

SENSORY EVALUATION OF MEAT FROM RED SOKOTO GOATS FED GRADED LEVELS OF CORN COB DIETS SUPPLEMENTED WITH COWPEA HUSK

*¹Y.M. ISHIAKU,²D. N. TSADO AND²S. U. OYIBO

¹National Animal Production Research Institute, P.M.B. 1096, Ahmadu Bello University, Shika, Zaria, Nigeria.

²Department of Animal Production, Federal University of Technology, Minna, P.M.B. 65, Niger State, Nigeria.

*Correspondence Email: ishiakuyunusam@yahoo.com GSM: 08101055090

ABSTRACT

An experiment was conducted on Sensory evaluation of meat from Red Sokoto goats in feedlot trial. The goats were fed graded levels of corn cob diets at 0%, 10%, 20%, and 30% supplemented with cowpea husk. Meat from the experimental animals was subjected to cooking and frying. 18 untrained panelists are requested to record their responses for meat quality based on colour, tenderness, juiciness, flavour and overall acceptability for cooked and fried meat samples using the nine point scoring scale. From the result obtained in this study has shown that both cooking and frying of the meat samples were significantly ($P<0.05$) different in terms of individual preferences for meat quality. The consumer preferences observed for the cooked meat in all the treatment diets ranges from (7.17 to 8.94) and for the fried meat was from (6.15 to 8.72), respectively. However, cooked meat samples in terms of colour preference in Diet 3 (8.78) was significantly ($P<0.05$) better than the meat samples from other treatment diets. Meat samples obtained from Diet 2 was significantly ($P<0.05$) better in tenderness (8.56), juiciness (8.94) and flavour (8.78). The fried goat meat preference for colour (8.50) was significantly ($P<0.05$) better in Diet 4. Meat sample from goats fed Diet 2 was better in tenderness (8.67), while meat samples from goat fed Diet 4 was significantly ($P<0.05$) better in juiciness (8.72) and flavour (8.11) respectively. The overall acceptability of goat meat samples for the cooked and the fried meats preferences were not significantly ($P>0.05$) different when compared for all the treatment diets on colour, juiciness, tenderness and flavour. It was concluded from this trial that despite consumer's preference for goat meat sample varies. Goat meat either cooked or fried was highly acceptable. Therefore, corn cob can be included in the diets of Red Sokoto goats up to 30% for better meat quality and acceptability without any detrimental effect.

Key words: Red Sokoto goats, Meat, Sensory evaluation, Corn cob and Cowpea husk

INTRODUCTION

In recent times, the quality as well as quantity of animal products has become very important both in developing countries like Nigeria, where especially goat meat known for its low fat content has been more preferred. Goat meat is characteristically lean, thus rich in nutrient that could be acceptable by health conscious consumers. Banskalieva, *et al.* (2000) revealed that goat meat contains higher amounts of poly-unsaturated fatty acids compared with sheep meat. Most consumers' preferences for a product have determined the process of meat quality improvement. The sensory properties like colour or tenderness may have a significant impact on meat quality acceptability. These qualities of meat are some of the primary factors influencing consumers' satisfaction. Sensory analysis performed by untrained panelists is the most appropriate tool to explain differences between the treatments as perceived by humans (Rodrigues and Teixeira, 2009). Meat and meat products have continued to claim their share of food value because of their acceptable sensory characteristics. Also, meat palatability depends on factors such as colour, texture, flavour,

tenderness and general acceptability. Tenderness and juiciness are part of the measures of overall meat eating quality (Chulayo and Muchenje, 2013) for cooked or fried meat. The investigation of sensory characteristics of small ruminants' meat can provide a useful tool for the meat quality evaluation. Corn cobs and cowpea husks can substantially reduce the cost of feed (Makkar, 2002). This will give hope for feeding millions of Nigerians and safe guard their food security. Therefore, this present study was aimed at carrying out sensory evaluation of meat from Red Sokoto Goats fed graded levels of corn cob based diets supplemented with cowpea husk.

MATERIALS AND METHODS

Experimental site and location: The experiment was conducted at Feedlot Unit of the Teaching and Research Farm of Animal Production Department, School of Agriculture and Agricultural Technology, Federal University of Technology, Minna. It has an altitude of 75m above sea level with a land area of 6784km² and lies between latitude 9°37'N and longitude 6°33'E. The mean annual rainfall is about 1200-1300mm, while the mean annual temperature of Minna is between 38°C to 42°C and Minna is

located in the Guinea Savannah Zone of Nigeria (NSADP, 2005).

Experimental Animals, their management and experimental design: Sixteen (16) Red Sokoto goats with an average body weight of 10.19 ± 0.19 kg were used for the experiment. The animals were randomly allotted to 4 dietary treatments with each treatment having 2 replicates with 2 animals per replicate. Animals in Diet 1 (control) were fed 0 % corn cob, Diet 2 (10 %) corn cob, Diet 3 (20 %) corn cob and Diet 4 (30 %) corn cob. The animals were fed 500g each in the morning at 7-8am and supplementary feed at 4-5pm daily and water was offered *ad-libitum*. Feed intake was measured daily by subtracting the feed left over from feed offered. A randomized complete block design (RCBD) was used according to Steel and Torrie, (2000).

Sensory evaluation and statistical analysis: At the end of experimental period which lasted for 9 weeks, two goats were randomly selected from each of the treatments. They were slaughtered the following day by cutting their jugular veins and allowed to bleed for 5 minutes. Their skin was removed (eviscerated), an average of 40g meat samples from the right hind leg of each treatment animals were collected after removing the flesh from the bone and labelled for identification as described by Isah *et al.* (2009). Samples meat from each animal was divided into two parts, the first part was cooked by adding 1gram of salt and water at a temperature of 65°C for 30 minutes in a cooking pot using a Kerosene stove as described by (Fasae *et al.*, 2010), while the other part was also cooked for 30 minutes and then fried for 5 minutes in a frying pan using vegetable-oil. Eighteen (18) untrained panelists were used in the assessment procedure. They were instructed to chew on a sample from each treatment and score it for colour, flavour, juiciness and tenderness. Bottled water was served to the panelists to rinse their mouths after scoring each sample to reduce flavour carryovers. The panelists scored each sample on a nine – point hedonic scale: 9= like extremely, 8= like very much, 7= like moderately, 6= like

slightly, 5= neither like nor dislike, 4= dislike slightly, 3= dislike moderately, 2= dislike very much and 1= dislike extremely. (AMSA, 1978). Overall acceptability was scored on a three-point scale: 1= least acceptable, 2= more acceptable and 3= most acceptable. (Iwe, 2002). Data collected were subjected to analysis of variance (ANOVA) with general model of SAS (2008) and significant means were compared by Duncan Multiple Range Test (AOAC, 2000).

RESULTS AND DISCUSSION

Sensory evaluation of cooked meat sample of Red Sokoto goats in Table 1 showed that values obtained in this study for juiciness, flavour, tenderness and colour were significantly ($P < 0.05$) different between the treatment groups. The significant values obtained were higher than those report of (Bello and Tsado, 2013) and (Ronaldo, 2009). Colour of meat have been found to be considered as an important parameter that attracts customers to buy meat in the markets Adam *et al.*, (2010). Sensory evaluation of fried meat sample of Red Sokoto goats in Table 2 showed that colour of meat from animals fed (Diet 1) were observed to be significantly ($P < 0.05$) lower between the treatment groups. Meat from animals fed Diet 2 and 3 was easy to cut compared to those fed with Diet 1 and Diet 4, this may be attributed to its tenderness. Choice of either fried or cooked meat are based on consumer's preference which in this study was in agreement with the report of Bello and Tsado, (2013) when Yankasa rams were fed sorghum stover. In this study cooked meat was better in juiciness, tenderness and flavour while fried meat was better in terms of colour, this may be attributed to individual preference for fried meat samples. The overall acceptability in Table 3 showed no significantly ($P > 0.05$) different with all the treatment groups. Whether meat of goat was cooked or fried, the consumers preference still remain the same. Therefore, despite variation in fibre content of diet fed to goats the overall acceptability for goat meat still remain unchanged.

Table 1: Sensory evaluation of cooked meat sample from Red Sokoto goats fed graded levels of corn cob supplemented with cowpea husk

Treatments	Parameters			
	colour	Tenderness	Juiciness	Flavour
Diet1	$7.61^b \pm 0.31$	$7.28^b \pm 0.41$	$7.72^b \pm 0.40$	$7.78^b \pm 0.36$
Diet 2	$8.44^a \pm 0.28$	$8.56^a \pm 0.23$	$8.94^a \pm 0.40$	$8.78^a \pm 0.36$
Diet 3	$8.78^a \pm 0.24$	$7.27^b \pm 0.35$	$7.83^b \pm 0.33$	$7.28^b \pm 0.36$
Diet 4	$7.67^b \pm 0.35$	$7.61^b \pm 0.30$	$7.89^b \pm 0.40$	$7.61^b \pm 0.44$
LS	*	*	*	*

ab - Means in the same column with different superscripts are significantly different ($P < 0.05$), LS - Level of Significance *: Significantly ($p < 0.05$) different, $\pm$ Standard Error of Mean.

Table 2: Sensory evaluation of fried meat sample from Red Sokoto goats fed graded levels of corn cob supplemented with cowpea husk

Treatments	Parameters			
	colour	Tenderness	Juiciness	Flavour
Diet 1	7.28 ^b $\pm$ 0.35	6.15 ^c $\pm$ 0.37	6.17 ^c $\pm$ 0.45	7.22 ^b $\pm$ 0.29
Diet 2	8.39 ^a $\pm$ 0.27	8.67 ^a $\pm$ 0.21	8.67 ^a $\pm$ 0.26	7.17 ^b $\pm$ 0.35
Diet 3	8.33 ^a $\pm$ 0.18	7.78 ^{ab} $\pm$ 0.32	7.22 ^b $\pm$ 0.29	7.11 ^b $\pm$ 0.33
Diet 4	8.50 ^a $\pm$ 0.29	7.33 ^b $\pm$ 0.41	8.72 ^a $\pm$ 0.34	8.11 ^a $\pm$ 0.22
LS	*	*	*	*

ab - Means in the same row with different superscripts are significantly different ($P < 0.05$) LS - Level of Significance, *: Significantly ($p < 0.05$) different $\pm$ Standard Error of Mean.

Table 3: Overall acceptance cooked and fried meat from Red Sokoto goats fed corn cob diets supplemented with cowpea husk

Parameters	Diet 1 (0%)	Diet 2 (10%)	Diet 3 (20%)	Diet 4 (30%)	LS
Overall acceptance					
Cooked meat	3.44 $\pm$ 0.20	2.78 $\pm$ 0.36	3.28 $\pm$ 0.38	3.61 $\pm$ 0.44	NS
Fried meat	3.22 $\pm$ 0.33	2.61 $\pm$ 0.24	3.11 $\pm$ 0.29	2.67 $\pm$ 0.34	NS

NS - Not significantly ($P > 0.05$) different, $\pm$ Standard Error of Mean

Conclusion

Meat from Red Sokoto goats fed corn cob diet can enhance better meat quality preference and overall acceptability whether cooked or fried. The organoleptic quality depends on consumer's preference for goat meat. Therefore, corn cob can be incorporated in the diet of Red Sokoto goats up to 30% with supplement for better meat quality without any detrimental effect.

Acknowledgement

The authors are grateful to the Director, National Animal Production Research Institute, Ahmadu Bello University, Zaria, for his permission to publish this research. Our gratitude also goes to the programme leader Animal Feed and Nutrition Research Programme, National Animal Production Research Institute, Prof. J.T. Amodu, who has added value to the success of this work.

REFERENCES

- Adam, A. A. G., M Atta, S and Ismail, H. A. (2010). Quality and Sensory Evaluation of Meat from Nilotic Male kids fed on two different diets, *Animal Science Journal*, 1, 1, 7-12p
- AMSA, (1978), Guidelines for cooking and sensory evaluation of meat. American Meat Science Association in Co-operation with National Livestock and Meat Board, Chicago, 33p.
- AOAC, (2000). Official Method of Analysis. International Association of Official Analytical Chemists, 24th edition, Washington D.C. USA. Pp 200-210
- Banskalieva V., Sahlu T., and Goetsch A.L. (2000). Fatty acid composition of goats muscle and fat deposits: A Review on Small Ruminant Research, 37, 255-268.
- Bello, A. A and Tsado, D. N (2013), Feed intake and nutrient digestibility and growing Yankasa rams fed sorghum stover supplemented with graded level of dried Poultry based diet, *Asian Journal of Animal Sciences*. 7, 2, 56-63p
- Chulayo, A.Y and Muchenje, V (2013). Effect of Pre-slaughter conditions on Physio chemical Characteristics of mutton from three sheep breeds slaughtered at a smallholder abattoir. *South African Journal of Animal Science*. Peer reviewed paper; Proceeding. 45th Congress of South African Society for Animal Science. 1-5p
- Duncan, D.B., (2000). Multiple Range, F Test Biometry, 9:1-42p
- Fasae, A., Adu, I. F, Aina, A.B.J and Dipeolu, M. A (2010). Growth performance, carcass characteristics and meat sensory evaluation of West African Dwarf sheep fed varying levels of maize and cassava hay. *Tropical Animal Health and Production*. 43, 2p
- Isah, A.A., Abieyuwa, O and Akinsoyinu, A.O (2009). Performance, Linear body measurements and carcass characteristics of WAD Goats fed Diets supplemented with

- slaughter house by products. *Nigerian journal of Animal Production*, 36,1, 113-124.
- Iwe, M.O. (2002). Handbook of sensory methods of analysis, 1st Ed. Rejoins Communication Services Limited, 70-71p.
- Makkar, H.P.S., (2002). Application for the in vitro gas method in the evaluation of feed resources and enhancement of nutritional value of tannin rich tree/browse leaves and field evaluation of animal feed supplementation packages. *Proceedings of an IAEA Technical Cooperation of Regional AFRA Project Organization*. Cairo, Egypt. Pp23-40.
- Rodrigues, S. Teixeira A. (2009): Effect of sex and carcass weight on sensory quality of goat meat of Cabrito Transmontano. *Journal of Animal Science*, 87, 711-715.
- Ronald L. O. (2009). Sensory evaluation of young goat meat submitted to diets with licury *Syagrus Coronate (Martius) Beccari* oil level. World Congress on Oil and Fat, 23-30p.
- Steel, R.G.D. and Torrie, J.H. (2000). Principles and Procedures of Statistics: A Biometric Approach. 2nd Edition. McGraw Hill Book Co. Inc., New York, USA, ISBN: 9780070610286, Pages: 633.
- Tsado, D. N., Adama, T. Z., Ayanwale, B. A. and Shiawoya, E. L (2011) Effects of Age at Castration, Sex and Type of Birth on Body Weight Changes and Nutrient Digestibility of Savannah Brown Goats *Savannah Journal of Agriculture Vol: 6 (2) pp93-98*