

Whole Sale Cuts and Sensory Evaluation of Meat of West African Dwarf Goats Fed Some Browse Species

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ABSTRACT

Sixteen (16) male West African dwarf goats were allotted into four (4) treatments of four goats each. The goats were slaughtered fed leaves from Gmelina (T_1), Teak (T_2), Neem (T_3) and Tamarind (T_4) for (50) days. At 300g/goat/day. Three (3) goats from each treatment were slaughtered on the last day of the experiment and their whole sale cuts determined by weighing and converting to percentage of live weights. An eight member taste panel was used to assess the meat quality of the goats. The weight for the head, thigh, ribs back and neck showed significant ($P < 0.05$) difference across the treatment means, values for shoulder and belly were however not significant ($P > 0.05$). Juiciness, leanness, and over all meat quality were not significant ($p > 0.05$) across the treatment means. Flavor, tenderness and palatability were significant ($p < 0.05$). It was concluded that the browse species significantly ($p < 0.05$) influence the weights of nearly all the whole sale cuts tested, the browse species had no significant ($p > 0.05$) effects on the over all meat quality. It was concluded that other classes or breeds of goats as well as other species of ruminant be used for further research.

INTRODUCTION

Meat plays a major role in human diets as it contributes required nutrient for growth and maintenance of health. Goat meat (chevon) is a very rich source of nutrient and is consumed in most countries of the world. Goat meat is internationally regarded as a clean red meat with favourable characteristics. (Webb et al., 2005) goat meat and meat products tend to be more juicy, leaner, coarser and have darker red color than mutton (Tshabalala et al., 2003). The total edible and saleable proportions of goats vary from one region to another because of differences in eating habits and the value of the by-product, the dressing percentage of various goat breeds compare quite well with those of sheep and beef cattle. In goats the dressing percentage is usually between 35-50% (Steele, 1996), and it increases as animals mature, males have a higher dressing percentage than females and goats that have been well fed have higher dressing percentage than those fed on an

inadequate diets. The value of a goat carcass depends on the quality of edible parts available for sale, the nutrition of goats have been reported to reflect in the meat quality (Steele 1996)

This study was therefore designed to evaluate the effects of some browse species fed to goats on their meat quality.

MATERIALS AND METHODS

Study Area

The experiment was carried out at the Sheep and Goat unit of the Teaching and Research Farm of the Department of Animal production, Kogi State University, Anyigba. Anyigba lies on latitude $7^{\circ}15'N$ and $7^{\circ}29'N$ longitude $7^{\circ}11'E$ and $7^{\circ}32'E$ with average altitude of 420 meters above the sea level. The area lies in derived Guinea savannah zone, with average annual rainfall of 1600mm the daily temperature range is about $25^{\circ}C$ - $35^{\circ}C$ (Ifatimehin et al., 2009).

Experimental Animals, Management, Feed Preparation and Experimental Procedure

A total of 16 growing male West African dwarf goats were sourced from Anyigba and its environ. The animals were housed individually and treated with ivomec to control both endo and ecto parasite, as well as procaine penicillin, oxytetracycline hydrochloride to control scouring and nasal discharge and to provide a common health status. The browse species used for the experiment were collected from within the campus of Kogi State University Anyigba. The goats were weighed and allotted using Completely Randomized Design (CRD) into four (4) dietary treatments, T1 Gmelina, T2 Tamarind, T3 Teak and T4 Neem with each having four goats. Concentrate at 100g/day was fed to the animals and the browse was given at 300g/goat/day. The browse was fed first in the morning afterwards the concentrate in the evening. Water was given to the goats *ad-libitum*. The cashew nut shell was collected from the Cashew Kernel Processing Plant in Kogi State University, Anyigba. The Cashew Nut Shell was pounded and mixed with other ingredient such as Maize offal, Bambaranut Offal, Rice offal, Bone meal, Fish meal and Table salt and then ground to desired texture. The experiment lasted for 50 days after an adjustment period of seven (7) days. At the end of the experiment two (2) goats each were slaughtered from each treatment and thereafter used to determine the carcass organo-leptic properties (flavour, tenderness, juiciness, leanness, palatability and overall meat quality) four (4) pieces of meat each were cut from the same thigh of two (2) goats slaughtered from each treatments (i.e eight (8) pieces of meat for each treatment (eight replicates)). The pieces of meat were cut in different shapes to facilitate identification as follows:

- T1 - Round
- T2 - Triangular
- T3 - Square
- T4 - Rectangle

Cooking was done at the same time in the same pot. Assessment by the taste panel was done at the same time. Each questionnaire was labeled i.e (T1, T2, T3 and T4), there were eight panelists. Each panelist tasted the cooked meat from each treatment (four (4) assessments /panelist) and completed the questionnaire provided. There were a total of 32 assessments (1x4x8). The questionnaires were rated on a

scale of 1-5 for each parameter as follows according to the method of Ocheja *et. al.*, (2016):

- Very good - 5
- Good - 4
- Moderate - 3
- Fair - 2
- Poor - 1

Thereafter, the scores for each replicate were added together and divided by 8 to get the mean score for each parameter/treatment. The total score for the five (5) parameters were added together to determine the overall meat quality of the carcass.

The whole sale cut were determined by cutting the respective parts from the carcass and weighing them, the value were later converted to percentage of live weight using the formular

$$\frac{\text{Weight of Cut}}{\text{Live Weight}} \times 100$$

Experimental Design and Statistical Analysis

The experimental design was a Completely Randomized Design (CRD). Data collected were subjected to a one way analysis of variance (ANOVA), significant differences (where they exist); the means were separated using Least Significant Differences (LSD) with the aid of SPSS (2006) version 16.0.

Chemical Analysis

Samples of the browse species and the supplement were analyzed for their proximate composition using standard procedure (AOAC, 1995).

Table1. Composition of Experimental diet (% DM)

Ingredients	Composition
Cashew nut shell	10.00
Bambara nut offal	48.00
Maize offal	27.00
Rice offal	5.00
Fish offal meal	5.50
Wood ash	1.00
Table salt	1.50
Total	100
Calculated Nutrient Content % (DM)	
Nutrients	Composition
Crude protein	18.47
Crude fibre	14.16
Metabolizable Energy(Kcal/Kg diet)	3083.32

RESULTS AND DISCUSSION

Table2. Proximate Composition of Browse and Supplement (Actual Basis, %)

Nutrient	Treatments				
	T1	T2	T3	T4	Supp.
Crude Protein	9.98	11.55	8.63	9.64	17.23
Crude Fibre	10.20	11.50	12.66	10.88	15.50
Nitrogen free extract	30.12	32.06	34.01	32.23	51.85
Ether extract	2.10	1.89	2.05	2.35	7.50
Ash	6.10	5.80	6.60	5.25	3.40
Moisture	41.50	37.20	36.00	39.65	4.50

Whole Sale Cuts Of Experimental Animals

Whole sale cuts of carcass of West African dwarf goats fed browse species, is presented in Table 3. Values for head, thigh, ribs, back and neck showed significant (P<0.05) differences across the treatment means, values for shoulder and belly were not significant (P>0.05) and the values did not follow any particular trend. It appears that animal in T₁ best utilized the browse for muscle build up and meat production' since they had the highest weights in the prime muscle cuts i.e neck, shoulder, thigh and back. The decrease in the weight of the head as the carcass weight increased agreed with the report of Omojola and Attah (2006)

Table3. Whole sale cuts of carcass of west African dwarf goats fed browse species (% of live weight)

Parameters	Treatments				
	T1	T2	T3	T4	SEM
Head	7.14 ^c	13.75 ^a	11.25 ^b	8.89 ^c	1.06
Neck	5.14 ^a	3.75 ^a	2.75 ^b	4.45 ^a	0.43
Shoulder	7.75	7.50	6.50	6.67	0.71
Thigh	11.56 ^a	7.50 ^b	7.50 ^b	7.78 ^b	2.11
Ribs	10.71 ^a	4.27 ^b	3.75 ^b	9.66 ^a	1.00
Back	10.71 ^a	8.75 ^b	9.50 ^b	8.66 ^c	0.41
Belly	2.85	3.75	2.25	2.68	1.51

a, b, c=Treatment means on the same row with different superscripts differ significantly (p<0.05).

SEM =Standard Error of Means.

Sensory Evaluation of Carcass of Experimental Animals

The result of sensory evaluation of carcass of experimental animals is presented in Table 4. The juiciness, leanness, and overall meat quality obtained in the study were not significantly (p>0.05) different. The values did not follow any definite trend.

The values obtained for tenderness, palatability and flavor were significant, (p<0.05)

Table4. Organoleptic properties of meat of West African Dwarf Goats fed some browse species

Parameter	Treatment				
	T1	T2	T3	T4	SEM
Juiciness	4.13	4.13	4.13	4.25	0.091NS
Tenderness	3.88 ^a	3.50 ^b	3.75 ^a	3.65 ^a	0.095
Flavour	3.88 ^c	4.13 ^b	4.50 ^a	4.25 ^b	0.11
Leanness	3.50	3.50	3.50	3.38	0.12NS
Palatability	4.25 ^c	4.75 ^a	4.50 ^a	4.50 ^b	0.12
Overall Meat Quality	19.63	20.00	20.38	19.88	0.23NS

a, b, c – Treatment means on the same row with different superscripts differ significantly (p<0.05).

SEM =Standard Error of Means.

CONCLUSION AND RECOMMENDATIONS

The browse species had no significant effect on the overall meat quality.

The use of browse in feeding goats during the long dry season is recommended. Further experiments using other browse species is recommended.

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