



Characterization of bovine meat acquired, marketed and consumed at the main establishments of Chapecó, SC, Brazil

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ABSTRACT. This study aimed to analyze the profile of beef sold and consumed in Chapecó – SC, Brazil. Were interviewed 31 individuals responsible for the main distributors, supermarkets, meat markets, restaurants and steakhouses. The structured questionnaire method was used, with questions of closed and open answers applied to those responsible for the establishments previously mapped with greater representativeness in the municipality regarding the characteristics related to the meat trade and the type of product. With the results obtained, it was possible to identify the lack of information regarding the attributes and characteristics that direct preferences in the acquisition of a quality beef. Thus, the knowledge exposure, information dissemination and concepts of the production of beef to merchants and consumers becomes important in order to contribute to the improvement of the meat consumed and commercialized in this region.

Keywords: acquisition; buyers; beef cuts; consumers; demand.

Caracterização da carne bovina adquirida, comercializada e consumida nos principais estabelecimentos de Chapecó, SC, Brasil

RESUMO. Este estudo teve como objetivo analisar o perfil da carne vendida e consumida em Chapecó - SC, Brasil. Foram entrevistados 31 indivíduos responsáveis pelos principais distribuidores, supermercados, mercados de carne, restaurantes e churrascarias. Foi utilizado o método de questionário estruturado, com questões de respostas fechadas e abertas, aplicadas aos responsáveis pelos estabelecimentos anteriormente mapeados com maior representatividade no município, quanto às características relacionadas ao comércio de carne e ao tipo de produto. A partir dos resultados da pesquisa foi possível identificar a falta de informação sobre os atributos e características que norteiam as preferências na aquisição de uma carne bovina de qualidade. Portanto, torna-se importante a exposição dos conhecimentos, difusão das informações e dos conceitos sobre a produção de carne bovina de qualidade aos comerciantes e consumidores, a fim de contribuir para a melhoria da carne consumida e comercializada nesta região.

Palavras-chave: aquisição; compradores; consumidores; cortes de carne; demanda.

Introduction

In several states of Brazil, the beef market has socioeconomic relevance and moves several processing and distribution sectors of this segment. However, the question of meat quality from the consumer perspective is a complex factor (Pethick, Ball, Banks, & Hocquette, 2011) and multivariate. In addition to facing the rapid change in food habits from generation to generation, which in turn seek healthier food (Font-i-Furnols & Guerrero, 2014) and the level of education, which negatively influences consumers' preference for beef (Kirinus et al., 2013), among other factors. In this sense, the meat market seeks to adjust the quality according to the preference of the consumers according to the

relevant characteristics at the time of acquisition (Sasaki et al., 2017; Verbeke et al., 2015).

The lifestyle and purchase preferences of beef consumers change over time, especially when concerning quality perception and factors associated to health (Grunert, 2006), and regarding healthier eating habits. This leads the beef industry to concern itself with consumer decision of the beef to be purchased (Font-i-Furnols & Guerrero, 2014; Verbeke et al., 2015).

In Brazil, few studies are developed regarding the behavior of consumers of meat products, and the purchase of *in natura* beef (Souza, Mourad, Sproesser, & Novaes, 2011). This encourages the development of researches that clarify the profile

that determines the quality of the beefs purchased and consumed by the population. In addition to the final consumer, knowing the retail related to beef is important, for they are largely responsible for the beef that is offered to the population, and little is known about this link of the chain, which is responsible for the large portion of commercialization.

Part of the information the consumers receive regarding the beef and its quality is provided by means of advertisements, campaigns, labels or brands (Font-i-Furnols & Guerrero, 2014), and generally do not clarify most consumer enquiries regarding the quality of the product. Knowing the profile of the beefs offered to consumers allows the establishment of market strategies to improve the quality of the offered beef. This fact encourages research that clarifies the profile of the meat purchased and consumed. Linked to this fact, we must know the beef retailer as well as the final consumer, since they are mainly responsible for the quality and quantity of meat that reaches the population.

The present paper had the objective of analyzing the profile of beefs commercialized and consumed at the main distributors, supermarkets, meat markets, restaurants and steakhouses in the municipality of Chapecó-SC, Brazil, by means of questionnaires applied directly to the person responsible for the establishments.

Material and methods

To conduct this study, we used information on the main establishments in the municipality of Chapecó (latitude 27° 05' 47" S and longitude 52° 37' 06" W), Santa Catarina - Brazil, that acquired, commercialized and consumed beef in the first half of 2015. The research was carried out through structured questionnaires, with previously elaborated questions with possibility of closed and open answers of exploratory character. Applied directly to the person responsible for the establishments previously mapped according to the level of relevance regarding the amount of meat sold, as well as its geographical location in the municipality.

For applying the questionnaires, 31 establishments were visited, of which 3 were distributors, 6 were meat markets, 5 were supermarkets and 17 were restaurants and steakhouses. The questionnaires were formulated in two different models, one for distributors, markets and meat houses and another for restaurants and

steakhouses according to the particularity of acquisition and/or commercialization of each establishment.

The general questions, dealt with items such as: location and frequency of purchase of meat for resale, form of payment, types of purchase (whole carcasses, half carcasses, special cuts, hindquarter, forequarter and others), weight of carcass or cuts, more bought and consumed cuts (with or without bone). Difficulties in quality offer (finishing and/or marbling), observations of carcass with bruises and/or lesions, preferences for fat color, nutrition, gender, age and breed of the animals, as well as the purpose of the purchased meat, goals and main complaints observed in the purchase of beef.

For restaurants and steakhouses, included issues that addressed items such as: location and frequency of purchase of meat made available to customers, cuts bought, consumed by customers, preferences for fat color, nutrition and class of animals at the moment of purchase of the meat by the responsible person of the establishment, in addition to the main complain in the establishments by the consumers and those responsible for the place.

After completing the research, the data obtained by the questionnaires were organized in Excel ® spreadsheets. And due to the great variation in the responses, was used the descriptive statistics in order to interpret the results found and present them in percentages to facilitate the understanding of the obtained information and generate conclusive answers.

Results and discussion

The results and discussion are first presented by distributors, supermarkets and meat markets, and, subsequently, by restaurants and steakhouses, due to the application of distinct questionnaires and the differentiated profile of each establishment.

Distributors, supermarkets and meat markets

With the results obtained, it was possible to verify that the distributors, supermarkets and meat markets purchased mostly from slaughterhouses (64.3%). The meat markets and supermarkets, in some cases, purchase from the distributors of the municipality (35.7%). When questioned which would be the suppliers, 22 were presented, with all establishments receiving products from more than one supplier.

Of the beef purchased by the interviewed establishments, 45% derived from only three companies. Two from the south of the country, a local distributor, another from a slaughterhouse of

the region, and a large company of national reach. Of the interviewed establishments, 50% affirm that they always purchase from the same supplier, justifying that the products and prices present little difference between suppliers. The others prefer to change suppliers according to price seasonality, variety and product quality. This reflects a problem described by Braga (2010), in which the producers have difficulty in maintaining a constant production of steers and slaughter schedule, consequently affecting the standard and quality of the beef.

Most establishments (42.9%) reported the purchase frequency of once a week, followed by 28.57% of the establishments acquiring twice a week, and the remaining 28.57%, purchase daily. The quantities purchased by these establishments range from 8.6 to 20,000 kg per day, according to the capacity for commercialization. The distributors commercialize a superior volume of beef when compared to the meat markets, due to the higher demand of purchase and delivery of beef in the establishments of the municipality. The distributors sell a higher volume of beef compared to the meat houses, due to the greater demand of purchase and delivery of meat in the establishments of the city. The frequency and increase of meat consumption are dependent on income and social aspects (Casini, Contini, Romano, & Scozzafava, 2015); however, this increase is not the same for all meat cuts (Gunderson, Lusk, & Norwood, 2009), which promotes an oscillation, in consumer preference according to price.

The types of cuts with higher volumes commercialized correspond to cuts of half-carcass, hindquarter and forequarter and whole carcass (80%), and the remaining 20% are standard commercial cuts. Acquisition of commercial cuts is done in lower volume given that it has a more elevated cost, different from carcasses, which acquisition value is lower. However, the cuts are necessary, leading to a higher loss, especially with bones. The purchase of these commercial cuts can be observed especially in establishments with lower volume of purchase and sale, due to consumer demand.

Regarding the quality of the purchased beef, 57.15% report not having any difficulty at the time of purchase, showing no complaints of the product received, while 42.85% affirm having difficulties related especially to the fat finishing, presenting, in some cases, excess of fat finishing, unwanted by a large portion of the consumers, according to their own reports. Excessive fat in red meat is undesired by consumers and the main factor of choice at the time of agreement acquisition (Banović, Grunert,

Barreira, & Fontes, 2010) mainly due to the potential risk with cardiovascular diseases (Barreira, Brandão, Lemos, & Aguiar 2009).

Concerning the questions about fat, 71.4% prefer a median finish (2 - 4 mm), 14.29% prefer scarce finish (< 2 mm) and 14.29% report not have control of what was purchased and, according to the interviewees, these variations can occur in function of the breeds slaughtered. We know that the breed factor can influence this characteristic, but mainly the production system and the diet offered will have the greatest impacts in this respect. When questioned about the finishing goal, 42.9% reported the median finish as preference. The higher percentage preference for medium fat finishing is probably associated with the minimum requirement (3 mm) of the slaughterhouses at the time of slaughter.

In relation to the scarce finish, 35.71% preferred having it as goal in function of the demands of consumers, who seek beef with little fat. The remaining 21.43% did not justify which would be their finishing goal, perhaps due to lack of knowledge on the subject. The highest percentages for low-fat meat is consistent with studies already performed by McNeill, Harris, Field, and Van Elswyk (2012), due to the fact that consumers associate the amount of fat with cardiovascular diseases.

When questioned about the marbling, 42.9% did not respond, which may denote the lack of knowledge on the subject. Among those who answered, 35.7% prefer median marbling and 21.4% prefer the scarce. This has become more evident when questioning about the goal of the marbling, for which 71.4% did not know how to respond, 7.1% prefer median marbling and 7.14% prefer scarce. The remaining interviewees (14.28%) answered in millimeters, confusing the concepts of marbling with that of finishing. At this point, it is important to point out that the absence of this knowledge provides errors in the qualitative aspects when the meat is acquired. The fat thickness according to Baldassini et al. (2017) is the deposition of subcutaneous fat and provides protection to muscle structure during the cooling process. In addition, marbling is defined as an amount of intramuscular fat and is considered an important feature because it is closely related to the sensorial characteristics of the meat that can be perceived and appreciated by consumers (Costa et al., 2002).

The demand for cuts with bone was high, at 92.9%, possibly because they work with large quantities of beef, and perform the cuts according to the preference of regional consumers. Only one of

the establishments visited (7.1%) prefer cuts with no bone due to the ease of commercializing. Among the most sold cuts, 23% prefer rib, 23% prefer round eye, 27% prefer tenderloin and ribeye, 9% prefer bottom sirloin, 9% prefer bottom sirloin/flank, 4.5% prefer top sirloin, and 4.5% prefer ground beef.

As for the results related to the color of fat, 42.8% of the interviewees were indifferent to it. Preference were of 21.4% for white and 35.7% for yellow color. According to the interviewees, the yellow fat presents a visually more pleasant aspect and appearance, and provides more tenderness beef. When choosing the white fat, one of the interviewees reported that this color derives from males, and presents higher tenderness. One other establishment preferred the white fat due to the higher probability of it deriving from the state of Mato Grosso do Sul. It was possible to observe that the preference for fat color is mostly related to the demand of the consumers of the establishment. However, the factors that affect fat color are notably unknown by the interviewees. The color of fat can be influenced by factors such as breed, gender and age, in addition to the higher or lower capacity of absorbing carotenoids (Dunne, Monahan, O'Mara, & Moloney, 2009). Carotenoids are pigments found in plants and according to their chemical basis they are classified as carotenes and xanthophylls (Shete & Quadro, 2013). Faced with this the production system, be it in pasture, confined etc directly affects the availability of carotenoids in the diet offered and thus affects the coloration of fat.

Regarding the aspect of animal nutrition, 50% of the interviewees answered that they preferred animals reared in pasture, and use the main justification of the lack of unpleasant flavor/odor of the beef, 21.4% preferred semi-confined animals with the same justification and for having access to both pasture and concentrate, and for being slaughtered at a younger age. In 21.4% of the establishments, there were no preference for animal nutrition, and only in one (7.1%), the interviewee preferred confined animals, claiming that the meat is more tender and the animals are less stressed when confined. It was possible to verify that large part of the establishments avoids beef derived from confined animals, mostly due to a negative experience in which they verified a different flavor to the beef. However, it is one more factor in which the lack of knowledge of the interviewees is clear.

In relation to the gender of the animals, 57.1% answered that they prefer castrated animals, and justify this claiming that the meat is more tender and flavorful, also presenting a higher yield and carcass quality. The preference for females was reported by

21.4% of the establishments, affirming a higher yield and tenderness to the meat. Some (14.29%) reported having no preference, and 7.14% opted for non-castrated male, believing the meat is tenderer. The age of the animals was classified into young, adult and old, in which 57.1% opted for young animals, 28.58% preferred adult animals, and 7.1% use the standard the slaughterhouse makes available, which were not reported by the interviewees. The remaining 7.14% did not show preference. When directly questioned about the age of the animals, the preference was for young or adult animals, with age between 18 to 36 months.

Regarding the breed of the animals, 50% did not present a preference due to the lack of access to the breed compositions that the slaughterhouse or distributor provided. This aspect was verified especially in the supermarkets. The remaining interviewees answered that they seek beef from the Angus breed, especially in meat markets and some of the distributors. In smaller scale, a preference for Nellore animals also occurred, justified with the origin of the meat and that it presents more tenderness. The breed question obtained greater indifference among the interviewees, probably due to the lack of control over this characteristic.

When questioned about bruises or lesions on the carcasses, 50% of the interviewees did not observe such occurrence, while the other 50% affirmed finding some type of bruise or lesion in several places on the carcass, but that they occur sporadically. The participants in the meat chain increasingly aim for the welfare of animals as a way of adding value to the products marketed (Velarde & Dalmau, 2012), and mainly due to consumer pressures on this aspect. Thus, improvements in animal welfare standards would reduce the presence of bruises on carcasses and lower losses during meat processing.

In the aspect of form of payment, prompt payment was reported by 42.8% of the interviewees. Another 42.8% performed payments between 15 and 21 days, while the remaining 14.3%, performed monthly payments to their suppliers. Among future objectives, most establishments intend to increase the volume commercialized. This factor is linked to consumer demand, as well as with his/her satisfaction. Only two establishments intend to remain stable in relation to volume, especially because of the price. A few establishments wish to work with boneless and vacuum packaged beefs, due to its practicality and reduction of labor, both in deboning and shelf restocking. However, given the regional profile of preference for fresh beef and beef with bone, it is not yet possible.

The establishments report as main complaints from costumers the price (21.42%), the lack of tenderness (14.28%), and some complaints about vacuum packaged beef (beef with excess fat and with bruises). As well as a few related to ill taste of the beef, described as related to animals derived from confinement. No complaints were reported by 35.7% of the establishments.

Restaurants and steakhouses

When questioned in relation to the suppliers, 47% of the restaurants and steakhouses reported that they purchased directly from slaughterhouses, and the remaining 53%, from distributors and meat markets. It was possible to verify that 17 companies provided beef to these establishments and that 35% of the beef consumed are distributed by two regional distributors. Three large slaughterhouses of national relevance figure among the most mentioned. The municipal meat markets were also mentioned as suppliers. For 65% of these companies, there is supplier change along the year, with the main reason being the price. The remaining 35% work with the same supplier. Price is a decisive factor, generally leaving the quality of the offered product in second plane.

Regarding purchase frequency, 82% of the restaurants and steakhouses purchase once a week, and 18% purchase daily. It was evident that the beefs are purchased in the amount sufficient for weekly consumption. The daily equivalent of beef purchased ranged from 7 to 150 kg. There was no relation between the volume and the frequency of purchase, depending on the size of the establishment and client frequency.

Regarding the type of cut purchased, 94% of the establishments purchased standard commercial cuts, with the exception of one, which purchased whole carcass, possibly due to the volume necessary and for performing their own deboning. The main cuts purchased by restaurants and steakhouses were: rib (15.1%), round eye (11.3%), top sirloin (11.3%), botton sirloin/flank (7.5%) and tenderloin (7.5%). The remaining 47.2% are among the main commercial cuts.

Most establishments (82%) report no difficulty concerning quality, offer, weight, or finishing of the purchased beef. The other 18% mentioned issues related to the distributor that is, high variability in the quality of the meat provided. Regarding the carcass finishing aspect, 53% preferred median finishing, 29% preferred scarce and 18% preferred abundant finishing. As finishing goal, most (59%) defined median finishing as choice criteria. However, even when not purchasing abundant

finishing, some establishments (18%) have this goal. The remaining 23% preferred the minimum fat finishing as possible, in function of consumer demand. Thus, it is possible to verify a striking difference in consumer profile of each establishments interviewee.

Concerning the marbling, most interviewees (53%) chose median marbling, 41% chose scarce and 6% chose abundant. We can verify that a large portion of the establishments lacks knowledge of what this characteristic is. This becomes more evident when questioned on the goal for marbling, since most (82%) answered in millimeters, confusing marbling with finishing fat.

The preference for cuts was of 64.7% for deboned cuts, 11.7% for cuts with or without bone, and only 23.6% without bone. Most reported the preference for deboned cuts, since it facilitates preparation. The establishments that opted for cuts with bones highlighted that there is greater possibility of performing the cuts according to consumer preference. Among the types of cuts most consumed in restaurants and steakhouses, rib represents 21.4%, top sirloin 14.3%, round eye is 11.9%, steak 11.9%, ribeye is 7.1% and the remaining commercial cuts represent 33.3%.

When the establishments were questioned in relation to fat color, most (82.30%) were indifferent. The interest for white fat was reported by 11.70% of the establishments, with the reason that it is less sickening and more accepted by consumers. They also mentioned that yellow fat is associated to old animals. Only one establishment (6.0%) indicated preference for yellow fat.

Most establishments (58.8%) had no criteria for choosing finishing. This option is probably not offered by the supplier at the moment of delivery. The remaining 41.20% of the establishments showed preference for either scarce or abundant finishing. The variations occur due to the establishments seeking to adapt to consumer preference.

Regarding the tenderness of the beef, 70.5% answered that it is impossible to demand this aspect from distributors due to the absence of control over product supply. The others reported that they attempt to work with cuts described as 'noble', and some describe using their own experience, and even certain 'touch', on the cut in order to identify tenderness. Tenderness is a very important aspect, even if difficult to demand and evaluated without previous knowledge.

When dealing with animal nutrition, 58.8% of the interviewees were indifferent to this aspect, 17.6% reported preference for animals reared in

pasture, reasoning that there is a lower possibility of adverse taste of the beef, while 23.6% opted for confined animals, claiming that these animals present higher yield and superior beef quality. The aversive taste of the meat is a multifactorial characteristic, in general it is associated with the feeding of the animals, mainly as a function of fat deposition. Moisés et al. (2014) describe that the fat deposition process is a complex biological process and has the significant genetic effect on meat quality.

Regarding animal gender, 64.7% of the establishments reported having no preference, 29.40% preferred castrated animals and 5.9% preferred females. The interviewees who preferred castrated animals described there having no adverse taste to the beef. In this way we observed a misconception, where the interviewees believed that the beef was equated with pork of whole males, which due to androsterone and the escatol causes unpleasant odors in the meat.

The age of the animals represented no importance to 47% of the interviewees. The others prefer younger animals, and reported ages between 18 and 36 months old, as well as those interviewed in distributors, supermarkets and meat houses. As the age of the animals increases, there is an increase in the proportions of adipose tissue and a reduction of muscle and bone (Irshad et al., 2013) and thus the quality of the meat is affected.

Concerning animal breed, 64.7% of the establishments were indifferent, and 35.30% opted for British breeds (Angus and Hereford, especially). Some also pointed the Nellore breed as preference. The fact that companies do not control these factors may explain the low importance of this criterion.

The purchase of beef in restaurants and steakhouses presents the objective of barbecue in 39.3% of the cases, followed by baking at 28.6%. Stews, steak and grilled correspond to 32.1%. Regarding the increase of beef purchases, 58.8% affirm they intend to remain stable, 23.5% report the dependence on the amount of consumers that frequent the establishment, and 17.7% report they intend long-term increase. This demonstrated a certain stabilization in the meat sector in the region of Chapecó, which depends on economic factors and increased demand. Besides this, an understanding of the information passed on to the consumer, buyer and consumer of this region.

Among the intentions of the consumers of these establishments, an increasing demand for lean beef and search for tenderness was verified. Concerning issues involving consumer complaints, 64.70% reported not having any problems, and 35.30%

described an adverse taste present in the beef, complaining also about the tenderness and amount of fat, either in excess or lacking, which characterizes the diversity of preferences of consumers from the studied region. The forms of payment to suppliers were mostly performed between 7 and 21 days after delivery (58.8%), 11.8% were monthly payments, and 29.4% of prompt payment.

Conclusion

By analyzing the profile of beef consumed and commercialized in the municipality of Chapecó, it was possible to ascertain the main locations for beef commercialization (wholesale and retail), the main consumers in scale (restaurants and steakhouses). And, however, verify the position of the interviewees in relation to the main concepts of quality used in the meat market. Thus, it was possible to conclude that for the most part the purchase of meat is influenced by the price attributed at the moment that it is acquired by the buyers, which hinders the availability of quality meat to consumers, that is, the quality of the meat depends substantially on the value offered.

In general, it was possible to detect that in this evaluated segment there are still erroneous preconceptions regarding the meat market due to the lack of adequate information, mainly regarding the main concepts that influence the meat quality. In this sense, it is necessary to develop specific strategies at all levels of the meat production chain.

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