ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue XII December 2024

Dressing Percentage and Carcass Characteristics of Fattening Yankasa Rams Fed Treated Groundnut (*Arachis Hypogeae*) Shell in a Complete Diet

Bello M. D[1], Lamidi, O. S[2], Audu, S. B[3], Tanko, R. J[2], Maru, L. M[1], Mukhtar, A[1]

[1]College of education, Maru Zamfara state, Nigeria

[2]National Animal Production Research Institute (NAPRI) Zaria, Nigeria

[3]Ahmadu Bello University, (ABU) Zaria, Nigeria

DOI: https://doi.org/10.51584/IJRIAS.2024.912050

Received: 05 December 2024; Accepted: 20 December 2024; Published: 21 January 2025

ABSTRACT

The study was conducted to determine the effect of untreated, urea, lime and urea plus lime treated groundnut (*Arachis hypogaea*) shell in a complete diet on dressing percentage and carcass characteristics in fattening Yankasa rams. The study was conducted at the Teaching and Research Farm (Small Ruminants Unit of Animal Science Department, Faculty of Agriculture, Ahmadu Bello University, Zaria. Each kilogram of groundnut shell was treated with 5% urea and 5% lime for treatments 2 (UTGNS) and 3 (LTGNS) respectively. For treatment 4 (ULTGNS), 1 kg of groundnut shell was treated with 2.5% urea and 2.5% lime, but the shell in treatment 1 was not treated (UNTGNS). The urea and lime were diluted in water at 2 kg in 20 litres of water and sprayed on 40 kg of the groundnut shell. Four treatment diets were formulated containing 40% untreated, 40% urea treated, 40% lime treated and 40% urea plus lime treated groundnut shell. Sixteen Yankasa rams were used and randomly assigned to the four treatment diets with four animals per treatment in a completely randomized design (CRD). The diet was formulated to have 14% crude protein (CP) content. The fattening trial lasted for 90 days. The results showed that the live weight and weight after slaughter were significantly ($P<0.05$) higher in animals fed UNTGNS and those on ULTGNS diets compared to UTGNS and LTGNS. In hot carcass weight, rams fed UNTGNS diet were significantly ($P<0.05$) higher than those fed UTGNS, LTGNS and ULTGNS diets and rams fed the UTGNS diet were significantly ($P<0.05$) lower than those on LTGNS and ULTGNS diets. There was a significant difference ($P<0.05$) among the rams fed UNTGNS in dressing percent (53%) compared to rams on UTGNS and LTGNS diets which were significantly ($P<0.05$) T LTGNS than those on ULTGNS diet (49.21%). However, meat yield ratio was significantly ($P<0.05$) higher in rams fed the ULTGNS diet followed by those on LTGNS and the least was in rams on the UNTGNS diet. Results of the prime cuts shoed that the leg weight of the rams on UNTGNS and ULTGNS diets was significantly ($P<0.05$) higher than those on the other treatment diets. However, the chump weight was statistically higher ($P<0.05$) in the carcass of animals fed LTGNS diet than those in the other treatment groups. Rams on ULTGNS diet showed a higher value for loin which was significantly ($P<0.05$) higher than that of the other groups. However, rams on the UNTGNS diet had the highest mean values of breast, neck, midrib, main rib and shoulder which were significantly ($P<0.05$) different from those in the other treatment groups. The use of untreated groundnut shells in the diet of fattening Yankasa rams is therefore recommended.

Keywords: Treated groundnut shell, urea, lime, carcass percentage and characteristics.

INTRODUCTION

Feed is one of the critical factors that limit livestock production in the tropics, especially during the dry season when high-quality forages are scarce (Adebowale and Taiwo, 1996). The cost of livestock feeds and feed ingredients in recent years has increased tremendously. Hence, the cost of feeding has become a major problem of livestock production in the developing countries. Aduku (1993) reported cost of feed accounts for about 70% of the total cost of animal production. This therefore necessitates the need and interest in exploring

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue XII December 2024

neglected or underutilized feedstuff materials, such as groundnut shells which are left after the groundnut was processed and are very much available in the northwestern zone of the country. Several researches were conducted in this area; however, not much has been done evaluate nutritive potentials of groundnut shells in the diet of sheep in an attempt to reduce the cost of sheep production.

Sheep can use marginal lands and crop residues as feed and are kept in Nigeria mainly for meat (Bello, 2007). They are ranked second after cattle in terms of meat production (FDLPCS, 1992). FAO (1982) reported sheep to contribute about 16% of the total domestically produced meat in Nigeria. Of the four breeds of sheep in Nigeria, Yankasa sheep are perhaps the most widely and most numerous breed in the northern part of Nigeria, they are found in the Sahel, Sudan and Guinea Savannah zones of the Country (Gefu, 2002).

Increasing demand for rams and bucks as slaughtered animals for meat can be satisfied through fattening. The primary objective of fattening is to increase the live weight of the animal and the quality of meat in a relatively shorter period (Osuhor, 2002). Animals for fattening can completely be confined while all feeds and water are provided throughout the fattening period, though it can be achieved in a semi-intensive system, where they are offered more feed supplements than the rest of the flock before or after being released for grazing.

Groundnut shells were reported to contain 65.7% cellulose, 21.2% carbohydrates, 7.3% protein, 4.5% minerals and 1.2% lipids, since the processed shells from shelling machines contain bits and skins of nuts, the actual protein and lipid contents of this waste material are probably much higher (Abdurrazak *et al.,* 2014).

Information on the utilization of groundnut shells as an ingredient for feeding ruminants such as sheep is very scarce. Most of the earlier researches conducted were on groundnut haulms (Malau-Aduli *et al.,* 2003 & Arslan, 2005). The residue is left in the processing area after the nut has beenan removed, constituting environmental problem (Bello, 2018). Utilization of groundnut shells in the diet of ruminant animals will not only reduce cost of production but helps in reducing its negative environmental impact. The study aimed to determine the fattening performance of Yankasa rams fed a complete diet containing untreated, urea, urea plus lime-treated groundnut shell.

MATERIALS AND METHOD

The study was conducted at the Teaching and Research Farm (Small Ruminants Unit of Animal Science Department, Faculty of Agriculture, Ahmadu Bello University, Zaria. It is located in the Northern Guinea Savannah of Nigeria, on Latitude $11^{0}12^{I}$ N and Longitude 7^{0} 33^{I} E at an altitude of 610m above sea level (GPS, 2012). Annual rainfall of 1100 -1200mm and temperature that fluctuate+s within the range of 14.5-39.5^{0}C (IAR Metrological Service Unit, 2015)

Groundnut shells used in the experiment was obtained from a groundnut processing unit in Wanke, Zamfara state, Nigeria. It was ground using a hammer mill machine fitted with 2.5 sieve to ease mixing with other ingredients. In treatment 1 the shell was left chemically untreated, therefore served as untreated (UNTGNS).

Each kilogram of groundnut shell was treated with 5% urea and 5% lime for treatments 2 (UTGNS) and 3 (LTGNS) respectively. For treatment 4 (ULTGNS), 1 kg of groundnut shell was treated with 2.5% urea and 2.5% lime. The urea and lime were diluted in water at 2kg in 20 litres of water and sprayed on 40kg of the groundnut shell. The treated shells were ensiled in Persue cowpea improved sacks (PICS) for two weeks) then dried for a day and packed into other bags till the period of the feed formulation.

A total of 16 intact Yankasa rams weighing 24±4 kg were purchased from the Sheme market of Katsina state. They were randomly allotted to the four treatments at four animals per treatment, in a completely randomized design (CRD). Four treatment diets were formulated with other ingredients to contain 14% CP with 40% inclusion of UNTGNS, UTGNS, LTGNS and ULTGNS respectively. Table 1, shows the ingredients composition of the fattening diet.

A daily allowance of a complete diet at the rate of 4% body weight per head was offered. The rams were quarantined for two weeks in which prophylactic treatments were given. Dewormed with Albendazole 10% 3

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue XII December 2024

ml/20 kg orally, sprayed with Ametic (Ascaracide) 20 ml/15 lts of water, injected with Tetracycine L.A 1 ml/10 kg (im), Tylosin L A1 ml/10 kg(im) and Ivomectine 1 ml/50 kg (sc). Fresh and clean water was provided *ad libitum*, good sanitation practice was adhered to. The fattening trial lasted for 90 days. The animals were weighed bi-weekly to determine weight gain. Daily records of feed intake were taken throughout the experimental period by weighing the feed offered and the left over (orts) in the following day. Daily intake of the diets was calculated for each animal by subtracting the left over from the quantity already served to the animals. Daily water intake and temperature were also recorded.

The weight of the individual animals was measured at the onset of the trial after an overnight fasting to obtain their initial weights and subsequently at 2 weeks intervals between 8:00-9:00am throughout the feeding trial. Weight gain was determined by subtracting the initial weight from the final weight within the periods. The feed conversion ratio was also determined, by dividing the feed intake by weight gain.

Carcass analysis

Three rams were randomly selected from each of the treatment groups following the termination of the fattening study. They were starved of feed and water overnight to get shrunk body weight before slaughtering. They were each weighed before slaughtering to determine and record their slaughter weight. They were later weighed after slaughtering and reweighed after evisceration to determine hot carcass weight.

The external offals such as head, tail and skin were removed and weighed separately after slaughtering. Following evisceration, the internal offals (liver, lung, heart and spleen) were removed and weighed separately. The gastrointestinal tracts (GIT) were measured. Total weight and meat composition were also determined. The dressing percentage was determined using the method of (Aganga *et al*., 2003).

All the data collected on the growth, fattening, digestibility and carcass characteristics were subjected to analysis of variance (ANOVA), (SAS, 2002). Differences among treatment means were compared using the Duncan Multiple Range Test (DMRT) of SAS software.

The following model was used:

$$\mathbf{X_{ij}=\mu+t_i+e_{ij}}$$

Where:

X_{ij}=Observation measured

μ= Population mean

t_i=Treatment effect (control, urea, lime, urea/lime treatment)

e_{ij}=Experimental error

A repeated measure model was used to statistically analyze samples that were collected twice at 0 and 4 hours post-feeding i e, blood and rumen liquor.

RESULTS AND DISCUSSION

Dressing Percentage and Carcass Characteristics of the Fattening Yankasa Rams Fed Urea and Lime Treated Groundnut Shell in a Complete Diet.

The results of carcass characteristics of the fattening Yankasa rams are presented in Table 3. The results showed that the live weight and weight after slaughter were significantly ($P<0.05$) higher in animals fed UNTGNS and those in ULTGNS diets compared to UTGNS and LTGNS. In hot carcass weight, rams fed the UNTGNS diet were significantly ($P<0.05$) higher than those fed the UTGNS, LTGNS and ULTGNS diets and rams fed the UTGNS diet were significantly ($P<0.05$) lower than those on LTGNS and ULTGNS diets. There

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue XII December 2024

was a significant difference (P<0.05) among the rams fed UNTGNS in dressing percent (53%) compared to rams on UTGNS and LTGNS diets which were significantly (P<0.05) T LTGNS than those on ULTGNS diet (49.21%). However, the meat yield ratio was significantly (P<0.05) higher in rams fed ULTGNS diet followed by those on LTGNS and the least was in rams on UNTGNS diet.

Effect Urea and Lime Treated groundnut shell in a Complete Diet on prime cuts of Fattening Yankasa Rams.

The results of the prime cuts are summarized in Table 4. The results showed that the leg weight of the rams on UNTGNS and ULTGNS diets was significantly (P<0.05) higher than those on the other treatment diets. However, the chump weight was statistically higher (P<0.05) in the carcass of animals fed the LTGNS diet than those in the other treatment groups. Rams on ULTGNS diet showed a higher value for loin which was significantly (P<0.05) higher than that of the other groups. However, rams on UNTGNS diet had the highest mean values of breast, neck, mid rib, main rib and shoulder which were significantly (P<0.05) different from those in the other treatment groups. However, for the mean values of shoulder there was no statistical difference (P>0.05) between rams fed UNTGNS diet and those on the ULTGNS diet. Tail weight was not significantly different (P>0.05) among the animals on the treatment diets.

The dressing percentage of the fattening rams in this study was higher than the 42.07-43.62% reported by Adamu (2015) on the assessment of two groundnut varieties for forage, pod yield characteristics and effect of feeding haulms to Yankasa rams, 44 % reported by Intesar and Muna (2011). However, the dressing percentage was within the range of 48-54% for sheep reported (Bruce, 2016). It is important to note that besides feed, other factors that can affect dressing percentage, for example an animal that is weighed “full of feed” versus fasted for a day can dress up to 5 percent lower, also heavier muscled and fatter animals will in general, have higher dressing percentage than lighter muscled and leaner animals respectively, amount and length of hair may also influence dressing percentage.

The meat yield of rams fed untreated diet was not much different from the value obtained in rams on ULTGNS diet. Meat yield percentage was surprisingly higher in rams fed LTGNS diet. This may be attributed to the bone yield value of the rams in both UNTGNS and ULTGNS diets. Meat-to-bone ratio was also higher in rams fed the ULTGNS diet.

Prime cuts determine the carcass-cutting yield of an animal and can be bone-in or boneless (Bruce, 2016) depending on the need of the farmer, butcher, or customer. Rams on ULTGNS diet recorded the highest value in the leg and loin cuts. The mean value of chump was observed to be higher in rams fed LTGNS diet. However, the breast cut mean value indicated that rams fed UNTGNS diet have the highest value, but for shoulder cut, rams on UNTGNS diet had a similar value with those fed ULTGNS diet.

SUMMARY CONCLUSION AND RECOMMENDATIONS

Results of the carcass analysis showed that the live weight and weight after slaughter were significantly higher in animals fed untreated diets and had the highest carcass dressing percentage (53%) followed by those on ULTGNS diet. However, the meat yield ratio was significantly (P<0.05) higher in rams fed ULTGNS diet followed by lime-the treated and the least was in rams on UNTGNS diet. The leg weight of the rams on control and urea/lime treated diet were significantly (P<0.05) higher than those in the other treatment diets. However, the chump weight was statistically different (P<0.05) in rams fed LTGNS diet compared to the other treatment groups. Rams on ULTGNS diet showed a higher value of loin which was significantly (P<0.05) higher than that of the other groups.

Urea and lime treatment did not influence the carcass dressing percentage of the rams as animals fed the UNTGNS diet had the highest (53%), but chump weight was higher in rams on the LTGNS diet, rams fed the ULTGNS diet had a higher mean value of loin.

Farmers should be encouraged to grind/crush/chop groundnut shells and incorporate up to 40% inclusion in diet formulations for growing and fattening rams, treated or untreated. The Government should encourage

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue XII December 2024

further research to identify other potentials of groundnut shells in the diet of ruminant animals.

REFERENCES

1. Abdur-Razak,S., Otie, D. and Oniwapele, Y.A. (2014) Proximate analysis and anti-nutritional factors of groundnut shell and melon husk.Online Journal Animal Feed Resources, 4(2):25- 28.
2. Adamu, H. Y. (2015). Assessment of two Groundnut (arachis hypogaeal) Varieties for Forage, Pod Yield Characteristics and Effect of Feeding the Haulm to Yankasa Rams. (A Doctoral Dissertation Department of Animal Science Ahmadu Bello University. Zaria, Nigeria)127Pp
3. Adebowale, E.A. and Taiwo, A.A. (1996). Utilization of crop residues and agro-industrial by- products as complete diet for West African Dwarf Sheep and Goats. Nigerian Journal of Animal Production, 23 (1):153-160.
4. Aduku, A. O. (1993). Tropical Feed Stuffs Analysis Table. Department of animal Science Ahmadu Bello, University Press, Samaru, Zaria.
5. Aganga, A.A. and Tshwenyane, S.O. (2003). Feeding values and anti –Nutritive factors of forage tree legumes. Pakistan Journal of Nutrition, 2(3):170-177.
6. Bello, M.D. (2008) Utilization of Plants in the Control of Gastrointestinal Parasites in Sheep in Zamfara State of Nigeria. (A Master's thesis Department of Animal Science, Faculty of Agriculture Usmanu Danfodiyo University Sokoto, Nigeria)
7. Bello, M.D.; O.S. Lamidi; S.B. Audu; R.J. Tanko and L.M. Rabi'u (2019) Growth Performance of Yankasa Ram Lambs Fed Urea and Lime Treated Groundnut (Arachis hypogeae) Shell in a Complete Diet. Proceedings of WRFASE Internationak Conference, Abu Dhabi, UAE
8. Bruce, S. (2016) Sheep and Goat Marketing Information. Cornell small farm program. Cornell University. 2Pp
9. FAO (2016) Food Agriculture Organization of the United Nations. Production Year Book, 35. Rome, Italy.
10. FDLPCS (1992) Federal Department of Livestock Pest Control Services. Nigerian Livestock Resources.Vol. II.National Synthesis. Resource Inventory and ManagementLtd.St.Helier. UK. 440Pp.
11. Gefu, J. O. (2002). Socioeconomic Cosideration in Small Ruminant Proction. In C. A. . Lakpini, A. M. Adamu, O. W. Ehoche, & J. O. Gefu (Eds.), Small Ruminant Production Training Workshop (First., p. 97). Zaria: National Animal Proiduction Research Institute, Shika. P 97
12. IAR Metrological Service Unit (2012). Weather Report. Institute of Agricultural Research, Samaru. Ahmadu Bello University, Zaria, Kaduna State.
13. Malau-Aduli, B.S.,Eduvie, L. O., Lakpini, C. M. and Malau-Aduli, E.O. (2003). Chemical composition, feed intakes and digestibility of crop residue based rations in non-lactating Red Sokoto goats in the sub humid zone of Nigeria. Animal Science Journal, 74:89-94.
14. Osuhor, C.U. (2002) Techniques for Fattening Rams and Bucks. Small Ruminant Training Workshop Held at National Animal Production Research Institute NAPRI). Ahmadu Bello University, Shika, Nigeria, P 63.
15. SAS, (2002) Statistical Analysis System Institute. User Guide Version 9 Windows.Cary North Carolina USA.

Table 1. Ingredients composition of fattening experiment diets.

Ingredient (%)	Treatments diets			
	Control	Urea	Lime	Urea/Lime
Groundnut shell	40.00	40.00	40.00	40.00
Maize offal	20.50	33.50	23.00	28.50
C S C	37.50	24.50	35.00	29.50

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue XII December 2024

Bone meal	1.25	1.25	1.25	1.25
Salt	0.50	0.50	0.50	0.50
Premix	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00
Calculated CP	14	14	14	14
CSC-Cotton Seed Cake, CP-Crude Protein				

Table 2. Proximate composition of fattening diets.

Parameters (%)	Treatment diets			
	UNTGNS	UTGNS	LTGNS	ULTGNS
Dry Matter	91.28	90.88	92.04	90.87
Organic Matter	84.04	85.32	86.49	84.92
Crude Protein	13.88	14.31	13.76	14.13
Ether Extract	4.56	4.79	4.68	3.77
Lignin.	9.40	8.64	9.92	9.56
Ash	7.24	5.56	5.97	5.95
Acid detergent fibre	23.30	24.01	26.00	22.45
Neutral detergent fibre	48.72	48.02	49.12	46.30
Nitrogen free extract	57.13	57.46	58.89	57.06

Table 3. Carcass characteristics of fattening Yankasa rams fed UNTGNS, UTGNS, LTGNS and ULTGNS in a complete diet

Parameters	Treatment diets				SEM
	UNTGNS	UTGNS	LTGNS	ULTGNS	
Live weight (Kg)	32.20	28.00	29.00	31.50	2.11
Weight after slaughter (Kg)	31.25^{a}	26.80^{b}	27.45^{b}	30.15^{a}	1.29
Hot carcass weight (Kg)	17.10^{a}	14.00^{c}	14.55^{bc}	15.50^{b}	0.66
Carcass dressing %	53.11	50.00	50.17	49.21	0.15
Meat yield (Kg)	12.65^{a}	10.45^{c}	11.37^{bc}	12.25^{ab}	0.60
Bone yield (Kg)	4.38	3.38	3.15	3.30	2.81

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume IX Issue XII December 2024

Meat yield %	38.75	37.27	39.06	38.91	1.20
Meat bone ratio	2.89^{d}	3.09^{c}	3.44^{b}	3.71^{a}	0.10
Means within the same rows with different superscripts differ significantly (P<0.05) SEM=Standard error of means					

Table 4. Prime cuts of fattening Yankasa rams fed UNTGNS, UTGNS, LTGNS and ULTGNS in a complete diet.

Parameters (Kg)	Treatment diets				SEM
	UNTGNS	UTGNS	LTGNS	ULTGNS	
Leg	3.70^{a}	3.35^{c}	3.30^{c}	3.90^{a}	0.15
Chump	0.70^{b}	0.55^{c}	0.85^{a}	0.70^{b}	0.05
Loin	1.30^{b}	1.15^{bc}	1.00^{c}	1.55^{a}	0.09
Breast	2.50^{a}	1.80^{c}	2.00^{b}	2.05^{b}	0.07
Neck	1.90^{a}	1.60^{c}	1.65^{bc}	1.75^{b}	0.07
Mid rib	1.10^{a}	1.05^{ab}	1.00^{b}	0.80^{b}	0.11
Main rib	1.85^{a}	1.30^{b}	1.50^{b}	1.25^{b}	0.13
Shoulder	3.15^{a}	2.60^{c}	2.8^{b}	3.15^{a}	0.08
Tail	0.10	0.10	0.13	0.10	25.00
Means within the same rows with different superscripts differ significantly (P<0.05)					