African Journal of Biotechnology Vol. 9(28), pp. 4499-4502, 12 July, 2010
Available online at http://www.academicjournals.org/AJB
ISSN 1684–5315 © 2010 Academic Journals

Full Length Research Paper

Effect of feeding graded levels of biscuit waste based diet on non-carcass components of Yankasa rams

E. S. Apata, O. O. Eniolorunda*, K. A. Ojo and A. O. Okubanjo

Department of Animal Production, College of Agricultural Science, Olabisi Onabanjo University, Yewa Campus, Ayetoro, Ogun State, Nigeria.

Accepted 26 May, 2010

Five experimental diets B0 (0%, control), B1 (25%), B2 (50%), B3 (75%) and B4 (100%) were formulated with combined biscuit waste and *Leucaena leucocephala* meals and fed to 20 Yankasa rams for 91 days to evaluate their effects on non-carcass components of the rams. The rams were slaughtered at the expiration of the experiment and non-carcass components were measured which included external and internal offals, blood, bones and diaphragm. The results revealed that there were significant (P < 0.05) differences in the non-carcass components of all the rams fed different diets. It was further observed that diets B1 (25%) and B2 (50%) biscuit waste inclusion had the best (P < 0.05) effects on non-carcass components of the rams followed by diets B3 (75%) and B4 (100%) biscuit waste inclusion in that order compared with control diet B0 (0%) biscuit waste inclusion. It was therefore recommended that diets B1 and B2 be utilized for optimum results if non-carcass variables are desired in Yankasa rams.

Key words: Biscuit waste, *Leucaena leucocephala*, non-carcass components, Yankasa rams.

INTRODUCTION

The small ruminants sector plays important role in the economy of developing countries. In Nigeria, for instance, sheep are of high economic significance to man or rural dwellers who keep them in small units (Momoh and Ochaba, 2002). They are kept in almost all parts of Nigeria due to the fact that they serve as potential source of financial stability and supply of meat, milk and other by-products (FAO, 1991). Of all the breeds of sheep found in Nigeria, Yankasa is the most common as it is distributed throughout different ecological zones of the country (Kitchenby, 2002). Improved carcass composition which consists of lean and offal components is one fact that has impacted on mutton demand and consumption (Leward et al., 1995; Purcell, 1998). Increased size and fetuses are some of the factors that affect consumer acceptability of mutton (Jeremiah et al., 1995). Different researchers (Longe, 1987; Adeyanju et al., 1975) had worked on how to produce more meat for the teeming populace in terms of feed supply. Biscuit waste compounded with *Leucaena leucocephala* is very rich in protein and other nutrients which if fed to sheep can support their growth, hence increasing both carcass and non-carcass components of their bodies. Biscuit waste is an industrial by-product that is very rich for feeding livestocks, while *L. leucocephala* is a browse plant that is relished by all ruminants because it is richer than conventional grasses and lacks anti-nutritional factors (Longe, 1987; Olayeni et al., 2007; FIRA, 1980).

Despite all efforts to improve ruminants or better still the livestock sector for increased protein supply, the required protein consumption quota from meat for humans have not been met (FAO, 1991). It is therefore necessary to pay more attention to the consumption of non-carcass components of meat animals such as vital organs, the gastro-intestinal-tract, the skin, feet and head so as to augment protein intake of the people especially of the rural dwellers and growing children. This study was therefore undertaken with the objective of assessing the effect of feeding graded levels of biscuit waste on non-carcass components of Yankasa rams.

MATERIALS AND METHODS

Experimental animals

Twenty Yankasa rams about 10 - 12 months old of live weights

*Corresponding author. E-mail: seyieniolorunda@yahoo.com.

Table 1. Chemical composition of biscuit waste and *L. leucocephala* meals.

Fractions (%)	Biscuit waste meal	*L. leucocephala* meal
Dry matter	91.73	88.18
Organic matter	58.25	65.00
Crude protein	9.64	30.10
Ether extract	2.78	4.60
Ash	6.85	8.50
Crude fibre	10.05	22.47
Nitrogen free extract	62.41	22.51
Gross energy	3.20	2.14

between 8 – 15 kg were used for this study. They were purchased and transported from Shika, Zaria to the Teaching and Research farm of the College of Agricultural Sciences, Olabisi Onabanjo University, Yewa Campus, Ayetoro. The animals were stabilized through adaptation for two weeks before the experiment commenced and were given all needed medications. The animals were randomly allocated to five test diets with four animals on a diet which was given in the morning and evening but the animals were allowed to graze during the day. Water was provided *ad libitum* throughout the 91 days the experiment lasted.

Experimental diets

Five different test diets were formulated. Diet one contained 0% (control diet), diet two 25%, diet three 50%, diet four 75% and diet five 100% combined biscuit waste and *L. luecocephala* in replacement for combined maize and wheat offals as B0, B1, B2, B3, and B4 test diets.

Slaughtering and carcass processing

At the end of the experiment, animals in each group were slaughtered after fasting for about 17 h. The trendy rams were bled by severing the jugular veins and the carotid arteries below the jaws at the neck region. They were dressed using skinning method, eviscerated and washed. Both the external and internal non-carcass components of the rams were measured.

Chemical analysis

The proximate analysis of both the test diets and the combined biscuit waste and *L. leucocephala* meals were carried out according to (AOAC, 2000).

Statistical analysis

All the data generated from this study were subjected to analysis ofvariance using (SAS, 2002) and the means were separated with Duncan multiple range test of the same software.

RESULTS AND DISCUSSION

The chemical composition of biscuit waste and *L. leucocephala* meals is shown in (Table 1). The results showed that apart from dry matter, nitrogen free extract and gross energy, all other variables measured were higher in *L. leucocephala* meal which makes a good complement for biscuit waste meal in feeding livestock especially ruminants. Table 2 shows the composition of experimental diets. The dry matter, crude protein, and metabolized energy of the diets were high enough to support good results from the test rams groups. Table 3 shows the mean percentage of non-carcass (external) offals blood, diaphragm and bone of Yankasa rams fed with (25%) biscuit waste and *L. leucocephala* meals had the best ($P < 0.05$) result of non-carcass (external) offals, blood and bone followed by rams fed with diets B2 (50%) and B3 (75%) inclusions of biscuit waste and *L. leucocephala* meals combination and then rams in group fed diet B4 (100%) inclusion of the tested feed stuffs compared with the control diet B0 (0%) inclusion of the tested feed stuffs. These results could be as a result of high proximate composition and energy in diets B1, B2, B3, and B4 in that order. The mean percentage of non-carcass (internal) offals of Yankasa rams fed biscuit waste based diet is shown in Table 4. The results showed that there were significant ($P < 0.05$) differences in all the non-carcass (internal) offals measured. The results further indicated that rams fed test diets B1 and B3 had the best ($P < 0.05$) mean percentage non-carcass (internal) offals followed by those rams fed diet B2 and then B4 compared with the control diet B0. These internal offals developed in the rams as observed in different groups fed different levels of biscuit waste based diet as a result of appropriate protein, dry matter crude fibre and energy contents of diets fed to the rams. These results corroborate with the observations of (Longe, 1987; Olayemi et al., 2007) who noted that biscuit waste based diet could support growth increase in carcass and non-carcass characteristics of livestocks.

Conclusion

The results obtained from this study showed that biscuit waste based diet can improve both external and internal offals-non-carcass components of Yankasa rams. The results further revealed that rams fed diets B1, B2, B3,

Table 2. Composition of experimental diets.

Ingredient	Treatment diets				
	B0	B1	B2	B3	B4
Maize	32.50	24.37	16.02	8.13	-
Wheat offal	30.00	22.50	15.00	7.50	-
Leucaena leucocephala	-	7.50	15.00	22.50	30.00
Biscuit waste	-	8.13	16.05	24.37	32.50
PKC	10.00	10.00	10.00	10.00	10.00
BDG	23.50	23.50	23.50	23.50	23.50
Premix	0.50	0.50	0.50	0.50	0.50
Oyster shell	0.50	0.50	0.50	0.50	0.50
Bone meal	2.50	2.50	2.50	2.50	2.50
Salt	0.50	0.50	0.50	0.50	0.50
Total	100.00	100.00	100.00	100.00	100.00
Determined analysis (%)					
Dry matter	92.62	93.08	93.02	92.15	93.05
Organic matter	83.40	87.52	84.11	82.50	82.50
Crude protein	15.15	14.48	14.30	14.19	14.04
Ether extract	3.17	7.56	2.34	2.21	2.08
Ash	10.40	9.66	9.80	8.56	9.25
Crude fibre	11.20	13.61	13.61	13.00	14.15
Nitrogen free extract	52.60	47.77	53.42	54.19	43.53
ME (Kcal/kg)	3.15	3.10	2.95	2.92	2.85

Table 3. Mean percentage of non-carcass (external) offals, blood, bone and diaphgram of Yankasa rams.

Variable (%)	Treatment diets					
	B0	B1	B2	B3	B4	SEM
Head	7.53^{b}	9.00^{a}	6.40^{c}	7.35^{b}	7.45^{b}	0.56
Skin	7.80^{b}	6.50^{c}	8.55^{a}	7.55^{b}	6.90^{c}	0.35
Feet	2.10^{c}	3.40^{a}	2.50^{b}	2.25^{c}	2.30^{bc}	0.27
Blood	7.00^{b}	10.00^{a}	5.75^{c}	3.80^{d}	4.45^{d}	0.87
Diaphragm	0.45	0.45	0.47	0.49	0.41	0.08
Testes	0.68^{c}	0.98^{a}	0.79^{b}	0.70^{b}	0.75^{b}	0.10
Bone	z19.40^{c}	27.45^{a}	23.25^{b}	26.55^{a}	22.25^{b}	1.76

abcd: means within the same row with differing superscripts are significantly different ($P < 0.05$) Variables were derived as percentage live shrunk weight of rams.

Table 4. Mean percentage of non-carcass (internal) offals of Yankasa rams.

Variable (%)	B0	B1	B2	B3	B4	SEM
Kidney	0.49^{a}	0.29^{b}	0.31^{b}	0.35^{b}	0.33^{b}	0.11
Liver	1.57^{b}	1.40^{b}	1.96^{a}	2.18^{a}	1.56^{b}	0.30
Heart	0.38^{b}	0.31^{b}	0.54^{a}	0.53^{a}	0.51^{a}	0.09
Spleen	0.12^{b}	0.19^{b}	0.20^{b}	0.18^{b}	0.24^{a}	0.03
Lung trachea	1.35^{b}	1.76^{ab}	2.36^{a}	1.74^{ab}	2.23^{a}	0.81
Omentum	1.46^{a}	1.36^{a}	0.83^{c}	1.07^{b}	0.32^{c}	0.83
Kidney fat	0.25^{b}	0.29^{b}	0.28^{b}	0.35^{a}	0.25^{b}	0.04
Mesenteric fat	1.61	1.74	1.85	1.87	1.85	0.09
Full stomach	6.44^{b}	7.50^{a}	6.73^{b}	7.44^{a}	3.96^{c}	1.32
Full small intestine	2.86^{b}	3.80^{a}	2.98^{b}	2.65^{b}	2.62^{b}	0.62
Empty small intestine	4.23^{b}	5.17^{a}	4.49^{ab}	4.25^{b}	3.95^{b}	0.62
Full large intestine	4.23^{b}	5.17^{a}	4.49^{ab}	4.25^{b}	3.95^{b}	0.86
Empty large intestine	0.98^{b}	2.19^{a}	0.89^{b}	0.86^{b}	0.88^{b}	0.52
Full gut	25.55	26.25	26.00	26.00	25.50	0.58
Empty gut	1060^{c}	12.15^{a}	11.15^{b}	11.10^{b}	10.10	0.31

^{abc} Means within the same row with differing superscripts are significantly different ($P < 0.05$)

and B4 in that order furnished high non-carcass components compared with the control diet B0. It is therefore recommended that diet B1 and B2 with (25%) and (50%) biscuit waste and *L. leucocephala* combination should be utilized by ruminant livestock keepers since they support the animals non-carcass components if desired by the farmers.

REFERENCES

AOAC (2000). Association of official analytical chemists. Official methods of Analysis 16th edition. Washington D.C USA.

Adeyanju SA, Oguntuga DBA, Ilori JO, Adegbola AA (1975). Cocoa husk in poultry diet. Mali Agric. Res. 4: 131-136

FAO (1991). Livestock and livestock products. Quality Bulletin of statistics 4(3): p. 39. Food and Agricultural Organization, Rome, Italy.

FIRA (1980). Leucaena Leucocephala tropical Mexican usage potential. Blanco de Mexico D.F p. 90.

Jeremiah LE, Gibson LL, Akin Tong (1995). Retail acceptability of lamb as influenced by gender and slaughter weight. Food Res. Int. 26: 115-118

Leward CE, Trend Hill A, Derand JL (1995). Consumer perception of lambs compared with other meat sheep and Goat Res. J. 11: 64-70

Longe O (1987). Replacement value of biscuit waste for maize in broiler diets. Nig. J. Anim. Prod. 13(1-2): 70-78

Momoh OM, Ochaba AO (2002). Herd structure of small holder goat production in Otukpo L.G.A. of Benue State, Nigeria Trop. J. Anim. Sci. 5(2): 53-57

Olayemi TD, Farimi GO, Ojebiyi OO (2007). Replacement value of biscuit waste on the performance and egg quality parameters of laying hens. Proc. 32nd Ann. Conf. of the Nigerian society for Animal Production Calabar, March 18-21. pp. 313-320.

Purcell WD (1998). Problem, Need, Opportunities and prescription for the future. Sheep and Goat, 14: 160-120

SAS (2002). Statistical Analysis System SAS Stat Version 9 SAS institute Inc. Garry NC 27513 USA.