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Carcass Yield and Sensory Evaluation of Meat from Rabbits Fed Some Browse Plants Supplemented with a Concentrate Diet

Usman Grace Ojali[1, *], Netela Jibrin[1], Omale Yusuf Zainab[1], Omada Unekwuojo Juliet[2], Lamido Mohammed[3], Dauda Adamu Nuhu[3], Abalaka Ezra Onuh[2]

[1]Department of Food, Nutrition and Home Science, Kogi State University, Anyigba, Nigeria

[2]Department of Animal Production, Kogi State University, Anyigba, Nigeria

[3]Department of Animal Science, Federal University, Kashere, Nigeria

Email address:

ojaligu@yahoo.co.uk (U. G. Ojali)

[*]Corresponding author

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Abstract: Sixteen (16) male Rabbits were allotted into four (4) dietary treatments of four Rabbits each. They were fed concentrate diet and Bamboo, Senna, Gmelina and Teak leaves for 42 days, water was served ad-libitum, at the end of the feeding period 2 rabbits from each treatment were slaughtered and used for the evaluation of carcass yield and sensory properties All the values for carcass yield showed significant ($P<0.05$) difference across the treatment means, values for dressing percentage ranged from 51.50- 58%, while that for meat to bone ratio had a range of 2.80- 3.50. Values for Juiciness, palatability and over all meat quality were significantly ($p<0.05$) different across the treatment means. Flavor, tenderness and leanness were however not significant ($p>0.05$) T_1 (Bamboo) had the best value for overall meat quality with a score of 16.6. It was concluded that the browse species significantly ($p<0.05$) influenced, the carcass yield and sensory properties of the rabbit meat. T_1 (bamboo) had the best values for carcass yield and sensory properties. Bamboo was therefore recommended for rabbit feeding for improved carcass yield and sensory properties.

Keywords: Carcass Yield, Sensory Evaluation, Browse, Concentrate, Rabbits

1. Introduction

Meat, plays a major role in human diets as it supplies required nutrients for growth and maintenance of health. [1] According to Oguche *et. al.,* the nutrition of an animal reflects in the meat quality [2] The ideal carcass can be described as one that has a minimum quantity of bone, a maximum quantity of muscle and an optimum quantity of fat. The production of meat from rabbits is suitable because their feeding do not compete for feed ingredients with humans and their meat have some important characteristics which makes it a particularly good meat for human consumption [3], the meat is high in protein and low in fat, the fat in rabbit meat is mainly unsaturated fat, which is believed to be a more healthy type of fat than saturated fat which is common in other meat, the meat has lower cholesterol content than most other meat, this is a health promoting characteristic [4]. The health challenges faced by humans today arising from unhealthy food/ meat consumption calls for the production of meat from animal whose meat is believed to be more healthy, as well as assessing the meat from such animal species, the rabbit is a good example of such animal species

The study was therefore designed to evaluate the effects of some browse species on carcass yield and sensory properties of rabbit meat

2. Materials and Methods

2.1. Study Area

The experiment was carried out at the Rabbitary unit of the Teaching and Research Farm of' the Department of Animal production, Kogi State University, Anyigba. Anyigba lies on latitude $7^0$15'N and $7^0$29'N longitude $7^0$11'E and $7^0$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 ranges from 25°C - 35°C [5].

2.2. Experimental Animals, Management, Feed Preparation and Experimental Procedure

A total of 16 male rabbits were sourced from Anyigba and its environs. They were housed individually in hutches The rabbits were weighed and allotted using Completely Randomized Design CRD) into four (4) dietary treatments, each treatments had four (4) rabbits. the concentrate diet was fed at 50g each daily, and the browse (Bamboo, T_1 Senna, T_2 Gmelina T_3 and Teak T_4) leaves at 100g/rabbit/day Water was given to the rabbits *ad libitum*. The experiment lasted for 42 days after an adjustment period of seven (7) days.

Table 1. *Composition of Concentrate Diet (Dry matter%).*

Bambara nut offal	75.60
Rice offal	24.20
Table salt	0.20
Total	100

At the end of the experiment two (2) goats each were sacrificed from each treatment and thereafter used to determine the carcass yield (slaughter weight, dressed weight, dressing percentage and meat to bone ratio) and sensory properties (flavour, tenderness, juiciness, leanness, palatability and overall meat quality). The dressing percentage was calculated from the formula

$$\text{Dressing percentage} = \frac{\text{Dressed weight}}{\text{live weight}} \times 100$$

the meat to bone ratio was determined by clearly separating the flesh from the bones, the bones and the flesh were weighed separately and the ratio of the 2 determined Four (4) pieces of meat each weighing 20g were cut from the same thigh of two (2) rabbits 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:

T_1 - Round
T_2 - Triangular
T_3 - Square
T_4 - Rectangle

Cooking was done at the same time in the same pot. Assessment by a trained taste panel was done at the same time. Each questionnaire was labeled as (T_1, T_2, T_3 and T_4), there were eight trained panelists. Each panelist tasted the cooked meat from each of the 4 treatments, four (4) assessments/panelist) and completed the questionnaire provided. There were a total of 32 assessments (1×4×8). The questionnaires were rated on a scale of 1-5 for each parameter as follows according to the method of Ocheja *et al.*, [6]

1. Very good – 5
2. Good – 4
3. Moderate – 3
4. Fair – 2
5. 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.

2.3. 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), means with significant differences were separated using Least Significant Differences (LSD) with the aid of SPSS (2010) version 20.0 [7]

2.4. Chemical Analysis

Samples of the concentrate diet and browse species were analyzed for their proximate composition using standard procedure as out lined by AOAC [8].

3. Results and Discussion

3.1. Proximate Composition of Supplement Diet (Dry Matter%) and Browse Species (Dry Matter %)

The proximate composition of supplement diet and the browse plant are presented in Table 2.

The nutrient in the concentrate and the browse plants are generally adequate for Rabbits in the tropics [4] T_2 had the highest protein content of 15.25% the high ash content of T_1 (Bamboo), 10-14% and T_3 (Gmelina), 19.17 suggests high mineral content. [9] The crude protein content of 12.38% recorded for Gmelina was higher than 10.25%reported by Abdu et. al [10], the crude fibre content of 18.45%for Bamboo was lower than 23.3% reported by Asaolu et al [11], the crude protein and Nitrogen free extracts of the concentrate diet were within the range recommended for growing Rabbits in the tropics [12]

Table 2. *Proximate Composition of Supplement Diet (Dry Matter%) and Browse species.*

	$T_{1\ (Bambo)}$	$T_{2\ (Senna)}$	$T_{3\ (Gmelina)}$	$T_{4\ (teak)}$	*Concentrate*
Crude Protein 10.69		15.25	12.38	10.13	16.30
Crude Fibre 18.45		16.67	14.02	10.97	19.41
Nitrogen free extracts	59.25	60.11	63.69	68.13	51.66

	$T_{1\ (Bambo)}$	$T_{2\ (Senna)}$	$T_{3\ (Gmelina)}$	$T_{4\ (teak)}$	*Concentrate*
Either extracts 1.45	2.71	2.33	2.10	5.22	
Ash 10.14	5.26	7.57	19.17	5.20	

3.2. Carcass Yield of Experimental Rabbits

The carcass yield of the experimental rabbits is presented in Table 3

Table 3. *Carcass yield of Rabbits fed some Browse Species.*

	T_1	T_2	T_3	T_4	SEM
Slaughter weight	840^a	825^b	785^c	790^c	5.72
Dressed weight	460^b	465^a	454^c	455^c	2.48
Dressing percentage	58.70^a	52.00^b	52.75^b	51.50^b	2.34
Meat-Bone ratio	3.51^a	3.18^b	3.15^b	3.22^b	1.12

a, b, c=Treatment means on the same row with different superscripts differ significant ($p<0.05$).
SEM=Standard Error of Means.

Values for slaughter weight, dressed weight, dressing percentage and meat to bone ratio were all significantly ($p<0.05$) different across the treatment means values for dressing percentage ranged from 51.50- 58%, these values were within the range of 50- 56% reported by fielding [4], a lower range of 43-43.90% was reported by Musa *et, al*. [13] all the carcass yield values did not follow an definite trend. the meat to bone ratio ranged from 3.15 to 3.51, this confirms the report of fielding that rabbits have a relatively high meat to bone ratio [4] the higher carcass yield values for T_1 (bamboo) could be attributed to better utilization of nutrients, the slaughter weight of 790- 875 g was higher than 479.70 -727g reported by Abubakar *et. Al* [14]. This difference could be due to differences in feeds, breeds and slaughter procedure.

3.3. Sensory Properties of Experimental Rabbit Meat

The sensory properties of the experimental rabbits meat is presented in Table 4

Table 4. *Sensory properties of Meat of Experimental Rabbits.*

	T_1	T_2	T_3	T_4	SEM
Juiciness	3.75^a	3.28^b	3.25^b	3.18^b	0.16
Tenderness	3.00	3.23	3.00	3.18	0.14
Flavour	3.13	3.00	3.00	2.95	0.15
Leanness	3.30	3.20	3.30	3.25	0.85
Palatability	3.50^a	3.28^b	3.20^b	3.25^b	0.10
Overall meat quality	16.80^a	15.99^b	15.70^b	15.81^b	0.18

a, b, – Treatment means on the same row with different superscripts different superscripts differ significantly ($p<0.05$).
SEM=Standard Error of Means

Values for tenderness, flavor and leanness were not significantly ($p>0.05$) different, juiciness, palatability and overall meat quality were significantly ($p<0.05$) different, the values did not follow any definite pattern, the values for palatability ranged from 3.20 – 3.50, with T_1 having the best, the overall meat quality values ranged from 15.70 – 16.68. Ugwuene *et al* reported non significance ($p>0.05$) in all the sensory properties evaluated when rabbits were fed forage spice [15].

4. Conclusion and Recommendations

4.1. Conclusion

Rabbits fed bamboo (T_1) had the best carcass yield parameters. Rabbits fed bamboo leaves had the best sensory properties

4.2. Recommendations

Bamboo leaves is recommended for rabbit feeding for improved carcass yield and sensory properties. The other browse plants can also be used to feed rabbits The experiment can be repeated for a longer duration to further confirm the results obtained in this work.

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