PROXIMATE COMPOSITION AND QUALITY ATTRIBUTES OF MEAT FROM YANKASA RAMS FED GUINEA GRASS(*Panicum maximum*) SUPPLEMENTED WITH A CONCENTRATE DIET.

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ABSTRACT
Twelve (12) Yankasa rams aged about one year old were allotted into four (4) dietary treatments of three(3) rams each. The rams were fed concentrate supplement diets containing varying levels of a mixture of bambara nut offals and rice offal at ratios 25:75%, 50;50%, and 75;25% bambara nut to rice offal for T2, T3 and T4 respectively at 150g per ram/day and Panicum maximum at 250g/goat/day for a duration of sixty three (63) days .T1 was however fed 400g Panicum maximum only . The experimental design was a completely randomized design ,data were analyzed using a one way analysis of variance and least significant difference was used to separate the significant means with the aid of SAS , 2009 edition. Samples of concentrate diets , Panicum maximum and meat were analyzed for their proximate composition using the methods of AOAC (2000)) On the last day of the experiment the rams were slaughtered , bled ,eviscerated and dressed and 50 g of flesh cut of from each carcass and used for proximate composition and meat quality determination. Values for daily supplement intake(150 g) and total actual daily feed intake(388.00 to 391.00 g) were not significant.(P>0.05), values for daily forage intake ranged from230.50 – 391g and showed significant (P<0.05) differences . Values for protein, fat(7.00 to 8.90%),drip loss (4.14to5.50%) and cooking loss were all significantly(P<0.05) different ,with the supplemented groups having better values than the control. It was therefore concluded that concentrate supplementation of forages was a necessity for uptimum meat quality in yankasa rams. Bambara nut offal and rice offal were recommended for inclusion in supplement diets for yankasa rams for improved meat quality..Further research using other breeds of rams was recommended.

Keywords: Proximate Composition, Feed intake, Yankasa Rams, Guinea Grass, Concentrate

INTRODUCTION

The production of meat from sheep(rams) is becoming more popular as slaugter animals , for sale and for use during festive periods.(Lakpini *et al* ,2002) The worlds major exporters of sheep are Australia, New Zealand And some European countries, within Africa the major exporting countries are those in the semi-arid countries particularly Somalia, Sudan , Niger, Mali etc. there is little export from tropical Asia and America. The major importers of live sheep are in Asia, particularly the middle east, Africa(Cote d' voire, Nigeria,Libya) as well as some European countries.(Gatenby, 2002)

Meat from sheep (mutton) is slightly lighter in colour than meat from goats , the fat in mutton is distributed all over the body as against that of goats where visceral concentration is localized and the grain of the meat are more compact (Devendra, 1966).The dressing percentage of sheep (Ram) compare with those of various breeds of goats and cattle (Devendra, 1966)

Rams respond better and faster to fattening than bucks, they are usually fattened and sold mainly during the eid el kabir and eid el fitri ceiebrations , ram fattening for sale are very profitable at these times (Lakpini *et al*., 2002 ; Lakpini, 2002)

Meat plays a major role in human diets as it supplies required nutrients for growth and maintenance of health.(Anjaneyelu *et al*.,2007) According to Oguche *et.al.(2018)*, the way an animal is fed reflects in the quality of its meat. The ideal carcass can be described as one that has a minimum quantity of bones, a maximum quantity of muscle and an optimum quantity of fat

Feed scarcity is a major problem faced by ruminant livestock owners , especially during the long dry season, the use of agro by products have been suggested as a way of mitigation, but this must be done with caution since consumers are becoming more quality and health conscious (Ocheja *et a*l , 2020)

Given the health challenges faced the world over today , some consumers have become health conscious, therefore the need to search for feed materials that are cheap, can help in the dry season feeding of ruminant animals and at the same time produce high quality and healthy meat is imperative (Ocheja *et al* , 2020).

The present study was therefore designed to evaluate the effects of concentrate supplementation on the proximate composition and quality attributes of meat from Yankasa rams

MATERIALS AND METHODS

Study Area

The experiments were carried out at the Small Ruminants Unit of the Livestock Teaching and

Research Farm, Department of Animal Production, Kogi State University, Anyigba , which lies on Latitudes 7^0 15^1' and 7^0 29'N of the equator and Longitudes 7^0 11^1 and 7^0 32^1 East of the Greenwich Meridean (Ifatimehin *et al.*, 2009). It is located in the derived Savannah zone of Nigeria. The annual rainfall ranges between 1400mm –1500mm with about 6-7 months of rainfall. The ambient temperature ranges from 25 ^{0}C to 35 ^{0}C with the highest in March and April (Kowal and Knabe, 1972).

Experimental Feed Materials, Preparation, Experimental Animal Management and Procedure

The experimental feed materials were bambara nut offal, rice offal, Table salt, and bone-meal . All the feed components were sourced from Anyigba and its environs. The Guinea grass were harvested from Kogi State University, Campus, Anyigba.

Twelve (12) Yankasa rams, 12 months old, were sourced from Anyigba and its environs. The animals were ear-tagged for identification and were randomly divided into 4 treatments of three animals each. The experiment lasted for 63 days, Animals in treatments , T_2, T_3, and T_4 were fed 250 g guinea grass and 150 g of the supplement diet one hour later. T1 was fed 400 g of guinea grass only. Daily feed intake was calculated from differences between absolute feed served and leftover. At the end of the feeding trial, three (3) animals were slaughtered from each treatment and 50 g of flesh was cut off from the thigh of each of the slaughtered rams, 25g of flesh each were cut off and analyzed for their proximate values , The initial pH (pHi) was taken 30 minutes post mortem and the ultimate pH (PHu) was taken 24 hours postmortem ,these were taken using penetrating electrode of a portable pH meter , the probe was calibrated with 4and 7standard buffer solutions before and after every reading the electrode was thoroughly washed with distilled water and cleaned with cotton towels, . The drip loss was determined using 50 g of the meat , the meat samples were placed in a container on the supporting mesh and sealed to prevent air from entering the container , after 24 hours the samples were removed from the containers , dry cleaned and weighed again , drip loss was calculated as percentage of initial weight according to the method of Berri *et al.(* 2008)

$$\text{Drip Loss} = \frac{\text{Initial Weigh of Sample} - \text{Weight of Sample(after chilling for 24 hours)}}{\text{Initial Weight of Sample}} \times 100$$

The cooking loss was determined by putting 30mm x 30 mm of the meat from each ram carcass from each treatment in a plastic bag and cooking it to an internal temperature of 91Celsius (Kaman, 2016) the samples were left to cool to room temperature , the bags were opened and free juice drained (Choi *et al*, 2016), the cooked sample (B)was weighed and expressed as a % of the sample before cooking (A) (Yanget *et al* , 2007).

$$\text{Cooking loss (\%)} = \frac{(A-B)}{A} \text{ X } 100$$

Table 1: Composition of Supplement Diets (% Dry matter)

Ingredients	**Composition/Treatments**			
	T_1	T_2	T_3	T_4
Bambara Nut Offal	0.00	24.00	48.00	72.00
Rice Offal	0.00	72.00	48.00	24.00
Table salt	0.00	1.50	1.50	1.50
Bone meal	0.00	2.50	2.50	2.50
Total		100	100	100
Calculated Nutrient Content (% DM)				
Crude protein		14.05	16.75	18.70
Crude fibre		19.35	17.45	16.50
ME (Kcal/kgDM)		2690	2730	2810

Proximate Analysis

Samples of supplement diet, guinea grass and meat were prepared for analysis of their proximate composition. The protein content of the samples were determined by Kjeldahl method. Ether extract, crude fibre and ash content determination were according to standard procedure (AOAC, 2000). The nitrogen free extract (NFE) was calculated by subtracting the sum of the percentages of crude fibre, ether extracts, crude protein and ash from 100.

Experimental Design and Statistical Analysis

The experimental design was a completely randomized design (CRD). Data were analysed by a one way analysis of variance (ANOVA) and treatment means were compared and separated, (where there were significant differences) using least significant difference (LSD). With the aid of SAS, Statistical package.(2009 version)

RESULTS AND DISCUSSION

Table 2: Proximate Composition of Concentrate Diets and Panicum maximum (% DM)

	T1	T2	T3	T4	Panicum maximun
Crude protein	-	14.55	16.30	18.95	11.40
Crude fibre	-	19.80	17.62	16.00	18.50
Nitrogen free extracts	-	48.00	50.50	51.00	41.10
Ether extracts	-	4.00	4.50	5.05	6.00
Ash	-	10.30	8.40	7.10	19.80
Dry matter	-	94.45	95.55	94.30	54.90

Feed Intake Records of Experimental Yankasa Rams

The feed intake records of the experimental Yankasa rams is presented in Table 3, the daily concentrate intake of 150g for T2 ,T3, andT4 were not significant[y (P> 0.05) different, daily forage intake ranged from 230.50g to 391.00g , with T1 having the highest, the values were significantly (P<0.05)different, the. highest forage intake value of T1 could be because it was fed solely on forage,the values were . lower than 920 to 931 g reported by Ocheja *et al* (2011) this discrepancy may be due to the season in which the experiments were conducted. The actual total feed intake values were also not significantly (P>0.05) different

Table 3: Feed Intake Records of Experimental Yankasa Rams

Parameter	Treatment T_1	T_2	T_3	T_4	SEM
Daily Concentrate intake	-	150.00	150.00	150.00	0.00
Daily Forage intake	391.00[a]	230.50[b]	238.00[b]	240.00[b]	20.05
Total Actual Daily feed intake	391.00	380.50	388.00	390.00	7.00

a, b ,c, = Means on the same row with different superscripts differ significantly (P<0.05).
SEM = Standard Error of the Means

Proximate Composition of Meat from Yankasa Rams fed Guinea Grass and a concentrate Diet

The proximate composition of meat fromYankasa rams fed guinea grass and a concentrate diet is presented in Table 4 , the moisture contents were not significant (P> 0.05) . The values for ash were also not significantly (p>0.05) different. The fat values ranged from 7.00% – 8.90 % (T1) , and were significantly (P<0.050 different, the fat content were at optimum values for fat reported by (Steele 1996) neccessary to facilitate flavor, juiciness, tenderness and palatability. .The protein content ranged from 18.50 –24.80% and showed significant (P<0.05) differences, this range agreed with the report of Devendra,(1966) that ram (sheep) meat is high in protein and fat. The supplemented treatments had better values for fat and protein..this could be due to better feed quality from the concentrates. .

Table 4: Proximate Composition of Meat from Yankasa Rams Fed Guinea Grass and a Concentrate Diet (%)

Parameters	Treatments				
	T_1	T_2	T_3	T_4	SEM
Protein	18.50[c]	20.20[b]	21.00[b]	24.80[a]	1.25
Fat	7.00[b]	8.66[a]	8.70[a]	8.90[a]	3.11
Ash	1.88	1.84	1.86	2.00	0.95
Moisture	67.00	67.75	66.50	68.00	1.00

a, b,c = Means on the same row with different superscripts differ significantly (P<0.05).
SEM = Standard Error of the Means.

Some Quality Attributes of Meat from Yankasa Rams fed Guinea Grass and Concentrate Diets

Some Quality attributes of meat from Yankasa rams fed some browse species is summarized in Table 5. Initia pH (pHi) and ultimate pH(pHu)were both not significantly (P>0.05) different,.

The Phi range of 5.50 – 5.70 and pHu range of 5.30 – 5-50 were not significantly (P>0.05) different carcasses with lower pHu tend to be more tender with lower shear force value and better calorimetric values than those with a high pHu . pHu may affect several objective and sensory quality factors of meat ie colour , water holding capacity , and it is generally accepted and used as the main indices of meat quality commercially (Simela *et al* , 2004) .

Drip loss values (4.15 – 5.50%) were significantly (P<0.05) different, , high drip loss tends to lower the dressing percentage. (Ocheja *et al*,2020)The cooking loss ranged from 12.00 % -15.00% , the values were significantly (P<0. 05) different . this result was in line with that obtained by Choi *et al (*2016) who reported that differences in diets affected cooking losses of Korean goats fed different browses. The supplemented treatments had more favourable values for cooking loss and drip loss than the control. This may be due to higher fat values of meat from the supplemented groups

Table 5: Quality Attributes of Meat from Yankasa Rams fed Guinea Grass and a Concentrate Diet

Parameters	Treatments				
	T_1	T_2	T_3	T_4	SEM
Drip loss (%)	5.50[a]	4.40[b]	4.20[b]	4.15[b]	0.52
Cooking loss (%)	15.00[a]	12.65[b]	1200[b]	12.30[b]	1.00
pH (initial)	5.70	5.65	5.55	5.50	0.74
pH(ultimate)	5.50	5.45	5.30	5.40	0.70

a, b= Means on the same row with different superscripts differ significantly (P<0.05).
SEM = Standard Error of the Mean

CONCLUSION AND RECOMMENDATIONS

Conclusion

Bambara nut offal and rice offal based concentrate diets fed to Yankasa rams as supplememt to Guinea grass produced better values for meat proximate composition and some meat quality attriubutes .than those for the control.

Bambara nut offal and rice offal based concentrate diets are suitable for feeding yankasa rams especially during the long dry season.

Recommendations

Supplement diets containing bambara nut and rice offal can be fed to yankasa rams especially during the long dry season .for improved carcass quality

Further studies should also be carried out using another grass species as well as other breeds of rams.

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