DIVERSITY IN TEXTURAL AND MEAT QUALITY PARAMETERS OF DROMEDARY CAMEL

A. Ahhmed[1, 2,3], S. Karaman[1], Ö. Toker[4], G. Kaneko[2], H. Ushio[2],

R. Sakata[3], M. Çam[1], S. Sakı[1] & H. Yetim[1]

[1]Food Engineering Department, Faculty of Engineering, Erciyes University, Kayseri, Turkey

[2]Graduate School of Agricultural and Life Sciences, The University of Tokyo, Tokyo, Japan

[3]School of Veterinary Medicine, Azabu University, Sagamihara, Japan

[4]Faculty of Chemical and Metallurgical Engineering, Yildiz Technical University, Istanbul, Turkey

Abstract– The aim of this research was to determine the differences in textural and some physicochemical properties of four fresh muscles sourced from *Camelus dromedarius*. Muscles used in this study were *Semispinal capitis, Cutaneous-omo brachialis, Longissimus dorsi* and *Biceps femoris*. As a result, the textural data suggest that *Semispinal capitis* is the most qualified muscle among the fresh cuts. However, *L dorsi* showed to be the best among the cooked muscles. *B. femoris* apparently was the worst in the cooked samples because rated high scores for the most important attributes of eating quality (hardness, gumminess and chewiness). pH values were increase in all samples and this phenomenon is a converse to the usual hypothesis as meat pH drops down after 24-48 h. *C. brachialis* showed high values of pH compared with other muscles. Metmyoglobin % was equal in *C. brachialis* and *B. femoris* but lower in *L. dorsi* while *S. capitis* showed the greatest values. Color results suggest that that values of *L, *a** and *b** in *S. capitis* and *B. femoris* are higher than in *C. brachialis* and *L. dorsi.* In general muscles of dromedary camel differ in textural and physicochemical properties which could be due to their dynamic functions.**

Key Words – Color, meat chemistry, camelus meat.

I. INTRODUCTION

From a purely medical view the consumption of camel meat is very recommendable, particularly in prevention against cardiovascular diseases. It is injustice that many people lack acquaintance of the health benefits of camel meat, as we mean, because it has very valuable characteristic and offers unique nutritional profiles. Camel meat proteins have less been recognized for their nutritional and functional properties especially in the European society for cultural reason. Yet, camel is a good source of meat especially in areas where the climate adversely affects the performance of other meat animals, such as Middle-east, North African and Central Asian countries. In camelus dromedaries, skeletal muscle is characterized by its ability to dynamically adapt to variable levels of functional demands and also environmentally hard conditions of weather. These muscular characteristics of dromedary camel still remain neglected, even though this species has been domesticated for hundreds of thousands of years.

This work is carried out to determine textural and some physicochemical properties concerned with the quality and stability of different muscles from male camel (Table 1). Purpose of this paper is to offer information about some differences of particular properties in dromedary camel meat.

II. MATERIALS AND METHODS

Meat cuts: Male camel (bull camel) was slaughtered at age of 8 years, in a local butcher, Kayseri, Turkey. The animal spent whole life in the eastern part of Turkey, and subjected to ordinary life cycle, which vary in environmental condition and diet. After slaughtering the pH of the muscles was normal, however samples were kept in refrigeration temperature for 24 h prior to experimental processes.

Protein extraction

Proteins were extracted from the fresh samples by separately adding 5 g meat to 20ml distilled water

(H_2O). The protein concentration of the extracted solution was determined using the biuret method.
pH values: The pH hydrogen ion concentration and lector conductivity were measured in meat cuts [1].

Metmyoglobin %:
Metmyoglobin concentration in sample was evaluated using a modification of procedures by Krzywicki [3]. The filtrate of samples was measured at an absorbance of 525, 572, 700 nm using a spectrophotometer (Agilent 8453 Spectrophotometer Technologies, USA).

Color determination:
The measurements were carried out in accordance with the previous protocol [2]. The tests were five times at different areas, on each piece of meat, using a spectrocolourimeter (Minolta CM-1000; Tokyo, Japan).

Cooking samples:
Meat cuts 6 cm × 10 cm × 0.5 cm were grilled on each side at 160 ^{o}C for 9 min (1100W) by a microwave (Kenwood MW 796).

Texture analysis:
The texture analyzer (TA. XT. Plus, Stable Micro-System, Surray, England) was used for textural properties. The texture analyzer with a spherical probe was adjusted to a setting as follows: pre-test speed 2 mm/sec, test speed 1 mm/sec and post test speed 5 mm/ sec. The target mode was strain to 40% into the sample for 5 sec.

III. RESULTS AND DISCUSSION

Protein concentration of the muscles differed slightly from each other, *L. dorsi* showed a higher content when compared with other muscles (Figure 1). *S. capitis* uncooked muscle showed the lowest values for hardness, gumminess, chewiness and resilience, which may refer to the moisture content and muscle activities. As a result, the rheological data suggest that *S. capitis* is the most qualified muscle among the fresh cuts. However, *L. dorsi* showed to be the best among the cooked muscles. *B. femoris* apparently was the worst in the cooked samples because rated high scores for the most important attributes of eating quality (hardness, gumminess and chewiness) (Table 2). pH values were increase in all samples and this phenomenon is a converse to the usual hypothesis as meat pH drops down within 24-48 h after slaughtering. *C. brachialis* showed high values of pH compared with other muscles (Figure 2). There was a correlation between pH and reduction potential values, the higher the pH values the lower the reduction potential (Figure 3). These results suggest that reduction potential could be used as useful parameter that would be applied to determine the camel meat quality.
Metmyoglobin % was equal in *C. brachialis* and *B. femoris* but lower in *L. dorsi* while *S. capitis* showed the greatest values. The metmyoglobin is important indicator for the meat freshness, then *L. dorsi* demonstrated a low value among other samples which may indicate that this muscle contain lesser oxidoreductase enzyme (Figure 4). Color results suggest that values of *L**, *a** and *b** in *S. capitis* and *B. femoris* were higher than in *C. brachialis* and *L. dorsi* (data not shown).

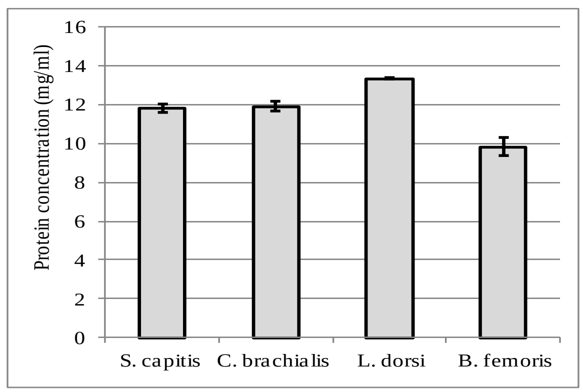

Figure 1. Protein content in camel meat cuts (mg/ml)

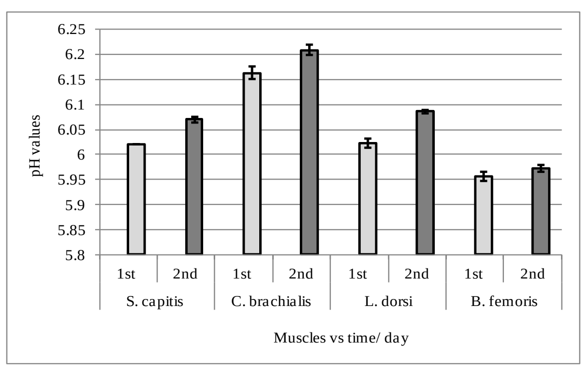

Figure 2. pH values of camel meat cuts at 24 and 48 h.

Because it contains a great content of fibers and myofibrillar proteins it is distinguished from other meat types. For instance, muscle contractility, which is described as the ability of muscles to be shorten. Camel meat also has the extensibility that means the ability to be stretched. Elasticity defined as the ability to resume normal length after contraction or having been stretched. The nutritional properties of proteins of camel muscle are associated with their amino acid content in conjunction with the physiological utilization of specific peptides upon digestion. Those are the reasons which stimulated us to consider camel meat as an important commodity in which we aimed in this study to determine the differences in textural and physicochemical properties of four fresh muscles.

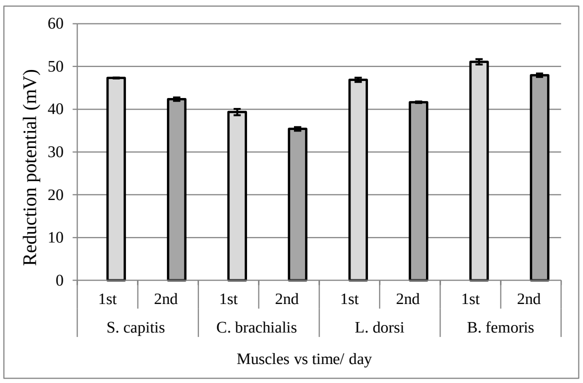

Figure 3. Reduction potential values of camel muscles within 24 to 48 h after slaughter.

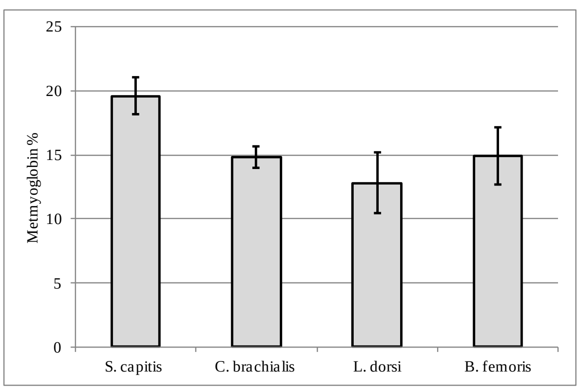

Figure 4. Metmyoglobin content in camel meat.

IV. CONCLUSION

The analysis of camel carcass and the subjects of carcass characteristics and meat quality have long been neglected. Very little is known about the anatomy of the skeleton and muscles of the camel, the post mortem reactions, and the effects of different major keys such as feeding, genetics, environment factors, slaughtering, chilling and deboning practices on the meat quality. Conversely, the importance of these influences has improved the revenue of the beef, sheep, and pork, poultry and fishes industries. Then question that many people ask today is: Do we need to look for a healthier alternative meat to beef and other fatty meats? The answer could be yes, and the best solution is camel meat. Camel meat is being touted as a healthy, cheaper alternative to beef because it resembles beef in looks and taste. Luckily, it is very low in fat, calories and cholesterol content meanwhile high in moisture, fiber and menials' content. Therefore, in the present study we determined the essential, textural and physicochemical properties of four skeletal muscles included protein content, textural properties, post mortem pH, electro-conductivity, color and relative content of metmyoglobin of selected cuts of camel meat with view to elevate its value. Results indicate that the four muscles differed in all textural and physicochemical properties. As conclusion we suggest that muscles sourced from neck and shoulder muscles are qualified for daily meals use as they showed low values of textural properties and high protein content.

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Table 1 Common names of camel muscles and their dynamic functions

Muscle	Common name	Source	Dynamic function
Biceps femoris	Bottom (outside) round	Back leg	Allow animals to lift their legs or bend the knees. Biceps femoris allows animals to rotate and flex their knee laterally. They are also act as a buffer for ATP.
Cutaneous-omo brachialis	Shoulder rose	Upper portion of the shoulder blade	This muscle allows the front legs to rotate in and out, move forward and behind the back.
Longissimus dorsi	Chuck eye	Middle back	Serves to help the front legs to move forward, walk and run. Also help rotates the shoulder along with other Muscles.
Splenius capitis	Back (outside) neck	Side portion of neck	This muscle is responsible for connecting the vertebrate of the neck to the base of the skull. The splenius capitis muscle is instrumental in allowing the head and neck to flex and rotate.

Table 2 Textural properties values of fresh and grilled camel cuts

Fresh samples	Hardness (g)	Adhesiveness (g/s)	Springiness	Cohesiveness	Gumminess	Chewiness	Resilience
S. capitis	356.26	-27.68	0.90	0.60	199.77	179.21	0.23
C. brachialis	472.26	-29.67	0.84	0.58	277.16	231.66	0.24
L. dorsi	877.70	-35.93	0.89	0.61	532.81	476.70	0.33
B. femoris	623.47	-9.04	0.72	0.57	356.30	259.36	0.30
Cooked samples							
S. capitis	680.69	-0.70	0.84	0.70	475.37	397.48	0.31
C. brachialis	637.33	-1.21	0.82	0.74	467.63	383.60	0.35
L. dorsi	672.27	-0.70	0.82	0.68	455.21	369.98	0.35
B. femoris	1667.96	-0.80	0.83	0.76	1260.39	1048.40	0.34