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Maputo, 28 Agosto - 1 Setembro 2022

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FRESH BOVINE MEAT: SENSORY AND INSTRUMENTAL EVALUATION OF TENDERNESS

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ABSTRACT

The objective of the present work was to define the ideal tenderness of bovine meat and establish an index for the differentiation between hard and tender beef of commercial origin. Different beef cuts ("Chã de Fora", "Rabadilha", "Vazia" and "Lombo") of different tenderness were considered for this study and were evaluated simultaneously by consumers using a hedonic scale and by instrumental methods. With these results, it was possible to compare the tenderness evaluation of commercial meat with Cachena meat.

***Keywords**:* Warner-Bratzler shear force, texture profile analysis, beef cuts.

INTRODUCTION

Consumers usually consider three attributes when buying meat: appearance, colour and presumed tenderness considering the beef cut. After purchase, the most important attribute is tenderness.

Cachena is a cattle breed part of the Portuguese genetic heritage, very interesting for the south Alentejo, a poor agricultural region of Portugal, due to the high rusticity of these animals. Cachena's animals are small and the meat is known by its excellent characteristics of texture and flavor, so the determination of the ideal tenderness is of extreme importance for the producers, and for consumers. According to several studies on fresh meat, the main textural feature influencing the intention to buy back is the tenderness of the meat, and the consumer is willing to pay a higher price for meat that is guaranteed as tender (Warner *et al.,* 2010).

In order to understand and measure the ideal tenderness concept for beef consumers, different commercial beef cuts were chosen: (1) "Chã de Fora" is the muscular part that covers the outer thigh and extends through the posterior region to the level of the tendon of the muscles that are inserted in the calcaneus; (2)"Rabadilha" is the muscular part that surrounds the lateral and anterior faces of the femur, until the kneecap; (3) "Vazia" is the muscular piece that fills the vertebral drip of the spinal portion; (4)"Lombo" is the muscle part taken from the ventral face of the roast beef, and includes the portion inserted into the iliac bone (http://animalbiosciences.uoguelph.ca/~swatland/ch4_1.htm).

About 250 consumers were asked about the frequency and mode of consumption of beef, and what their palatability for beef. Then four samples were given, corresponding to the described beef cuts, for the consumer to assess which tenderness category was the most appropriate for each sample, considering an affective acceptance test through a 5-category hedonic scale (Very Hard, Hard, Ideal Tenderness, Tender and Very Tender). At the same time, and using the very

same beef cuts, instrumental tests were performed to determine tenderness using two widely used methods for meat texture evaluation: the Warner-Bratzler Shear Force (WBSF), and the Texture Profile Analysis (TPA) (Honikel, 1998; Ruiz De Huidobro *et al*., 2005; Novaković & Tomašević, 2017).

RESULTS

"Chã de Fora", "Vazia" and "Rabadilha" were rated mainly as "Hard" and "Ideal Tenderness". The highest evaluation was found in "Lombo", which was always rated as tender. "Lombo" was found to be significantly tender than the remaining beef cuts regarding instrumental evaluation, which is in agreement with the assessment made by the consumers. The compression force was higher when testing "Chã de Fora" beef cut, however the results of the shear force for this same cut beef were identical to those of the "Rabadilha" and "Vazia". Cachena "Lombo" and "Vazia" were considered by consumers as ideal and tender for instrumental values 16 N and 24N compression force, and shear forces of 27 N and 33 N, respectively. Regarding "Rabadilha" and "Chã de Fora", the same applies as described for the commercial meat cuts.

CONCLUSIONS

The results obtained with this work allow the establishment of an index for differentiation between hard and tender meat. This index showed that a tender meat should have shear force values between 15 and 34 N, and compression forces between 11 and 24 N, while a hard meat should have shear forces greater than 37 N and compression forces greater than 30 N. By considering the results obtained with samples from four different commercial beef cuts, we can definitely state that "Lombo" and "Vazia" Cachena beef cuts were always tender, because all values obtained in previous studies were lower to the abovementioned.

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