



**ORIGINAL ARTICLE**

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## **Sensory Evaluations of Different Types of Red meat in Sudan**

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### **ABSTRACT**

*This study was aimed to evaluate the sensory evaluations of different types of red meat. The result showed the sensory evaluations showed that camel and goat meat were palatable and desirable to panelists. Panelist scores for color were not significant ( $P>0.05$ ) between the three types of meat. The result indicated that the color was acceptable to panelists. Panelist's scores for tenderness were lower for camel and goat meat compared to beef. Panelist's scores for juiciness were higher for camel meat and beef compared to goat meat. The result of this study showed that Camel meat and beef were more desirable compared to goat meat. However, the goat meat was also desirable to the panelists.*

**Key words:** sensory evaluation, color, tenderness, juiciness, flavor, overall acceptance

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### **INTRODUCTION**

Sudan is situated in northeast of Africa, lying between latitudes  $4^{\circ}$  and  $22^{\circ}$  North and longitudes  $22^{\circ}$  and  $38^{\circ}$  East. The country is traversed by the River Nile and its tributaries which have varying influences on irrigated agriculture and livestock production systems. In recent years, there has been an increased demand for convenience meat and meat products requiring minimal home preparation [1]. Siham, [2] stated that camel meat is palatable and coarser compared to beef, varying in color from raspberry red to brown red and having white fat. El-Faer et al., [3]; Elgasim and Alkanhal, [4]; Dawood, [5] reported that variation in beef quality is large and is due to many factors, such as differences in genetic background, sex, age, management and nutrition. Verbeke and Viaene, [6] stated that the consumer's decision to purchase beef is guided by the perception of healthiness and a variety of sensory traits including color, tenderness, juiciness, and aroma or flavor. Gadiyaram and Kannan [7] stated that goat meat is an ideal source of red meat for the preparation of heart-healthy products because of its lower fat content. Babiker *et al.*, [8] stated that goat has won favorable recognition for its quality which matches some consumer preferences for low-fat and consumer concerns on health. When compared to other meat, goat meat is low in calories and fat. According to USDA, [9] goat meat offers more nutritional value, greater health benefits, and is an ideal choice to be considered as "the other red meat." As the health benefits of goat becomes more widely known among the general population, the demand for alternative low-fat red meat should also continue to increase. The objective of this study was to evaluate sensory of fresh and frozen camel, beef and goat meat.

### **MATERIALS & METHODS**

This study was conducted in the laboratory of meat, College of animal Production Science and Technology Sudan University of Science and Technology (SUST).

#### **Meat samples:**

Twenty one kg of fresh deboned camel, beef and goat meat were obtained. Camel meat was purchased from "Soug Elnaga" local market, west Omdurman, beef from kuku research centre, and goat meat from local market.

**Sensory Evaluations of Fresh meat:** The samples used for sensory evaluation were randomly selected and thawed for 24 hours in  $4^{\circ}\text{C}$  refrigerator prior to cooking. Meat samples were separately cooked in an electric oven at  $163^{\circ}\text{C}$  for 90 minutes as described by Griffin, et al., [10]. A six point hedonic scale was

used, where six was extremely desirable while one was extremely undesirable (Appendix. 1). Tap water was available for the panelists use between testing samples.

**Statistical analysis:** The data collected were subjected to statistical analysis by using complete randomized design used to analyze the results obtained from this study and subjected to ANOVA followed by Least significant difference test (LSD) using the [11].

**RESULTS**

Table (1) and Figure (1) showed the panel rating of cooked camel, beef and goat meat. The treatments differ significantly ( $P < 0.05$ ) in the parameters measured except color and all scores obtained were above moderately desirable (Appendix 1). Panelists scores for juiciness of camel meat and beef were higher than that of goat meat and there was significant ( $P < 0.05$ ) different between them. Panelist scores for color were not significant ( $P > 0.05$ ) different between them. There was significant ( $P < 0.05$ ) different between them in tenderness. Panelist's scores for tenderness of camel and goat meat were lower than that of beef. There was highly significant ( $P < 0.01$ ) different between treatment in flavor. The scores for flavor of camel and goat meat were lower than that of beef. Overall acceptance showed significant ( $P < 0.05$ ) different between them. Camel meat and beef more desirable than goat meat.

**Table 1. Mean values ( $\pm$  SD) of meat quality attributes (sensory evaluations) of camel, beef and goat meat cooked by boiling:**

Meat type Parameters	Camel meat	Beef	Goat meat	Level of significant
Color	4.60 $\pm$ 0.70	4.80 $\pm$ 0.42	4.30 $\pm$ 0.48	NS
Tenderness	4.50 $\pm$ 0.71 <sup>b</sup>	5 $\pm$ 0.67 <sup>a</sup>	4.20 $\pm$ 0.63 <sup>b</sup>	*
juiciness	5.10 $\pm$ 0.57 <sup>a</sup>	5.10 $\pm$ 0.74 <sup>a</sup>	4.10 $\pm$ 0.57 <sup>b</sup>	**
Flavor	4.40 $\pm$ 0.52 <sup>b</sup>	4.60 $\pm$ 0.70 <sup>a</sup>	3.70 $\pm$ 0.67 <sup>b</sup>	**
Overall acceptance	4.80 $\pm$ 0.63 <sup>a</sup>	5,0 $\pm$ 0.67 <sup>a</sup>	4.20 $\pm$ 0.63 <sup>b</sup>	*

Notes = [1] Based on a scale of 1-6 with six the highest score

[2] Means (10 panelists).

\* = ( $P < 0.05$ )

\*\* = ( $P < 0.01$ )

N.S. = No significant difference between the two means.

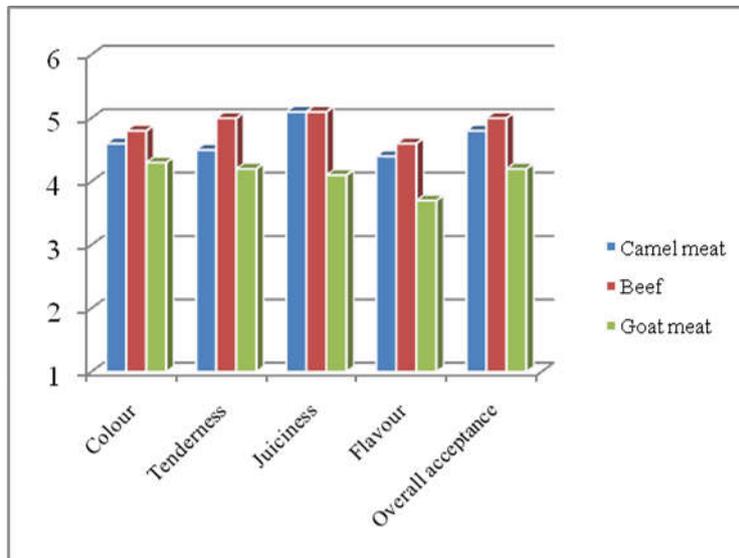


Figure 1. Sensory evaluation of different types of meat

**DISCUSSION**

This study showed that the treatments differ significantly ( $P < 0.05$ ) in the sensory parameters measured (tenderness, juiciness, flavor and overall acceptance) except color and all scores obtained were above moderately desirable. In this study Panelist scores for color were not significant ( $P > 0.05$ ), whereas, significant ( $P < 0.05$ ) different were observed in tenderness. Panelist's scores for tenderness of camel and

goat meat were lower than that of beef, which was in line with the findings of Sen *et al.*, [12]; Schönfeldt *et al.*, [13]; Griffin *et al.*, [10] who reported that goat meat was less tender than other types of red meat and the findings of Sen *et al.*, [12] who reported that goat meat was less tender compared to beef. The present result was in line with the findings of Smith *et al.*, [14] who compared sensory characteristics of goat meat with beef and stated that the goat meat had the same juiciness, but was less tenderness compared to beef. In this result tenderness of camel meat was less than beef, this result disagreed with the result stated by Adim *et al.*, [15] who found that the camel meat was similar in taste and texture to beef and Williams, [16] who reported that camel meat was similar in taste and texture to beef. In the present result the panelist's scores for juiciness of camel meat and beef were higher compared to goat meat. Differences in juiciness related primarily to the ability of muscles to hold water during cooking as reported by Aberle *et al.*, [17]. The present results disagreed with the result of Sen *et al.*, [12] who stated that goat meat had the same juiciness to beef. The scores for flavor of camel and goat meat were lower than beef, which agreed with the statement of Babiker *et al.*, [8] who reported that the goat meat was lower in flavor compared to lamb and beef. This was also similar to the findings of Schönfeldt *et al.*, [13, 18]; Casey *et al.*, [19]; Sheradin *et al.*, [20]; Webb *et al.*, [21] who reported the goat meat has a distinct flavor and aroma compared to beef and mutton. Some evidence stated by Nelson *et al.*, [22] who suggested that goat meat fares favorably in palatability when compared with lamb and beef. In this study the goat meat was desirable to the panelists; this result was in conformity with the findings of Degner, [23]; Griffin *et al.*, [24] and Miller, [25]. The present result was in line with the findings of Smith *et al.*, [14] who compared sensory characteristics of goat meat with beef and reported that the goat meat had less overall satisfaction when compared to beef. Overall acceptance showed significant ( $P < 0.05$ ) different. Camel meat and beef were more desirable compared to goat meat hence the goat meat was also desirable, which was agreed with the findings of Henryk, *et al.*, [26] who reported that the sensory evaluation confirmed good eating quality of goat meat. The present study showed the goat meat had less overall satisfaction compared to camel meat and beef, which was in agreement with the findings of Sen *et al.*, [14] who stated the goat meat recorded less overall satisfaction compared to beef.

## CONCLUSION

The present study showed the goat meat had less overall satisfaction compared to camel meat and beef.

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**Appendix 1**  
**Grading chart for meat and sausage**

Sample code	Color	Flavor	Tenderness	Juiciness	Acceptance
A					
B					
C					
D					
E					
F					

Evaluate these samples for color, texture, flavor and juiciness – for each sample, use appropriate scale to show your attitude by checking at the point that best describe the feeling about the sample. If you have any question please ask, thanks for your cooperation.

**Key:**

Color		Flavor		Tenderness		Juiciness	
6	Extremely desirable	6	Extremely intense	6	Extremely desirable	6	Extremely juicy
5	Very desirable	5	Very intense	5	Very desirable	5	Very juicy
4	Moderately desirable	4	Moderately intense	4	Moderately desirable	4	Moderately juicy
3	Moderately undesirable	3	Moderately un- intense	3	Moderately undesirable	3	Moderately Un juicy
2	Very undesirable	2	Very un intense	2	Very undesirable	2	Very dry
1	Extremely undesirable	1	Extremely un intense	1	Extremely bland	1	Extremely dry

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