age range of 2-3 years. Four bulls per treatment were allotted to five dietary treatments in a 2x2 factorial arrangement with a common control to compare the effect of 2 levels of inclusion (20 and30%) of raw (RRO) and parboiled rice offal (PRO). Maize offal is the main energy source of the control diet (NRO). Four test diets contain 20 and 30% RRO and PRO. The TDN(%), ME(Kcal/Kg DM) and feed cost per Kg were calculated (Table 1). The bulls were housed in individual pens and weighed every forth night. They were fed concentrate and hay (*Digitaria smutsii*) at 2% of their body weight respectively. The ration was adjusted at regular intervals with changes in live weight.

Chemical, Economic and Data analysis

Analysis of experimental diets was carried out by AOAC (2000) procedure. Also, Acid Detergent Fiber (ADF) and Neutral Detergent Fiber (NDF) were determined in all the feed ingredients according to Van Soest (1991). Metabolizable energy (ME) was determined by equation of (Alderman and Cottrill, 1985). The market price of the various feed ingredients was used to compute the total cost of feed consumed and feed cost per Kilogram weight gain. General Linear Model procedure of SAS (2002) to analyse data from fattening trial.

RESULTS AND DISCUSSION

Chemical composition of experimental diets

These are presented in Table 2. The ME of the diets ranged between 10.85-11.16MJ/Kg DM falls within the ranged 10-11.6MJ/Kg DM recommended for Bulls (Rutherglen, 1995). The CP of the diets range from 22.44% to 19.69%. These fall within the range of (19.00 to 22.91%)

reported by Lamidi *et al.* (2007). The CF the control diet (NRO) and 30% RRO inclusion were lower than the minimum level of 17% required for beef cattle (NRC, 2000).

Effect of Diet containing Rice Offal on the Fattening Performance of Bunaji Bulls

These are presented in Table 3. There was no significant (P>0.05) difference in the performance of bulls based on interaction between type and inclusion level. The average daily weight gain of 1.11-1.29Kg/day obtained in the present study was higher than those obtained in earlier studies Lamidi *et al.* (2007) (0.69-0.91Kg/day), Idowu (2011) (0.4-0.66Kg/day) and Madziga *et al.* (2013) (0.96-1.01Kg/day). Also, Feed Efficiency (FE) of 6.26-6.93 obtained in this study was superior to 9.04-9.55, 13.71-22.4 and 9.03-12.05 reported by Madziga *et al.* (2013), Idowu (2011) and Lamidi (2005) respectively. Higher values obtained could probably be due to differences in experimental diets, age and live weight of the experimental bulls.

Economic Evaluation

The data is presented in Table 3. The bulls on diets containing varying inclusion level of raw and parboiled rice offal had their initial weights improved by 116Kg, 107.50Kg, 104Kg, 100.5Kg and 100Kg for 0%, 20RRO%, 30%RRO, 30%PRO and 20%PRO, respectively. Positive net benefit and rate of return to feed investment was observed for interaction between type and inclusion levels.

Conclusion

Incorporation of rice offal can replace up to 30% of the maize offal in the diet for fattening Bunaji bulls. Farmers can fatten their bulls with any of the rice offal types and attain an average weight gain above 1Kg per day, increased positive Net Benefit, return to investment on feed, superiority of feed efficiency and average weight gain.

Acknowledgement

We appreciate the Management of National Animal Production Research Institute for given the permission to make use of the institute facilities to carry out this study. Also the contribution of the head of data processing unit of the institute Prof I.A Adeyinka for data analyses and contribution of Prof J.T Amodu are highly appreciated.

REFERENCES

Alderman, G. and Cottrill, B.R. (1985). Energy and protein requirements of ruminants. *An advisory manual prepared by the AFRC Technical Committee on Responses to Nutrients.* Wallingford, UK, CAB International.

AOAC. (2000). Official method of Analysis. Association of Official Analytical Chemists. Official Methods of Analysis, Washington, DC.

Idowu, O.O. (2011). Comparative Evaluation of some cereal by- product as energy source for fattening beef cattle. *M.Sc. Thesis submitted to Animal Science Department, Ahmadu Bello University Zaria, Nigeria.*

Lamidi, O.S. (2005). The use of some conventional non-protein sources for fattening cattle. Ph.D. Thesis. Department of Animal Science, Ahmadu Bello University, Zaria, Nigeria.

Lamidi, O.S., Adamu, A.M., Ehoche, O.W. and Alawa, J.P. (2007). Replacement value of Sun-dried broiler litter for cotton seed cake in the fattening diets for Bunaji bulls. *Journal of Animal Production Research* 20(1&2):99-112.

Madziga, I.I., Alawa C.B.I., Lamidi O.S., Goska, D.Y. and Adesote., A.A (2013). Feedlot assessment of four indigenous breeds of cattle in Nigeria. *International Journal of Life Science and Medical Research.* 3(1):35-38.

NRC (National Research Council), (2000). *Nutrient Requirements of Beef Cattle.* 7th Revised Edition. National Academic, Press, Washington, DC, USA.

Rutherglen, D.C. (1995). Energy and Protein Requirements of Beef cattle. Victoria State Government Agricultural Notes. AG0374 ISSN 1329-8062.

Van Soest, J.P. (1991). The use of detergents in the analysis of fibrous feeds. Determination of plant constituents. *Journal of Association of Agricultural Chemistry.50:50-55.*

Table 1: Percent feed composition of concentrate diets.

	Inclusion level				
Ingredient %	0	20RRO	30RRO	20PRO	30PRO
Maize offal	60	45	39	45.0	39.0
Rice offal	0	12	18	12	18
Cotton seed cake	19.5	24.9	29.7	24.0	29.0
Poultry litter	19.5	17.6	12.8	18.5	13.4
Salt	1	1	1	1	1
Total	100.0	100.0	100.0	100.0	100.0
Calculated analysis					
Crude protein(%)	15.16	15.15	15.11	15.17	15.15
TDN(%)	71.73	66.85	64.56	62.84	58.52
ME(Kcal/Kg DM)	2238	2090	2045	2145	2129
Feed cost (₦/Kg)	34.66	32.09	32.09	31.34	31.22

TDN = Total digestible nutrient, ME = Metabolizable energy, RRO = Raw rice offal, PRO = Parboiled rice offal.

Table 2: Chemical compositions of concentrate diets containing varying levels of raw or parboiled rice offal fed to fattening Bunaji bulls.

	Level of inclusion				
Parameters	0	20RRO	30RRO	20PRO	30PRO
Dry matter	90.05	89.77	88.77	89.85	89.17
Crude protein	19.94	19.69	22.44	21.38	20.56
Crude fibre	14.59	17.84	14.91	16.77	17.40
Ether extract	16.28	16.21	14.22	17.05	16.22
Ash	10.19	13.02	9.81	10.74	9.12
Acid detergent fibre (ADF)	20.56	21.89	21.32	24.13	21.09
Neutral detergent fibre (NDF)	36.44	40.81	39.87	43.96	42.41
Hemicellulose	15.88	18.92	18.50	19.83	19.32
Metabolizable energy (MJ/KgDM)	11.05	10.87	11.16	10.86	10.85

RRO = Raw rice offal, PRO=Parboiled rice offal, ME for the feed ingredients was determined by equation of Alderman and Cottrill, 1985. ME (MJ/Kg DM) = 11.78 + 0.0064 CP + $(0.000665EE)^2$ - CF (0.00414EE) - 0.0118A. Where DM=Dry matter, CP=Crude protein, EE=Ether Extract, CF=Crude fiber and A=Ash.

Table 3: Performance and Partial budget analysis of Bunaji bulls fed varying levels of Raw or Parboiled rice offal as energy source

Parameters	Level of inclusion and Type of rice offal					SEM	LOS
	0	20RRO	30RRO	20PRO	30PRO		
Initial weight (Kg)	205.25	203.25	197.50	204.25	198.50	14.500	NS
Final weight (Kg)	321.25	310.75	301.50	304.25	299.00	18.467	NS
Average concentrate intake (Kg/day)	5.22	5.09	4.96	4.99	4.93	0.304	NS
Average hay intake (Kg/day)	3.59	3.44	3.39	3.43	3.53	0.222	NS
Average feed intake (Kg/day)	8.81	8.52	8.35	8.32	8.46	0.475	NS
Average DM intake (Kg/day)	8.04	7.77	7.56	7.59	7.68	0.433	NS
Average weight gain (Kg/day)	1.29	1.20	1.16	1.11	1.12	0.065	NS
Feed Efficiency	6.26	6.60	6.52	6.82	6.93	0.345	NS
Cost of concentrate (₦)	16277.3	14687.0	14310.2	13792.4	13846.2	905.271	NS
Cost of hay (₦)	8723.8	8352.6	8241.9	8323.2	8576.8	539.571	NS
Total cost of feed (₦)	25001.1	23639.6	22552.1	22115.5	22422.9	1304.79	NS
Cost/ Kg gain (₦)	216.07	217.39	216.16	220.85	224.50	11.193	NS
Net Benefit (NB)	21398.9	19960.4	19047.9	17884.5	17777.0	1836.18	NS
Return to investment on feed (RIF)	0.85	0.88	0.86	0.82	0.79	0.089	NS
Value of gain (₦)	46400.0	43000.0	41600.0	40000.0	40200.0	2323.790	NS

RRO = Raw rice offal, PRO = Parboiled rice offal, SEM = Standard error of mean, LOS = Level of significance*=P<0.05; NS = Not significant (P>0.05)