Study In Some Quality Attribute Of Meat

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Abstract: The study aimed to evaluate the quality attributes of fresh camel meat and beef. The result showed that hunter lightness (L) values were highly significant (P< 0.001) between the types of meat. Beef recorded higher values of lightness compared to camel meat as (35.40 and 29.56) respectively. Redness (a) values was significantly (P< 0.01) between the types of meat studied, hence beef recorded the higher values than that in camel meat as (19.60 and 16.45) respectively. The yellowness (b) values were significantly (P< 0.001) different between treatments, However, beef recorded the higher values than in camel meat as (7.78 and 5.10) respectively. In general, camel meat appeared brighter red than beef. Water holding capacity (WHC) was not significantly (P> 0.05) different among the two types of meat studied. The WHC values were (3.07 and 2.67) for camel and beef respectively. Shear force, which measures muscle tenderness, was not significantly (P> 0.05) different among the two types of meat studied. However, beef recorded the lower values than in camel meat as (4.60 and 5.11) respectively. Connective tissue strength values were highly significant (P< 0.001) between the types of meat. Hence, camel meat recorded higher values than beef as (3.57 and 2.62) respectively.

Keywords: Quality Attribute, Shear force, Connective Tissue Strength of camel meat and beef.

INTRODUCTION:

Traditionally meat quality is either eating quality or processing quality, therefore quality is directly associated with usage and is a multifaceted concept (Webb et al., 2005). Lawrie, (1991) stated that meat eating quality involves five attributes namely, colour, water holding capacity, tenderness, juiciness and flavour. All attributes are influenced by breed, sex, age, anatomical location, exercise, nutrition and internal variability. Color is an important criterion of raw or cooked meat and meat products. It reflects the proper composition of the products, particularly in relation of meat to other compounds, freshness of raw materials, texture, taste and proper conditions of storage (Klak et al., 2001; Alberti et al., 2002). Water holding capacity is the ability of meat to retain its own or added water during application of external forces such as cutting, heating, grinding, or pressing (Judge et al., 1989) . Cooking loss is one of the most important properties of sausage products as it is related to water holding capacity. There is variation in water holding capacity among different types of meat from different animal and muscles (Lawrie, 1991). Mukasa, (1981) defined texture of meat as the sensory manifestation of the structure of the meat and the manner in which the structure reacts to the force applied during biting. Simela et al., (2003) stated that meat tenderness and flavor are the most important components that determine meat quality. The Objective of this study is:

1. To determine the eating quality attributes of camel meat and beef, to detect the differences between camel meat and beef and to evaluate the camel meat.
2. To determine the force Connective tissue strength of camel meat and beef.

MATERIALS AND METHODS:

Study was conducted at the laboratory of Meat Science and Technology, College of animal Production Science and Technology, Sudan University of Science and Technology and Meat laboratory in Khartoum University.

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Meat samples: A total of 10 kg fresh deboned camel meat was obtained from camels slaughtered at local market “Soug Elnaga “west Omdurman. A total of 10 kg fresh deboned beef meat was obtained from kuku research centre.

Quality attributes: Ten samples from the two types of meat were used for each parameter. Color Measurement was done according to (CIE, 1986). Water Holding Capacity (WHC) was measured according to the modified methods of Jauregui et al., (1981). Cooking Loss % was determined according to (AMSA, 1995). The samples were free of external visible fat and connective tissue and sub sampled for chemical analysis and quality parameters. Samples for quality attributes were allowed to oxygenate for 2 hours at 4^{o}C before use.

Color Measurement: Color measurements were performed using hunter lab Tristimulus colorimeter model D 25 M-2 Hunter. Lightness (L), redness (a) and yellowness (b) were recorded on muscle sample (CIE, 1986).

Water holding capacity	Loss water area – meat film area
	Meat film area

Water Holding Capacity (WHC): One gm from minced meat (LD) was used. Each sample was placed on humidified filter paper (Whatman No. 40) in a desiccators over saturated KCl solution) and pressed between two Plexiglas plates for 3 min. at 25 kg load. The meat film area was traced with a ball pen and the filter paper was allowed to dry. Meat and moisture areas were measured with a compensating Plano-meter (Jauregui et al., 1981). As follows:

Cooking Loss Determination: The cooking loss was determined according to (AMSA, 1995). Meat samples were thawed at 5^{o}C for 24 hr. then cut into samples of equal dimensions and weighed Samples were cooked in plastic bags in a water bath at 80^{o}C for 90 min., cooled in running tap water for 20 min., then dried from fluids and reweighed. The cooking loss % was also determined by oven. Frozen samples randomly selected were used for determining cooking losses and thawed for 24 hours in 4^{o}C refrigerator. Two fingers from each treatment were weighed separately and rapped by aluminum foil, then cooked by oven at 160^{o}C for 25-30min. Samples allowed to cooling at room temperature, then

reweighed. Cooking losses were determined by weight difference between raw and cooked sausage. The cooking losses were determined according to (Ziprin et al., 1981). Cooking loss was determined as the loss in weight during cooking and expressed as a percent of pre-cooking weight as follows:

$$\text{Cooking loss \%} = \frac{\text{Weight before cooking} - \text{Weight after cooking}}{\text{Weight before cooking}} \times 100$$

Objective Measurement of Tenderness and Toughness:

For sheer force and connective tissue strength determinations, an Instron Model 1000 fitted with a Varner-Bratzler shear device was used. Rectangular meat samples having a cross sectional area of 1 cm was shorn across the muscle fiber to give shear force values of the muscle fibers. Cubical meat samples (1 x 1 x 1 cm) were also cut from the cooked meat and were used to determine connective tissue strength by shearing along the muscle fiber. Many shear force values were determined on each samples and their mean was taken.

Statistical analysis:

For the purpose of this study, data were transformed into Computer using SPSS. Method of analysis by using T test method.

RESULTS:

Table (1) show the eating quality attributes of camel meat and beef. The result showed that hunter lightness (L) values were highly significant (P< 0.001) between the types of meat. Beef recorded higher values of lightness compared to camel meat as (35.40 and 29.56) respectively. Redness (a) values was significantly (P< 0.01) between the types of meat studied, hence beef recorded the higher values than that in camel meat as (19.60 and 16.45) respectively. The yellowness (b) values were significantly (P< 0.001) different between treatments, However, beef recorded the higher values than in camel meat as (7.78 and 5.10) respectively. Water holding capacity (WHC) was not significantly (P> 0.05) different among the two types of meat studied. The WHC values were (3.07 and 2.67) for camel and beef respectively. Shear force, which measures muscle tenderness, was not significantly (P> 0.05) different among the two types of meat studied. However, beef recorded the lower values than in camel meat as (4.60 and 5.11) respectively. Connective tissue strength values were highly significant (P< 0.001) between the types of meat. Hence, camel meat recorded higher values than beef as (3.57 and 2.62) respectively.

Table (1): *Quality Attributes of the Camel meat and beef:*

Parameters		Camel meat	Beef	Standard error (SE)	Level of significance (L.S)
Color	L	29.56^{a}	35.40^{b}	0.397	***
	a	16.45^{a}	19.60^{b}	0.628	**
	b	5.10^{a}	7.78^{b}	0.205	***
Water holding capacity		3.07	2.67	0.524	N.S.
Cooking loss %		35.60^{a}	38.60^{b}	3.253	*
Shear force kg/cm^2		5.11	4.60	1.143	N.S.
Connective tissue strength kg/cm^2		3.57	2.62	0.068	***

* = (P< 0.05)
** = (P< 0.01)
*** = (P< 0.001)
N.S. = No significant differents between the two means
L = Degree of lightness a = Degree of redness
b = Degree of yellowness

DISCUSSION:

Objective color measurements of fresh camel meat and beef were studied. . Beef recorded higher values of lightness, redness and yellowness compared to camel meat as (35.40 and 29.56) and (19.60 and 16.45) and (7.78 and 5.10) respectively. Results showed that camel meat appeared brighter red than beef. This result was supported by results by Fox, (1966); Saffle, (1968) who reported that the camel meat is lighter in color compared with that of beef. Results were also inconformity with the statement of Babiker and Yousif, (1990) who reported that camel meat color varied from raspberry red to brown. The present results were in line with the results of Kadim et al., (2006) who reported camel meat color values as lightness (L) ranged from (27.86 to 43.21), redness (a) ranged from (10.46 to 22.81) and yellowness (b) ranged from (4.63 to 10.11). Water holding capacity was not significantly (P< 0.05) different among the two treatments. The present study was showed the WHC values were (3.07 and 2.67) for camel and

beef respectively. The present results were lower than the values reported by Kafe, (2001) in camel meat as (5.8). Whereas, the present results disagreed with the result of Arguello et. al., (2004) who reported that the WHC in goat meat (0.59). Lower water holding capacity of meat increased cooking loss in final products as stated by Lawrie, (1991). Cooking loss was higher in beef than camel meat, probably due to the lower content of fat in camel meat, also due to superior (WHC). Shear force values were lower in the beef than that in camel meat, similarly connective tissue strength was significantly weaker in beef than in camel meat indicating, that the former of beef was tender than that in camel meat. The camel meat had the highest shear force and connective tissue strength. The camel meat with its superior processing properties and low fat content furnishes a good raw material for comminuted meat production and healthy food commodities.

Conclusion:

In this study the eating quality attributes, shear force and connective tissue strength of camel meat and beef were evaluated.

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