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Consumer preferences for beef in an Algerian Region

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Abstract

This article aims to analyze the perception of beef by Algerian consumers according to their socio-demographic profiles. Surveys were carried out in 2018 with 300 consumers (68% males, 32% females) from four different age groups (> 50; 40-50; 31-39; 30-26; 25-20; < 20), to draw up an inventory of their preferences in order to assess their perceptions of beef. The study was conducted in an area located in an Algerian region. The results showed that color, tenderness, flavor, and price of beef are the most important criteria for the consumer. The results also highlight that many other factors such as psychological factors, social factors, and marketing factors or environmental factors influence consumer behavior towards beef.

Key words: Consumption, Perception, Beef, Sensory, Socioeconomic

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1. Introduction

Algeria's total cattle herd has only increased by 520,306 heads from 1,561,000 heads in 2003 to 2,081,306 head in 2021 although the development of cattle breeding has always been a priority for Algeria to meet the needs of the population in animal proteins (UBIFRANCE, 2014), particularly for the northern regions of the country, which are considered to be large consumers of red meats. The majority of beef produced comes from dairy calves from small farms that represent 80% of cattle farms (Sadoud *et al.*, 2015). Slaughtering barely covers two-thirds Algerian beef needs (Sadoud and Hocquette, 2022). The beef self-sufficiency rate is 55%. Beef production increased by 30% between 2010 and 2018, but not enough to meet the demand of Algerians (Algerian National Statistics Office, 2020). However, the government provides financial support to farmers, i.e. up to 70000 AD per animal raised up to 18/24 months.

The consumption of meat products is often the symbolic marker of the relative prosperity of a society and / or of specific socioeconomic groups (Raude and Fischler, 2007). Meat consumption around the world is very variable, it depends on country, region, family structure and gender which act in interaction (Liu *et al.*, 2022). In addition, consumer behavior in terms of meat consumption can be explained by different families of other factors such as (1) psychological factors, (2) intrinsic quality traits especially sensory factors. Some authors make a distinction between intrinsic qualities and extrinsic quality traits of the product that could be combined

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to better respond to the growing diversity of the expectations of consumers ([Hocquette et al., 2012](#); [Font-i-Furnols and Guerrero, 2015](#)). Although meat consumption has decreased in the North of the Mediterranean, as in France in particular from 2002 to 2012, from 105 to 85 kg /year /person on average ([Ellies-Oury et al., 2018](#)), it has however increased in the same period in the southern Mediterranean (Tunisia, Morocco and Algeria) from 23.5 to 39 kg /year /person on average during the period ([Sadoud, 2020](#); [Sadoud, 2019](#)). This is likely to be explained by the evolution of consumer preferences ([Chikhi and Padilla, 2014](#)), which have never been deeply studied in Algeria. Therefore, this study aims to identify major factors driving beef consumption in Algeria.

2. Materials and methods

Research work in economics and consumer sciences concerning meat products has developed in recent years both at European and international level.

Most have been primarily concerned with analyzing the complex interplay of the players in these sectors ([Boutonnet, 1998](#); [Barré, 1999](#)), others have focused on analyzing the sensory properties of meat products with a view to better matching them to consumer expectations.

2.1. Survey principles

The questionnaire was sent to heads of households, who are mainly people responsible for purchasing meat, 68% of them being male and 32% females. The survey comprised 24 questions targeted habitual beef consumers, who had been selected beforehand. This survey made it possible to draw up an inventory of consumer preferences in order to know their perceptions of beef. The following factors were studied: household size, family situation, level of education, income, type of most purchased meat, frequency of purchase, cut, color, smell, taste and juiciness of the meat, consumption preferences, cooking time, diet, cuts to eat.

An evaluation version of IBM SPSS Statistics 20 was used to perform the statistical analysis. This multivariate statistical treatment proved necessary in order to correlate socioeconomic factors with sensory preferences.

NB: AD: Algerian Dinars

AD / US\$ = 116.6 ([Algerian Ministry of Finance, 2018](#))

AD / EURO = 137.7 ([Algerian Ministry of Finance, 2018](#))

3. Results and discussion

3.1. Principal component analysis

The Principal Component Analysis summarizes the differences between consumers into two main axes:

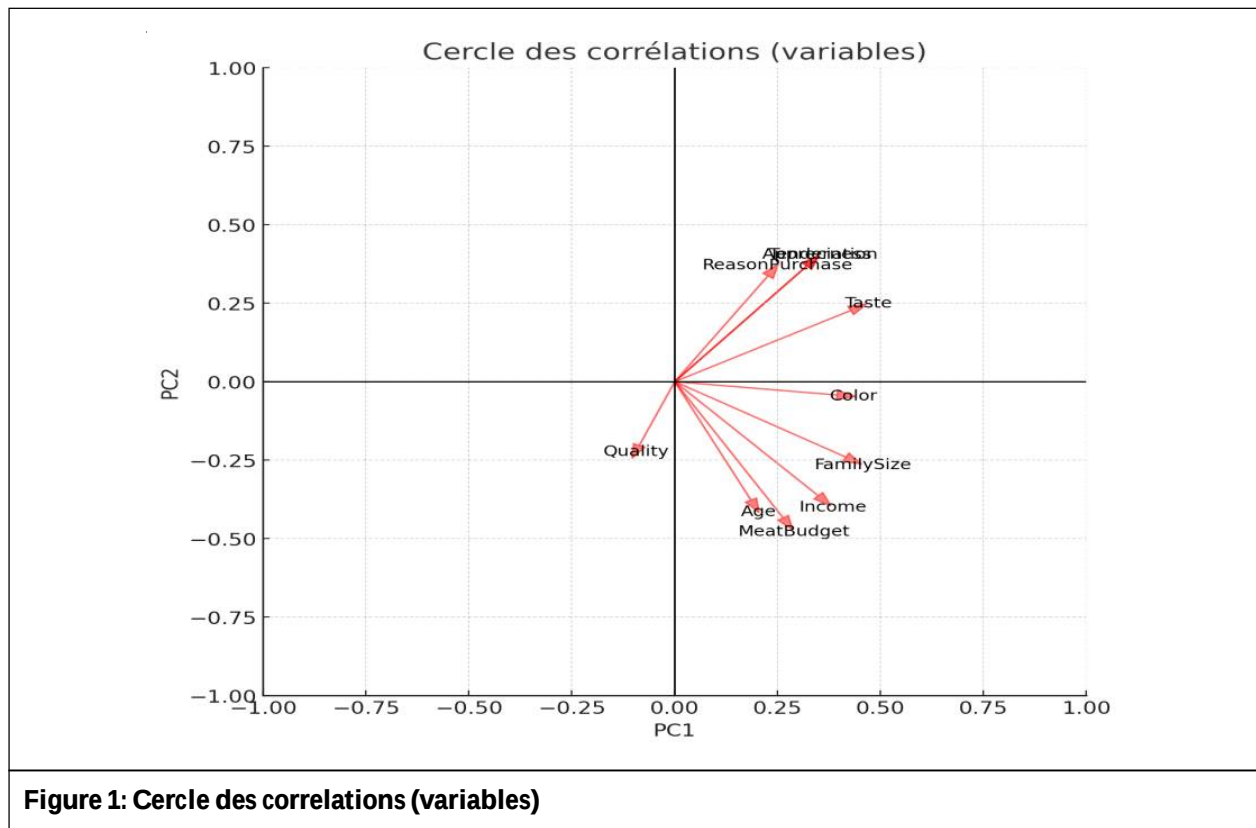
- Axis 1 (horizontal) reflects socio-economic characteristics, mainly age, income, and meat budget.
- Axis 2 (vertical) is associated with sensory and qualitative preferences, such as quality, tenderness, taste, and color.

Together, these two components explain a large part of the total variability observed in the dataset.

- The arrows for Age, Income, and Meat Budget point in the same direction → these variables are positively correlated: older consumers generally have higher incomes and meat budgets.
- Taste, Tenderness, Quality, and Appreciation are also grouped together → they define a sensory-oriented consumption pattern.
- Color and Reason Purchase appear more isolated → they contribute less to the main structure of consumer preferences.

The Principal Component Analysis (PCA) identified two dominant axes describing the diversity of beef consumers. The first axis mainly represents socio-economic conditions, including income level, age, and meat expenditure, and separates consumers according to their financial status and purchasing capacity. The second axis relates to sensory appreciation, encompassing taste, tenderness, and overall product quality. The analysis distinguishes two principal consumer categories: older individuals with higher incomes who emphasize sensory

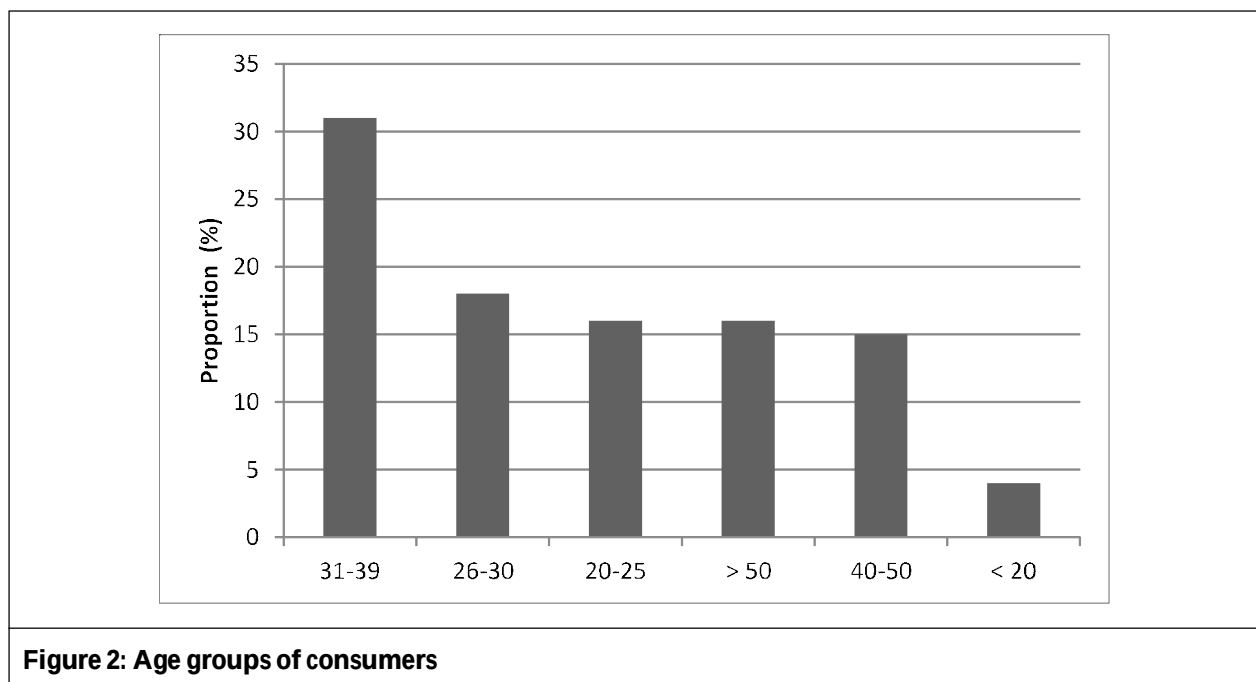
enjoyment and product quality, and younger, lower-income consumers who give more importance to nutritional value and price. The correlation structure supports these findings, revealing strong relationships among socio-economic indicators and among sensory attributes. Overall, the study demonstrates that both economic situation and sensory perception significantly influence consumer attitudes toward beef consumption (Figure 1).



3.2. Socioeconomic determinants of respondents

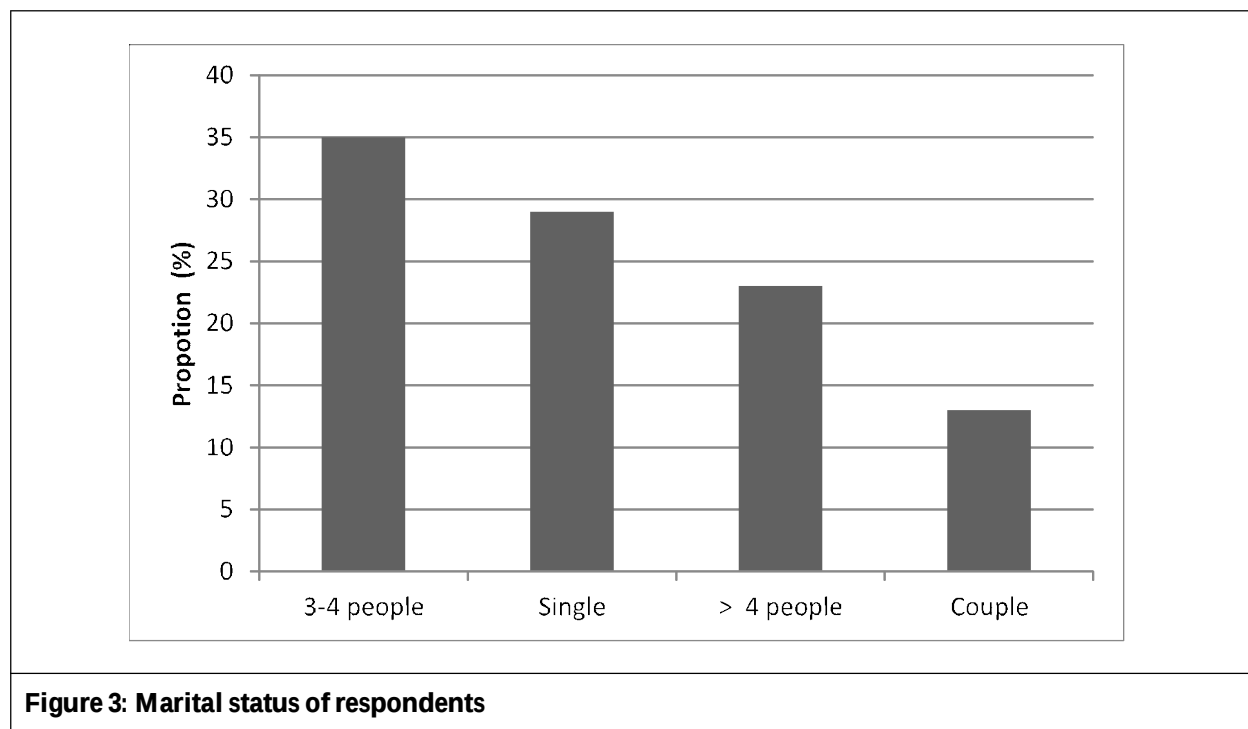
3.2.1. Age of consumers interviewed

The age of beef consumers varies between less than 20 and more than 50 years, of which 4% are under 20 years of age, 16% are between 20 and 25 years of age, 31% are between 31 and 39 years of age, 15% are between 40 and 50 years of age and 16% are more than 50-year-old (Figure 2).



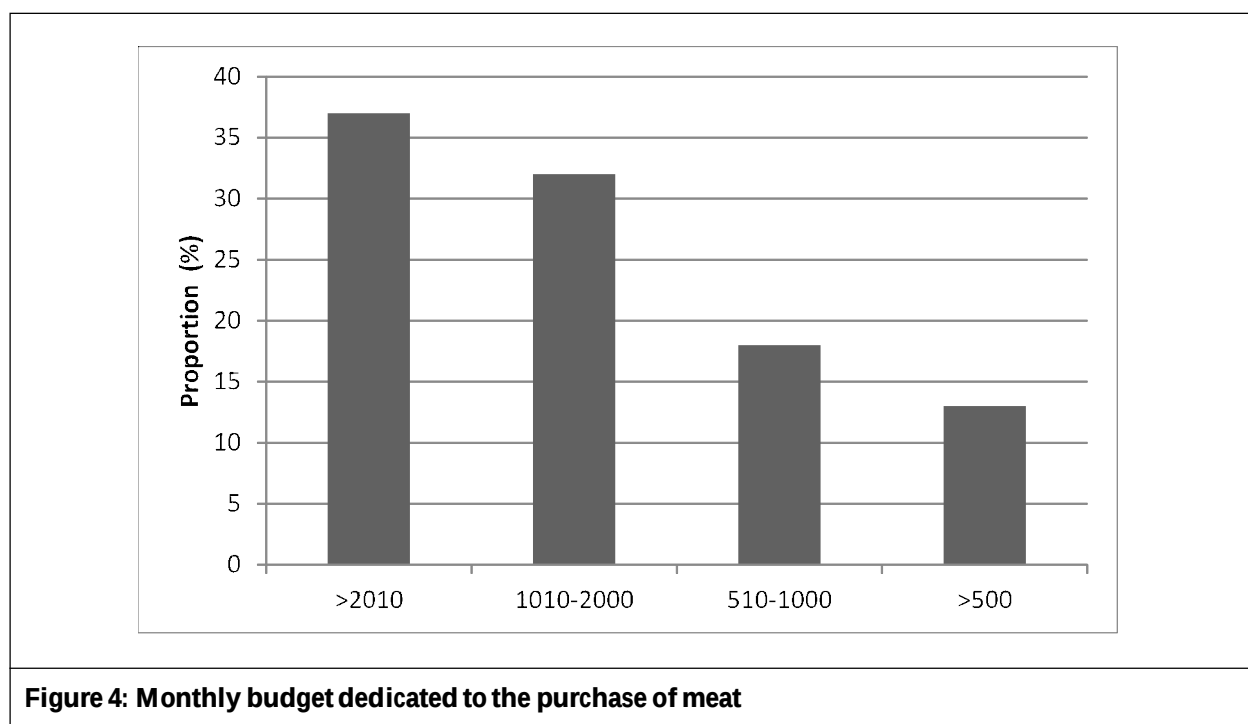
3.2.2. Family situation of respondents

Families of 3 and 4 persons who regularly buy beef were the most representative in our respondent sample (35%), followed by one-person families (29%). Large families of more than 4 people accounted for 23%, while couples represented 13% of respondents (Figure 3).



3.2.3. Incomes of respondents

Income is an important variable in determining meat consumption since it determines the purchasing power of consumers. It should be noted that about 35% of respondents had an average income between 30,000 and 50,000 DA, followed by the category of consumers who had an income between 15,000 and 30,000 with 22% and by those who received a salary between 50,000 and 70,000 AD, with 25%. However, the category with an income of less than 15,000 DA represented 7% of respondents, while those earning more than 70,000 DA account for 7% (Figure 4).



3.2.4. Monthly beef budget

The monthly budget devoted by consumers to the purchase of meat, at around 2010 DA was in first place with 37%. Those with a budget between 1010 and 2000 DA represented 32% and those with a budget between 510 and 1000 DA, 18%. Consumers spending 500 DA or less on meat represented 13% of respondents (Figure 5).

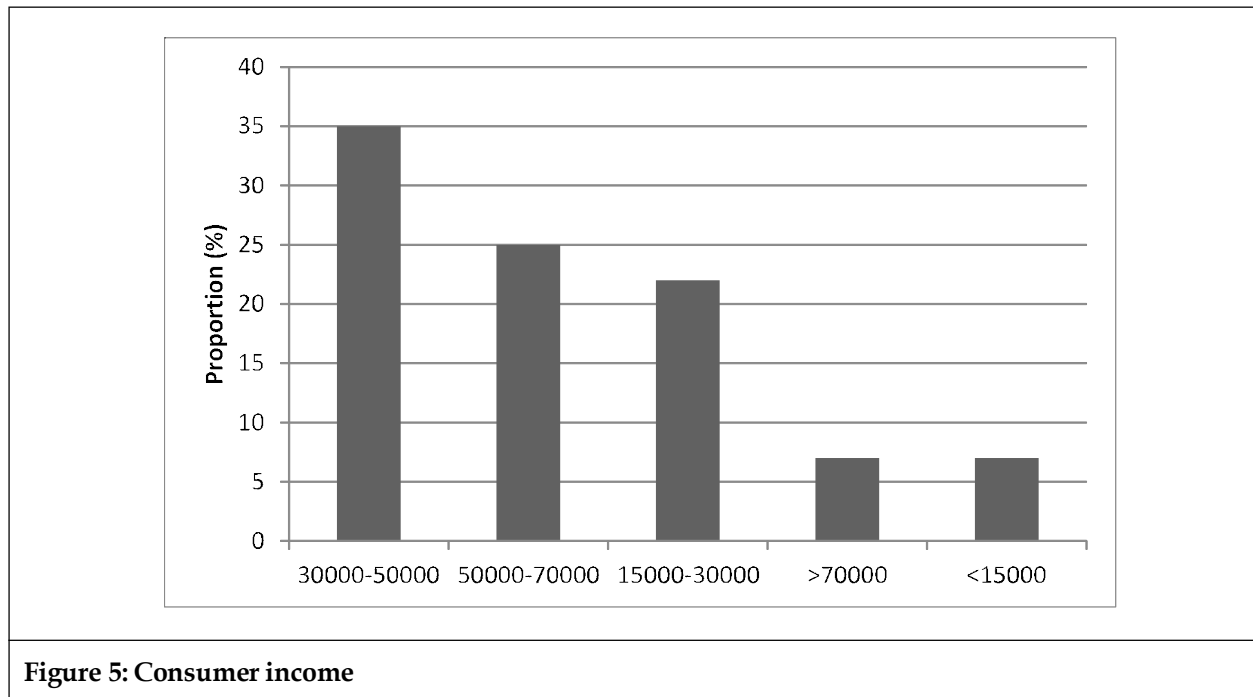


Figure 5: Consumer income

3.3. Importance of meat quality for the consumer

3.3.1. Preferred parts of beef by consumers

We observed that 43% of respondents prefer the cooking part of beef, because of its higher nutritional value than the other parts, as well as its taste (i.e., the pleasure of eating it). However, 18% preferred to buy meat without bones in the form of “minced meat”. On the other hand, 14% of consumers preferred the neck in beef, while 11% of them preferred ribs and entrecotes, due to their higher nutritional values than other parts. However, 7% of respondents preferred roast beef, 4% lower ribs and 3% roast meat. On the other hand, the chuck and flank steak were not consumed by some consumers (Figure 6).

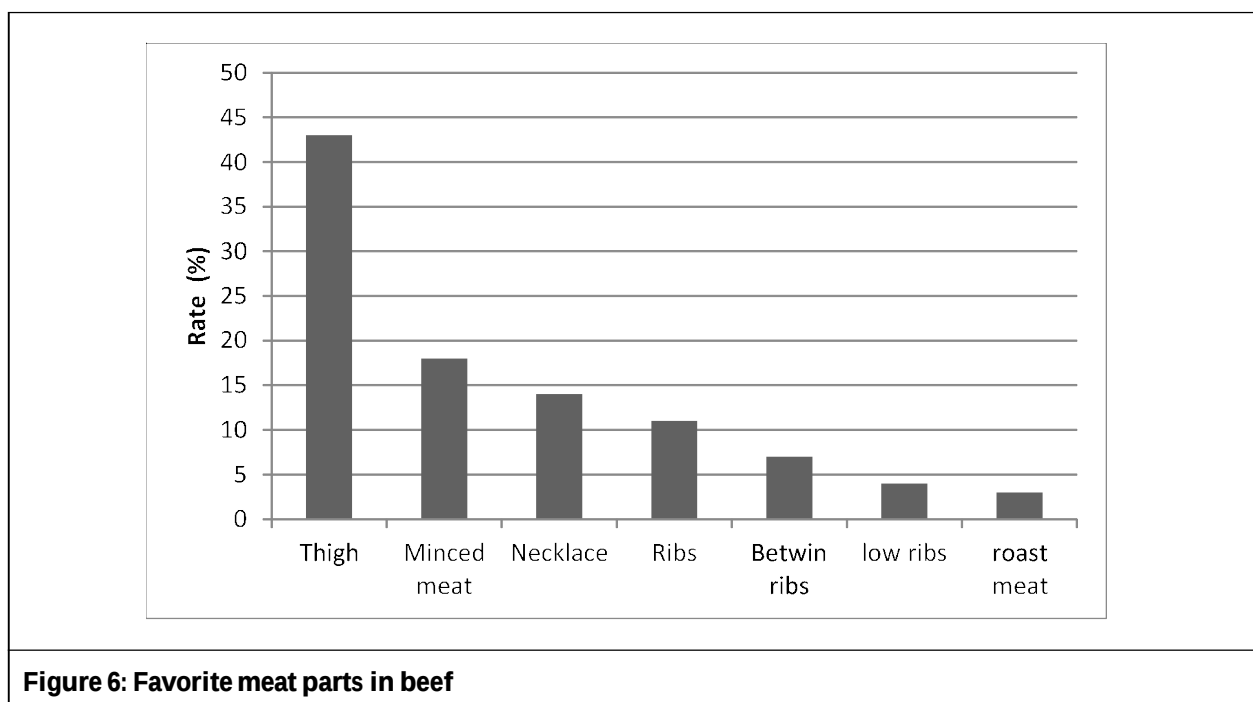
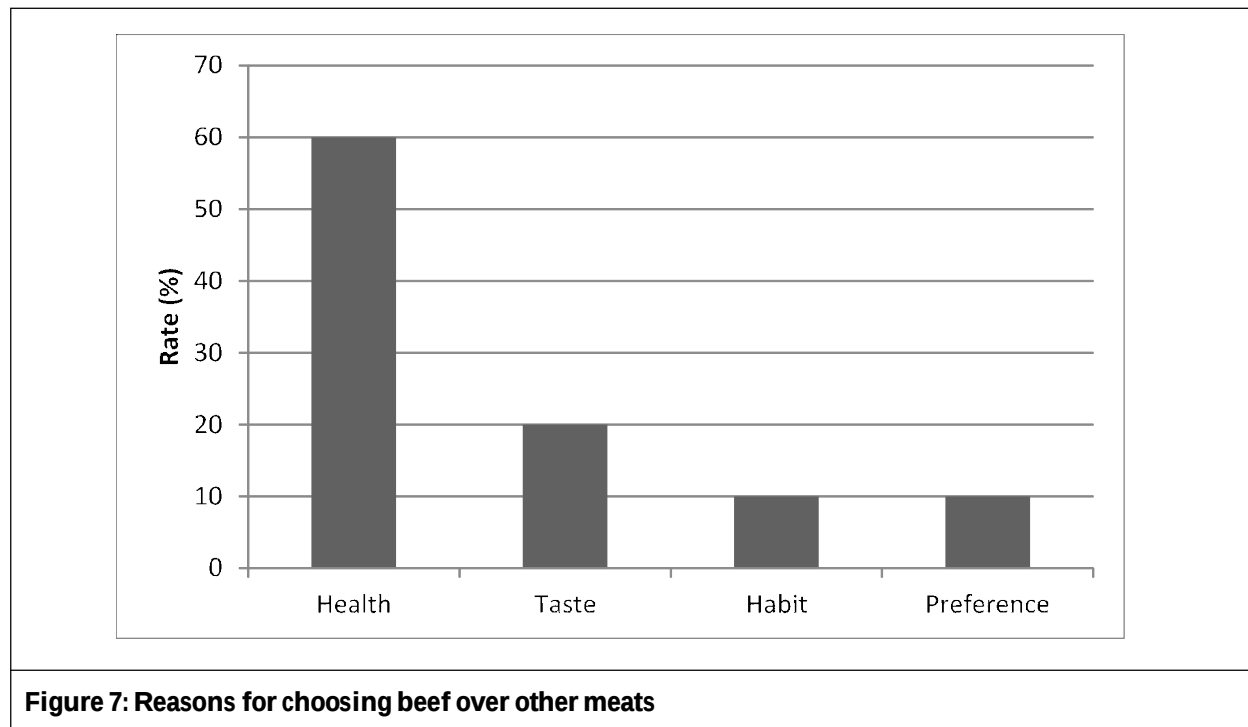


Figure 6: Favorite meat parts in beef

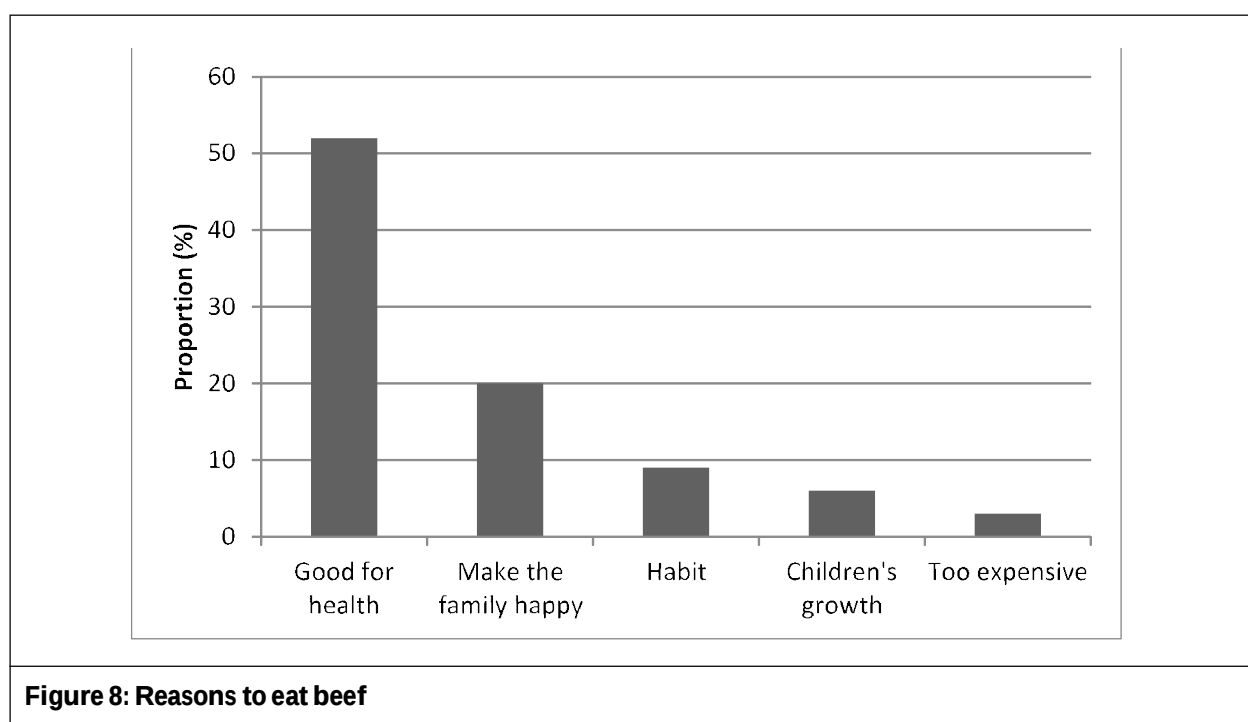
3.3.2. Choice of beef over other meats

According to Sentandreu (2006), most of the consumers surveyed preferred to eat beef-type red meats more than other meats (sheep, white). Indeed, 60% of them chose this type of meat for its nutritional value (for healthiness) as it is rich in essential amino acids (Gruffat and al., 2015). However, 20% of consumers bought beef according to taste without considering its price. Only 10% of consumers buy bought out of habit and preference (Figure 7).



3.3.3. Reasons for eating beef

Among the respondents, 52% of them considered that what motivates them to buy meat is its healthiness as it contains low fat. Another 20% declared to buy meat to please family members. However, 9% buy meat out of habit, because they are used to preparing dishes with this meat for pleasure. However, 6% of respondents were moving towards meat, because they believed it is necessary for children's growth, as it is very rich in protein. Finally, 3% of households did not consume beef because it is too expensive for them (Mao et al., 2016) (Figure 8).



3.3.4. Beef appreciation

Almost half of those surveyed, or 49%, consider beef to be an important part of their diet and that they cannot replace it with other types of meat because it is the best source of protein. On the other hand, 23% of them eat beef but when this meat is not available they turn to other types of meat and therefore they do not find it inconvenient not to eat the meat. However, 21% of households regularly consume beef. Finally, 7% of them rarely eat meat (Figure 9).

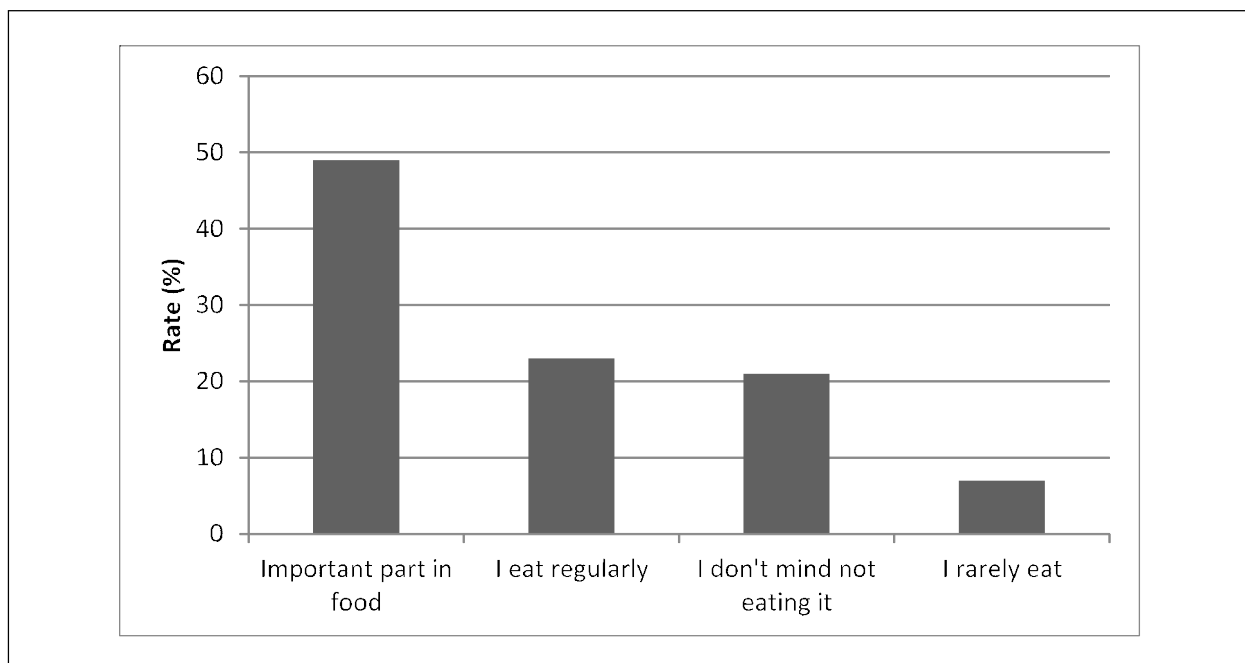


Figure 9: Consumer appreciation of beef

3.3.5. Perception the quality level of the beef consumed

We found among respondents that 45% of them say they are satisfied with the quality of the meat they consume, while 43% find that the meat is of good quality. However, only 9% of consumers favor higher quality. On the other hand, 3% of them are dissatisfied with the quality of the meat ([Destefani et al., 2000](#)) (Figure 10).

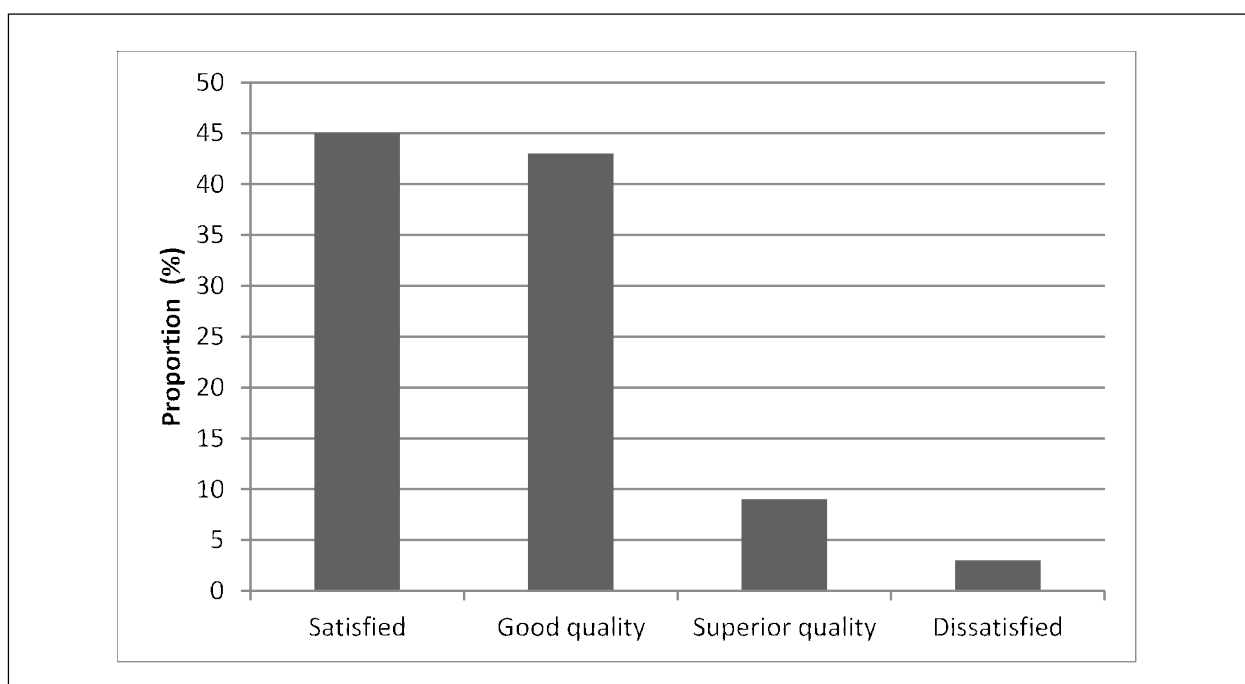


Figure 10: Quality of meat purchased according to the consumer

3.4. Importance for the consumer of the sensory quality of beef

The variability in the sensory quality of beef is considered to be one factor among others in reducing the consumption of this meat (Polkinghorne *et al.*, 2008)

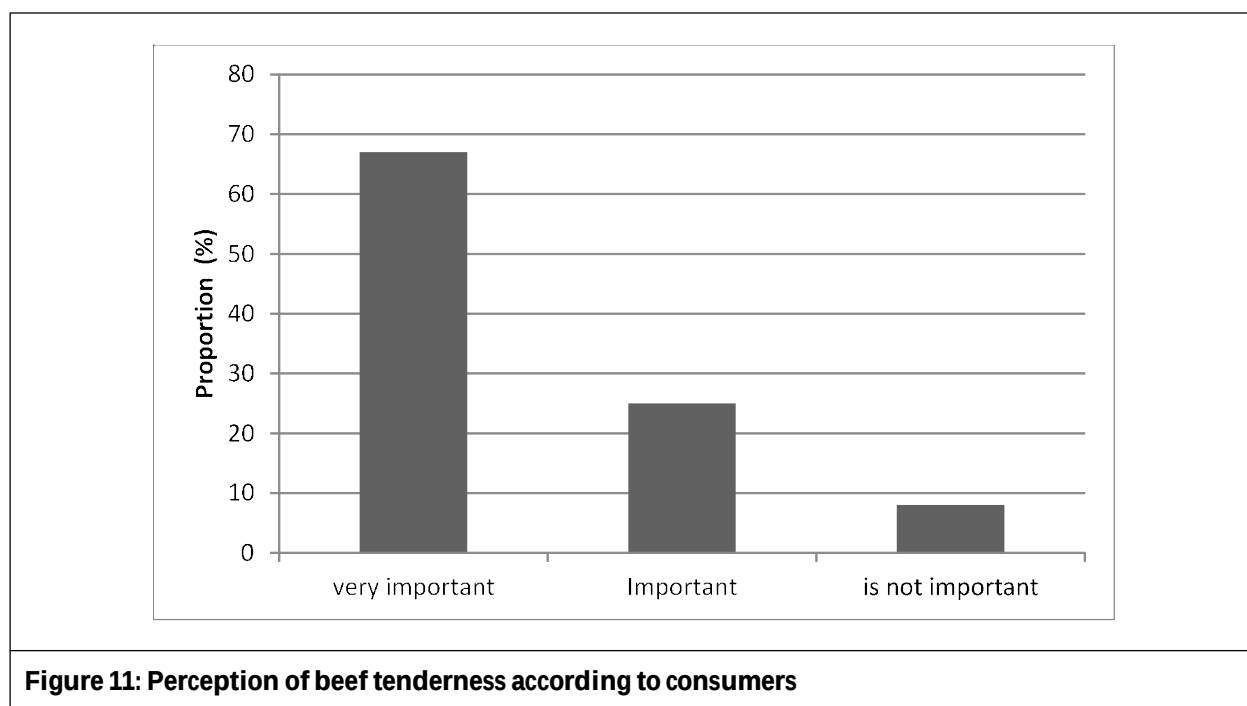
The sensory properties of a food are the characteristics that consumers can perceive directly through their senses. Sight and perceptions in the mouth are particularly important for the meat product. The main sensory characteristics are color, tenderness, juiciness and flavor (Touraille, 1994; Cassignol, 2018). Recent work has shown that flavour is now more important than tenderness (Liu *et al.*, 2020)

3.4.1. The color

The particularity of beef is its red color given by a pigment, myoglobin, which transports oxygen to the muscle (Renner, 1990). This color also depends on the proportion of muscle-type oxidative fibers which is higher than that of white meat (Listrat *et al.*, 2015). First characteristic perceived by consumers, it is often the only one which guides the choice at the time of purchase. The fact that the color of the meat is the first characteristic influencing the purchasing decision leads consumers uninformed to use discoloration as an indicator of product degradation (Smith *et al.*, 2000) The vast majority of consumers favor the meat light, 72%, because the color of the meat is the first quality characteristic perceived when purchasing (Ngapo *et al.*, 2017). The consumer considers it as a criterion of product freshness (Coibion, 2008). Only 28% prefer dark meat (Ngapo *et al.*, 2017; Gruffat and al., 2015).

3.4.2. Tenderness

Tenderness used to be the most important quality criterion for the consumer when consuming meat (Troy and Kerry, 2010) and is decisive for the beef consumer (Grunert *et al.*, 2004; Normand *et al.*, 2014; Gruffat and al., 2015). It measures the ease with which the structure of meat can be disorganized during chewing (Ouali *et al.*, 2008). In the Algerian region, slightly more than half of respondents, or 67%, declare that tenderness of meat is very important, because it plays a leading role during chewing (Touraille, 1994). On the other hand, 25% of them consider that tenderness is only important. On the other hand, 8% of consumers consider that tenderness is not important (Figure 11).



3.4.3. Juiciness

Juiciness, also called succulence, has two aspects: the initial juiciness, perceived at the first bite, it is mainly linked to the quantity of water present and released during chewing, the second is linked to the lipid content of the meat, which induces more or less salivation. It represents the more or less dry character of the meat when consumed (Micol *et al.*, 2010). We have noticed that the majority of consumers, i.e., 72%, consider that beef

juiciness is an important criterion because the juiciness or succulence of a meat is an organoleptic quality perceived during chewing, the essential factor of which is the potential muscle water retention (hydration), which is the meat's ability to retain its own water or added water, which is related to the binding strength of water to muscle fiber proteins (Henry, 1992). The proportions of consumers who consider meat to be very important or not important each represent 14% of the total respondents (Figure 12).

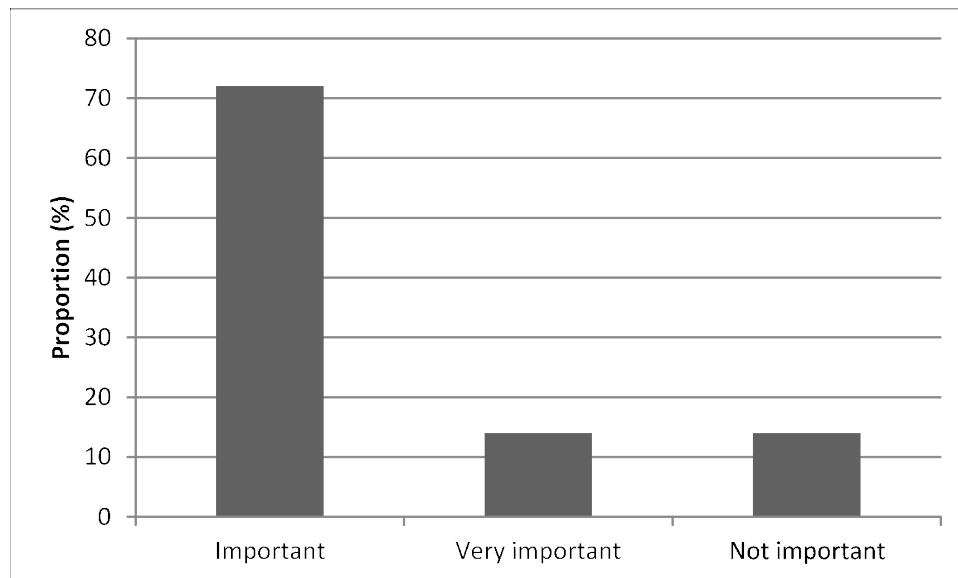


Figure 12: Perception of beef juiciness according to consumers

3.4.4. Flavor

The flavor of meat corresponds to “all the olfactory and gustatory impressions” experienced during tasting (Lamoise *et al.*, 1984). However, it is important to note that the flavor is very different from one muscle to another, because it depends on the metabolic type of the muscle (review by Hocquette *et al.*, 2005).

Tenderness and flavor are qualities of meat, closely linked to the quantity and quality of lipids present in muscles. According to the bibliographic review by Hocquette *et al.* (2010), a minimum of 3 to 4% fat is needed to give meat a flavor and juiciness that will be appreciated by consumers. Beef flavor corresponds to all the

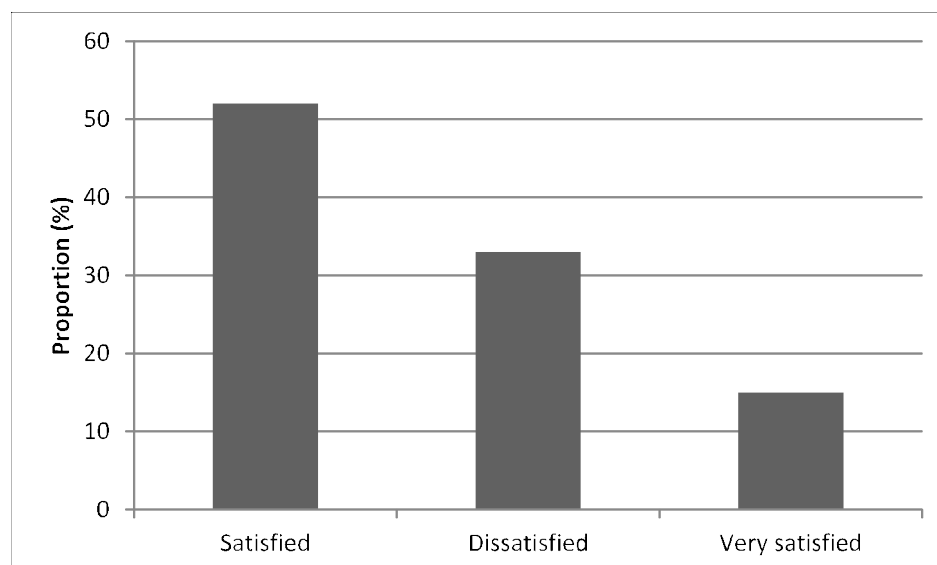


Figure 13: Perception of beef flavor according to consumers

olfactory and taste impressions that one experiences at the time of tasting, the various chemical compounds responsible for the flavor of the meat being released mainly during cooking (Lamoise *et al.*, 1984). Among all consumers, 52% of them are satisfied with the taste of beef. On the other hand, 33% are dissatisfied with this criterion and 15% are very satisfied (Figure 13).

Algerian beef is characterized by significant and often uncontrolled sensory variability, which leads to insufficient consumer satisfaction. Various factors from farm to fork, such as animal type, stress level, muscle type, maturation, and cooking method, among the most important, influence meat quality (Liu *et al.*, 2022), which necessitates adapting the production system to a sustainable food system.

4. Conclusion

Many factor factors such as psychological factors, sensory factors, influence consumer behavior towards beef. Thus, consumer preferences are very complex and heterogeneous and depend not only on the sensory properties of meat, but also on psychological aspects. The analysis of the perception of meat by consumers in the Algerian region shows very varied behaviors towards beef. This variability is mainly due to the different socio-demographic and economic conditions of the region's population resulting in particular consumption patterns. Indeed, there is a relatively high importance of certain attributes and criteria, namely color, taste and price, and the low interest in fat content. The majority of consumers in the region turn to the butcher for the purchase of meat. Thus, half of them consume good quality meat, while the rest considers it is an important part of their diet. Thus the majority consider the meat to be of satisfactory quality. The practice of cutting by butchers and consumer preferences for the most popular parts do not make it possible to respond to changes in demand in the long term. We can say that the traditional butchery in contact with the consumer, is the majority processing and marketing circuit which appeals to consumers' preference. But this hinders the development of a modern sector, capable of meeting consumer expectations and preferences, given the rapid evolution of consumption habits. The development of modern distribution in general, and of the beef sector in particular, will undoubtedly contribute to changing the perception of meat quality in Algeria. Despite the rapid evolution of the diet of Algerian consumers, meat processing remains underdeveloped. In a context where demand is increasing more and more, we are witnessing the absence of a strong brand policy, which is a weak point that does not allow the development of beef consumption. However, innovation in all its forms is one of the one of the ways the sector can gradually adapt to these changes.

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