

## **Greek and European consumer behaviour towards beef, lamb and mutton meat safety and quality: a review**

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**Abstract:** Food and meat quality is formed mainly by the consumers' expectations and is related to nutritional value, organoleptic characteristics and food safety. Consumers rely on several factors that may influence their choices. Beef and sheep meat have always been considered as a highly desirable food commodity worldwide. However, the preferences in different countries and even in different social groups within the same country tend to differ. Several issues, such as contemporary health hazards and scandals, or certain socioeconomic fluctuations, can cause an abrupt change on consumer preferences. In this review an effort was made to identify the factors that influence the European consumer desires, behaviours and preferences. As a

case of interest, the Greek consumer's attitude towards different types of meat was portrayed. Therefore this review can aid food scientists and professionals in order to predict the consumer preferences and promptly adapt to any changes observed.

**Keywords:** consumer; behaviour; preferences; lamb meat; beef; Europe; Greece.

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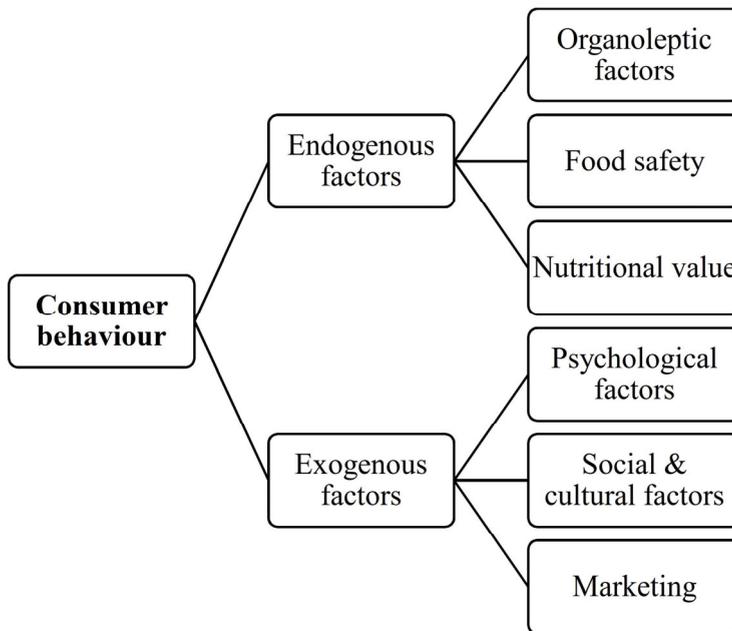
## 1 Introduction

Consumer opinion on the quality of meat can be quite complex (Pethick et al., 2011). Food quality is characterised by its degree of adaptation to consumers' requirement which are related to nutritional value, organoleptic characteristics and food safety (Bremner, 2000; Petrescu et al., 2020). Consumers rely on conscious or subconscious factors that may influence their choices. These factors are distinguished into endogenous and exogenous. Endogenous factors are the organoleptic characteristics of the food, its nutritional value and its safety. They are characteristics of the product that cannot be changed unless the nature of the product changes, and are particularly important in assessing the quality of meat and meat products. Still, they can often mislead the consumer to form a false view of the quality of a product (Guenther et al., 2005). Exogenous factors are individual or environmental factors that, even though they are not property of food, they do provide information about it and may be altered due to external factors. Endogenous factors are directly related to food quality, while exogenous factors include psychological factors, sociocultural factors and marketing (Grunert et al., 2004; Font-i-Furnols and Guerrero, 2014). These factors are interrelated and can affect both people's cognitive and emotional intelligence (Figure 1).

Beef and sheep meat have always been high in consumer preferences worldwide. However, there are many differences observed both within and among countries regarding which type of meat is preferred and considered of better quality. For example, according to Henschion et al. (2017), the most important factors that influence consumer beef preferences are price, quality labelling, fat content, taste and freshness. On the other hand, Aboah and Lees (2020) state that the five most important quality characteristics that consumers utilise in their purchasing decisions are food safety certification, price, country of origin, production system and quality certification labels, all of which are extrinsic factors and relate to credence attributes. Still the definition of each of these parameters can vary widely among consumers, with the desired trait being quite

subjective, even among specific areas. Thus, the mapping of consumer behaviour is quite demanding, especially for beef and ovine meat, due to the concerns about health issues and environmental sustainability that are related to them and due to the shift of meat consumption from red meats to poultry and pork (Mandolesi et al., 2020; Dudinskaya et al., 2021). Moreover, food scandals, such as the crisis of bovine spongiform encephalopathy in the 1990s, can cause abrupt changes in consumer preferences (Rezitis and Stavropoulos, 2012). It is therefore vital for the beef and ovine market to be able to interpret the factors influencing consumer behaviour towards beef, lamb and mutton, in order to promptly adapt to any changes observed. The scope of this review is to identify the factors that may influence consumer desires, behaviours and preferences.

**Figure 1** Factors that influence consumers' behaviour and preferences



## 2 Factors that shape consumer behaviour and preferences towards beef and sheep meat

### 2.1 Endogenous factors

Meat and meat products are food commodities with high nutritional value and excellent organoleptic properties. They contain proteins of animal origin of high biological value, fats, essential minerals and vitamins in high concentrations, and carbohydrates in small quantities. Meat is an almost-complete food, as its chemical composition resembles that of the human body and thus, a proper amount of meat is necessary to be included in the human diet (McNeill and van Elswyk, 2012). However, the overconsumption of meat and processed meat products may lead to cardiovascular diseases, obesity, type 2 diabetes and

certain types of cancers (especially colorectal cancer) (Ardisson Korat et al., 2014; Boutron-Ruault et al., 2017; Mijatovic-Vukas et al., 2018; Toi et al., 2020; George et al., 2021; Vernia et al., 2021; Michel et al., 2021). Moreover, biological (such as bovine spongiform encephalopathy, avian influenza or salmonellosis), chemical (such as microbial toxins, dioxins and dioxin-like polychlorinated biphenyls), and physical hazards in meat and meat products, have raised consumers' concerns about the risks and benefits of meat consumption (Font-i-Furnols and Guerrero, 2014; Koutsoumanis et al., 2020). However, healthiness and nutritional value of meat appear to be more significant to consumers than safety, which is often regarded as a prerequisite (van Rijswijk and Frewer, 2008; Verbeke et al., 2010; Petrescu et al., 2020). Health seems to be an important reason for changing consumption habits and thus, an important percentage of consumers reduce or even eliminate meat from their diet (Latvala et al., 2012; Cheah et al., 2020). Nutritional awareness concerning meat products may alter consumer preferences, especially for specific types of meat (Guenther et al., 2005; Zeng et al., 2019). For example, there is a positive attitude towards beef or sheep meat products with reduced fat or salt (Guàrdia et al., 2006; Kumar, 2019; López-Pedrouso et al., 2021; Paglarini et al., 2020), even though a significant portion of consumers are not ready to exchange inferior organoleptic properties for health benefits (Verbeke and Ward, 2006). In any case, adequate meat labelling could improve public confidence in these products, especially for the consumers who are concerned about nutritional value and food safety (Font-i-Furnols and Guerrero, 2014).

Organoleptic parameters play a significant role in consumer preferences, with the most important factors regarding beef and sheep meat being appearance, colour, taste, aroma, juiciness and tenderness of meat. These factors are influenced by both endogenous and exogenous factors, such as animal species, breed, nutrition, age, animal's welfare conditions during slaughter, *ante mortem* treatment of the animal and *post mortem* treatment of the carcass, maintenance and maturation of meat (Pethick et al., 2005; Font-i-Furnols and Guerrero, 2014; Massaglia et al., 2018). Thus, it is quite difficult to improve one organoleptic characteristic of a meat product without adversely affecting another. Organoleptic factors and particularly appearance and taste, influence consumers' preferences regarding beef and ovine meat. Meat colour is considered to be one of the most important fresh meat characteristics, as most people correlate specific colour to meat spoilage or wholesomeness (Font-i-Furnols and Guerrero, 2014). Bright red is the most preferred colour and an indicator of fresh meat, whereas brown is the least preferred and an indicator of spoilage (Carpenter et al., 2001; Feuz et al., 2020). Consumers' preferences towards fat are heterogeneous, meaning that it is hard to decipher the role of fat in willingness to pay (Dudinskaya et al., 2021). More consumers prefer to buy leaner meat cuts and products, as the consumption of a large amount of fat is considered unhealthy (Ngapo and Dransfield, 2006; Dudinskaya et al., 2021). Tenderness, juiciness, taste and aroma are also highly correlated with consumers' purchasing decisions and willingness to pay (Banović et al., 2009; Silvestri et al., 2020). These characteristics are positively correlated with the intramuscular fat content and the type of fat (Pannier et al., 2014). Furthermore, meat's aroma is influenced by animal species. Lamb and mutton is differentiated from beef due to the formers' intense aroma, a characteristic which is not widely acceptable among consumers (Matsuishi et al., 2004; Maughan and Martini, 2012). In addition, many differences are observed both within and among countries, regarding consumer preferences for the desirable organoleptic characteristics of meat. For example, marbling content is generally preferred in Asian

countries (Ngapo et al., 2007), whereas in other countries it is negatively affecting meat appearance and consumer preferences (Moeller et al., 2010). In a recent survey among Brazilian and Spanish consumers, Boito et al. (2021) report that beef marbling was sought for, since consumers are correlating it with increased tenderness. Moreover, some consumers show preference for lamb which is fed with milk or concentrate and has lower weight and lighter meat coloration, while other countries prefer mutton over lamb, which has darker coloration, is produced from heavier sheep reared in pastures that are slaughtered at an older age (Bernués et al., 2012). Familiarity, customs and habits of consumption are important factors concerning the formation of the final consumer preferences (Leroy and Praet, 2015).

## *2.2 Exogenous factors*

The impact of psychological, social and cultural traits on consumer behaviour has always concerned the scientific community. Factors such as common beliefs, attitudes, expectations, motivations, perceptions, lifestyles and values shape consumer personalities and influence their behaviour (Font-i-Furnols and Guerrero, 2014). In general, consumers tend to follow the already established behaviour towards meat (Povey et al., 2001). Thus, consumer attitudes and perceptions towards meat and its products depend both on the characteristics of the product and on the already established behaviour. However, meat tends to have a rather negative image in the general public on average, due to factors related to animal welfare, slaughter conditions (Troy and Kerry, 2010), the environment (Povey et al., 2001), religion, ideology and ethics (Berndsen and van der Pligt, 2005). In addition, risks concerning meat safety, such as bovine spongiform encephalopathy, and the potentially adverse effect of meat consumption on human health, are important reasons for the consumers to change their eating habits by reducing or even eliminating meat from their diet (Garnier et al., 2003; Latvala et al., 2012; Clonan et al., 2015). However, these negative attitudes do not seem to have a significant effect on meat market (Grunert, 2006; Font-i-Furnols and Guerrero, 2014), as consumers prefer to change the role assigned to meat within a meal instead of reducing meat consumption. Meat is now treated as an ingredient, rather than the most highly valued and important part of the meal (Font-i-Furnols and Guerrero, 2014; Faber et al., 2020). The value consumers attribute to meat is also indicated by the fact that even vegetarian dishes include plant derived food prepared as if they were meat and appear similar to meat dishes (Font-i-Furnols and Guerrero, 2014; Holm and Møhl, 2000). This consumer behaviour can be interpreted by two main psychological mechanisms: selective amnesia, which degrades unpleasant memories consciously or subconsciously (Font-i-Furnols and Guerrero, 2014), and cognitive dissonance, in which any discrepancy observed between consumer expectations and product performance will be assimilated by consumers, who will change their perceptions of the product to conform more to their expectations (Deliza and MacFie, 1996; Dickinson and Kakoschke, 2021).

Consumers receive much of the information regarding meat through advertisements, campaigns or quality labelling. This information is capable of creating expectations for a product and thus affecting intention to purchase and willingness to pay. Several marketing strategies have been adopted, such as online shopping and telemarketing, in order to increase sales and business revenues and to influence consumer behaviour and preferences (Font-i-Furnols and Guerrero, 2014). The most important marketing

parameters that have an influence on consumer preferences are the price of the product and its quality labelling. Price is an extrinsic factor which is directly related to the demographic characteristics of a country, since low-income consumers prefer low quality cuts (Reicks et al., 2011; Yang et al., 2021). Although high price is often associated with high food quality (Acebrón and Dopico, 2000), lower prices are often preferred, especially for consumers with low purchasing power, who occasionally eat meat or do not show interest in the type of meat they consume, replacing an expensive meat product with a more affordable one (Font-i-Furnols and Guerrero, 2014; Yang et al., 2021). As far as quality labelling is concerned, the most common information sought by consumers is the product's brand/name, expiration date, quantity statements and country of origin (Verbeke and Ward, 2006). Certified product brands and domestic products are preferred by consumers, as they relate them to freshness, tastiness and high quality and safety (Chambers et al., 2007; Feldmann and Hamm, 2015). Muslim consumers pay significant attention to certified halal meat, which assures that food is prepared in a halal way and guarantees halal authenticity of meat and meat wholesomeness (Hossain et al., 2020; Bhatti et al., 2021; Dudinskaya et al., 2021). Young and more acclimated female Muslims are willing to pay more for halal beef (Verbeke et al., 2013; Hossain et al., 2020). Moreover, organic products are highly preferred by consumers, even though they are more expensive due to their pricey production (Kim et al., 2008; Capuano et al., 2013; de Jonge and van Trijp, 2013). Consumers are willing to pay more for a certified organic product, mainly because organic production is safe for the environment and guarantees nutrition, better ecological footprint, ethics and high food quality and safety (Verbeke et al., 2010; Dudinskaya et al., 2021). However, many differences are observed regarding consumer preferences worldwide, making it more difficult for their behaviour to be deciphered (Table 1).

**Table 1** Summary of the factors and parameters that shape consumers' behaviour and preferences

| <i>Endogenous factors</i>   |                         |                          | <i>Exogenous factors</i>     |                                    |                   |
|-----------------------------|-------------------------|--------------------------|------------------------------|------------------------------------|-------------------|
| <i>Organoleptic factors</i> | <i>Food safety</i>      | <i>Nutritional value</i> | <i>Psychological factors</i> | <i>Social and cultural factors</i> | <i>Marketing</i>  |
| Appearance                  | Microbiological hazards | Energy                   | Beliefs                      | Religion                           | Price             |
| Colour                      |                         | Fat                      | Attitudes                    | Demographics                       | Quality labelling |
| Taste                       | Chemical hazards        | Protein                  | Expectations                 | Origin                             | Adverts           |
| Flavour                     | Physical hazards        | Carbohydrates            | Motives                      | Income                             | Campaigns         |
| Juiciness                   |                         | Minerals                 | Perceptions                  | Lifestyle                          | Telemarketing     |
| Tenderness                  |                         | Vitamins                 | Values                       |                                    | Online shopping   |

### 3 Beef, lamb and mutton consumption trends in Europe

Consumer preferences concerning beef may vary both within and among European countries (Table 2). In Italy, the five most important factors are the price of the product, animal welfare, animal breed, the labelling of the product and whether the food is organic (Merlino et al., 2018). On the other hand, the factors that affect Italian consumers the

least are the organoleptic characteristics of a beef product other than taste (e.g., tenderness, aroma, colour), its origin, nutritional value and the existence of an identification and traceability system. Nevertheless, Scozzafava et al. (2016) note that there are two significant portions of Italians: the first portion gives importance to beef cuts, purchasing specific cuts and types of beef (e.g., cutlet, steak, minced meat), and being unlikely to switch to different cuts even if the price is reduced, while the other pays more attention to the origin of a beef product and its nutritional characteristics and it is prone to switch between different cuts depending on price and availability. Similar categories of citizens are mentioned by Mesías et al. (2005) for Spain, highlighting that the origin of beef, its labelling, production process and price, are the main factors that affect Spanish preferences. German consumers also show a significant preference for quality labelled products, especially black Angus meat, for which they are willing to pay more than other types of beef (Meyerding et al., 2018).

Other differences regarding consumer behaviour among European countries are described by Almli et al. (2013), in the example of Belgium and Norway. In both countries there is a clear preference for beef tenderloin. Still Norwegians are not willing to buy it because of its high price, in contrast to Belgium, where its price is comparatively lower, indicating that price and marketing in general may affect consumer preferences. Moreover, Norwegians show higher hedonic involvement with beef and pay less attention to nutritional value, food safety and technology, diametrically opposed to Belgians' preferences. In general, European consumers consider a reasonable consumption of beef beneficial to their health, thus positively affecting beef purchase. Their preferences are towards leaner (Ngapo and Dransfield, 2006; van Wezemael et al., 2014), local (Realini et al., 2013; Miller, 2020; Stampa et al., 2020) and less technologically processed beef (Verbeke et al., 2010).

Many differences occur in consumer preferences among countries regarding high-quality sheep meat (Table 2). The most significant difference is related to the preference of consumers of the Mediterranean countries and Northern Europe for lamb and mutton respectively. The former prefer carcasses of light weight and lambs fed with milk or concentrate, while the latter prefer carcasses of heavier weight and grass-fed sheep. Consumers in France, the UK and Iceland prefer French or Icelandic sheep breeds, which produce carcasses over 15 kg, while in Spain and Italy they prefer autochthonous sheep breeds, with a carcass of less than 10 kg (Sañudo et al., 2007). The factors mainly influencing European consumers' choices are the origin and type (lamb or mutton) of meat, and the animal's breeding system (Font-i-Furnols et al., 2011). The less important factors include price (Bernabéu and Tendero, 2005), specific cuts, nutritional value, labelling, expiration date and traceability (Bernués et al., 2003). However, each of the above factors does not have the same impact on all consumers. Bernués et al. (2003) state that some consumers are mostly affected by food quality and safety, others pay more attention to the ease of cooking or the origin of the food product, whereas some consumers are more conservative and are mainly influenced by its appearance and organoleptic characteristics. Moreover, Gracia and De-Magistris (2013) support that, although the origin and type of ovine meat play a significant role in consumer behaviour, the majority of Spanish consumers would not pay more to buy ovine meat that satisfies their requirements and desires. Instead, they would settle for a cheaper product even if that falls short of expectations. In general, European consumers prefer to purchase

domestic and fresh lamb or mutton, indicated by its bright red colour and its white-coloured fat (Bernués et al., 2012).

**Table 2** Meat preferences studies among European consumers.

| <i>Reference</i>               | <i>Country</i>                                    | <i>Sample size</i> | <i>Method</i>                     | <i>Meat type</i> | <i>Most important factors</i>   |
|--------------------------------|---|--------------------|-----------------------------------|------------------|---|
| Bernués et al. (2003)          | England, France, Italy, Scotland, Spain           | 2,288              | Focus groups                      | Beef, sheep      | Expiration date, origin, traceability, cuts, nutritional value, safety          |
| Bernabéu and Tendero (2005)    | Spain   | 400                | Questionnaire                     | Sheep            | Cuts, origin, price, labelling  |
| Mesías et al. (2005)           | Spain   | 575                | Personal interviews               | Beef             | Origin, labelling, breeding system, price                                       |
| Ngapo and Dransfield (2006)    | UK  | 1,064              | Questionnaire                     | Beef             | Cuts, fat content   |
| Verbeke et al. (2010)          | Germany, Spain, France, UK                        | 65                 | Focus groups, online survey       | Beef             | Technologically processed products  |
| Font-i-Furnols et al. (2011)   | Spain, France, UK                                 | 291                | Questionnaire                     | Sheep            | Origin, price, animal nutrition   |
| Bernués et al. (2012)          | Spain   | 343                | Questionnaire                     | Sheep            | Origin, freshness, colour, fat content, labelling, animal nutrition             |
| Almli et al. (2013)            | Norway, Belgium                                   | 218                | Questionnaire                     | Beef             | Price, nutritional value, safety, cuts  |
| Gracia and De-Magistris (2013) | Spain   | 266                | Questionnaire                     | Sheep            | Origin, social factors, price, fat content, freshness, colour                   |
| Scozzafava et al. (2016)       | Italy   | 1,500              | Online survey                     | Beef             | Cuts, origin, organic product, safety   |
| Merlino et al. (2018)          | Italy   | 401                | Questionnaire                     | Beef             | Price, animal breed and welfare, labelling                                      |
| Meyerding et al. (2018)        | Germany   | 55                 | Sensory tests, willingness to pay | Beef             | Flavour, taste, tenderness, juiciness, labelling, price, origin, meat type      |
| Ripoll et al. (2018)           | Spain   | 200                | Online survey                     | Sheep            | Origin, fat content, labelling, freshness, organic product                      |
| Mandolesi et al. (2020)        | Finland, France, Greece, Italy, Spain, Turkey, UK | 140                | Focus groups                      | Sheep and goat   | Unique taste, authenticity and natural production, health and enjoyment of life |

It is evident that there are differences in meat preferences among European consumers that may also change abruptly when a food crisis occurs. These differences and the consumer reaction can be explained partially by individual or group characteristics present in different areas. An interesting categorisation regarding sheep meat preferences was reported by Ripoll et al. (2018) who have categorised Spanish meat consumers in four main categories: gourmet, conservative, basic and disinterested. Gourmet consumers are fond of ovine meat, use new recipes and are more likely to purchase innovative sheep products and cuts. Conservative consumers include sheep meat as part of their diet, but prefer traditional recipes and do not easily accept new products. Basic consumers are not stable concerning their tendency towards ovine meat and they consume it only occasionally, whereas disinterested consumers dislike sheep meat and avoid its consumption.

#### **4 Consumer preferences regarding beef and sheep meat within a country: the example of Greece**

In Greece, the average annual meat consumption is lower than the European average, mainly due to climatic and environmental factors and the dominance of the Mediterranean diet on the Greek cuisine. Meat consumption in Greece increased substantially during the 1970s and 1980s, stabilising from the 1990s onwards. According to the most recent available data published in FAO database (FAOSTAT, 2021), in 2013 the annual per capita consumption in Greece was 16.1 kg of bovine meat and 12.47 kg of lamb/mutton and kid/goat meat. Greek consumers prefer to buy meat from local butcher shops or supermarkets (Krystallis et al., 2006). According to Dudinskaya et al. (2021), the most preferred beef and lamb cuts by Greeks, based on the results of a discrete choice experiment, are beef T-bone and lamb chops. However, the relevant literature on meat consumption in Greece is limited and little information is available regarding the preferred cuts of beef and sheep meat (Table 3).

Greek cattle husbandry mainly consists of a large number of local, small farms, although recently a noticeable increase in the establishment of large dairy farms has been observed. Nevertheless, the small size of the farms and the lack of the necessary technical knowledge acquired by producers do not affect the preferences of Greek consumers for beef (Krystallis et al., 2006). Domestic production does not cover the amount of beef consumed in Greece (FAOSTAT, 2021). In fact, beef imports exceed the imports of all types of meat. During the 1990s, when the universal beef industry went through a food crisis due to the bovine spongiform encephalopathy (BSE), beef production in Greece and the price of beef were not particularly affected, as there was only one official report of BSE beef by Greek authorities in 2001 (Rezitis and Stavropoulos, 2012). According to the studies available, the most important factor regarding purchasing behaviour in Greek beef market is taste, an attribute that can be assessed only after purchasing. Therefore consumers rely on a variety of characteristics that can be assessed during purchase, such as appearance, colour and fat content (Krystallis et al., 2006). Social factors are also affecting Greek consumer behaviour, such as the age of the consumers and their educational level. Older people and people with lower educational level appear to choose beef based only on product labelling, in contrast to younger and more educated consumers who further explore nutritional value and microbial safety (Krystallis and

Arvanitoyannis, 2006). According to Morrison et al. (2003), exogenous factors can potentially affect the Greek market. However, the prices of beef have been relatively stable; therefore, its purchase is mainly influenced by consumer's income, with older people being more affected (Krystallis and Arvanitoyannis, 2006). The financial crisis in Greece and the volatile economic environment in general have had an impact on the purchasing behaviour of consumers in Greece who moved to low-priced meat cuts and products.

**Table 3** Meat preferences studies among Greek consumers

| <i>Reference</i>                     | <i>Country</i>  | <i>Sample size</i> | <i>Method</i>                                  | <i>Meat type</i>  | <i>Most important factors</i>  |
|--------------------------------------|---|--------------------|--|-------------------|--|
| Morrison et al. (2003)               | Greece  | -                  | Review   | Beef, lamb        | Price, income, taste   |
| Krystallis and Arvanitoyannis (2006) | Greece  | 268 households     | Questionnaire, personal interview              | Beef, lamb        | Safety, nutritional value, labelling, taste, appearance  |
| Krystallis et al. (2006)             | Greece  | 268 households     | Questionnaire, personal interview              | Beef, lamb        | Organic product, price, availability   |
| Sañudo et al. (2007)                 | Greece, Spain, Italy, France, UK, Iceland                     | 773                | Organoleptic evaluation at home, questionnaire | Lamb              | Smell, aroma, tenderness, juiciness, flavour   |
| Mandolesi et al. (2020)              | Finland, France, Greece, Italy, Spain, Turkey, UK             | 140                | Focus groups                                   | Sheep and goat    | Unique taste, authenticity and natural production, health and enjoyment of life  |
| Dudinskaya et al. (2021)             | Finland, France, Greece, Italy, Spain, Turkey, United Kingdom | 2,900              | Discrete choice experiment                     | Beef, sheep, goat | Price, origin, organic labelling, carbon footprint labelling, halal labelling, protein content labelling, fat content, convenience |

Sheep breeding is a traditional field of Greek animal husbandry, consisting mainly of numerous small farms (Mandolesi et al., 2020; Dudinskaya et al., 2021). Despite the several problems, Greece has high self-sufficiency regarding sheep meat, since its domestic production covers up to 90% of its consumption (Krystallis et al., 2006; Rezitis and Stavropoulos, 2012; FAOSTAT, 2021). Greeks prefer to eat lamb over mutton, as it is considered to be of better quality due to its lighter coloration (Bernabéu and Tendero, 2005). Lambs are usually slaughtered at the age of 4-8 weeks, producing a carcass weight that varies between 6–10 kg (Christodoulou et al., 2007). However, in specific regions of the country (Epirus, Sterea Ellada) a significant portion of citizens, especially in the countryside, consume heavier sheep carcasses (over 13 kg) (Skapetas et al., 2006). Skapetas et al. (2006) argue that the heaviest sheep carcass is more acceptable to Greek consumers when they are informed about its high nutritional value. Both lamb and

mutton consumption present seasonal demand, with Easter being the period of the highest demand due to religious purposes (Mandolesi et al., 2020). Sañudo et al. (2007) examined consumer preferences in six European countries. After organoleptic examination of meat of different breeds at different ages of slaughter, they concluded that taste (juiciness, tenderness, and aroma) and appearance (colour, fat content) play the most important role in beef and lamb meat selections. These factors are mainly influenced by the animal's breed, age and diet. Most Greek consumers prefer to consume autochthonous sheep breeds with a slaughter age of up to 2.5 months. Similarly to beef, there are limited literature sources describing the preferred sheep meat cuts. In general, small cuts are preferred (e.g., chops, ribs, leg), because they are considered easier to prepare and cook (Mandolesi et al., 2020; Dudinskaya et al., 2021). The sheep and goat carcasses are usually cut shortly before they are sold in the butcher's shop and their cuts follow those of cattle (Mandolesi et al., 2020) (Table 4).

**Table 4** Greek cuts of bovine and sheep carcasses

| <i>Bovine carcass</i> |               |                    |             | <i>Sheep carcass</i> |                    |
|-----------------------|---------------|--------------------|-------------|----------------------|--------------------|
| <i>Forequarter</i>    |               | <i>Hindquarter</i> |             | <i>Forequarter</i>   | <i>Hindquarter</i> |
| Chuck                 | Shoulder      | Top bit and        | Striploin   | Best end neck        | Leg                |
| Brisket               | Shoulder clod | rump               | Tenderloin, | Shoulder             | Chump              |
| Plate                 | Blade         | Top side, inside   | fillet      | Chop                 | Loin, chop         |
| Rib eye               | Chuck         | round              | Heel muscle | Flank                | Saddle             |
| Fore ribs             | tenderloin    | Knuckle,           | Hindshank   | Foreshank            | Tenderloin         |
| Chuck                 | Foreshank     | thick flank        | Flank       | Brisket              | Hindshank          |
| roll                  | Brisket       | Rump, tail-on      |             |                      |                    |
|                       |               | Silverside         |             |                      |                    |
|                       |               | Top round          |             |                      |                    |

## 5 Conclusions

Consumer behaviour regarding beef and lamb meat is difficult to assess accurately, due to the large variation, both among and within countries. There are several differences among European countries, concerning the preferred endogenous factors of beef and lamb. The puzzle gets more complicated when the various social, economic and cultural factors, and the contemporary events are considered. In addition, exogenous factors, such as the price of the product, seem to affect consumer behaviour both within countries and among them. Globally, two large consumer groups are recognised: the consumers that are willing to pay more for a better-quality food and the consumers that look for the cheapest food, regardless of quality. Different geographical areas within the same continent are quite diverse on their dietetic preferences, perhaps due to differences in traditional animal husbandry. Even in certain countries, like Greece, these differences can be profound, creating a quite different market landscape. However, some similarities are observed among countries. The vast majority of consumers prefer domestic beef and sheep. Similarly, consumers prefer to buy fresh meat, relying mostly on its bright red colour. Categorisation of consumers in groups with specific common characteristics, such as the categorisation of Ripoll et al. (2018) can help predict the reaction of consumers to certain

stimuli. Adoption of similar categorisations is particularly important for meat producers and professionals, as it will enable the accurate promotion of products according to specific consumers' categories. Especially in countries such as Greece in which large differences occur between different districts, mapping of consumer preferences and trends towards meat is a prerequisite for the economic growth of this sector. In any case, it is necessary for the beef and lamb meat market to continuously assess the factors affecting consumer choices in order to adapt to any contemporary changes observed.

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