



Mekelle University
College of Veterinary Sciences

**Consumer preferences and perceptions of processed red meat in Mekelle City,
Tigray, Ethiopia.**

By

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**A Thesis Submitted in Partial Fulfillment of the Requirements for the Master
of Science Degree in
Meat Processing Technology**

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Declaration

This is to certify that this thesis, titled “Consumer preferences and perceptions of processed red meat” and submitted in partial fulfillment of the requirements for the Master of Science Degree in Meat Processing Technology, is a record of original research done by Mr. Daniel Gebregzabher Gebremedhin under our supervision and guidance. This thesis paper has not been submitted in part or in full for any other degree or to any other university. The assistance and help received during the course of this investigation have been duly acknowledged. Therefore, I recommend that it to be accepted as it fulfills the thesis requirements.

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Biography

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Abstract

The present study was carried out to understand the consumer perception and preferences towards processed red meat. Purposive sampling method was used to select a total number of four hundred and forty (440) respondents. Data were collected by using a semi-structured questionnaire. Descriptive statistics was used to analyze the data which then were presented using tables in frequencies and percentages. The study group comprised of 367 males and 73 females. The educational background of respondents was found to vary between schools going to college/university degree. The study indicates that close to 94 percent respondents liked processed red meat. The weekly consumption level was the highest (75.45%) consumption pattern. Beef sausage and burger were the processed meat types consumed in the city. Consumption was affected by sensory quality (flavor, color, tenderness and juiciness) and nutrition, healthiness and safety and quality. In addition, extrinsic attributes such as reliability, attractiveness and packaging affect the consumers' consumption. Furthermore, high price, accessibility (availability) and promotion were the main challenges for consumers where their main source of information was window display. Determination of consumer preferences and the factors affecting them had great importance as marketing tools and developing new strategies.

Keywords: consumers, consumption, processed meat, perception, preferences

1. INTRODUCTION

The global market for animal food products and the demand for meat based sources of protein has increased significantly throughout the world. Meat has become the fastest growing agricultural product worldwide due to high consumption rates and large quantities of trade (Schutte, 2006).

Red meat has been highly topical in the past two decades because of the arising innovations in the meat industry the developments in the market have tarnished the positive image of the value of meat (Van Wezemaelet *al.*, 2010).

Consumers' all over the world have turned out to be progressively worried about food borne diseases, personal health and are aware of the quality of food they consume (Van Wezemaelet *al.*, 2010). On another perspective, consumers are increasingly expressing concerns on how the production, processing and transportation of meat is done, particularly since producing meat is resource intensive and aggressive on the environment (Krum,2002).

processing and packaging of meat to maintain and grow market share one of the greatest challenges to developing more successful marketing strategies in the food sector is gaining a better understanding of the diversity of consumer needs (Onwezenet *al.*, 2012), One of the greatest challenges to developing more successful marketing strategies in the food sector is gaining a better understanding of the diversity of consumer needs (Onwezenet *al.*, 2012).

Consumer perception of meat and meat products is a critical issue for the meat industry because it directly impacts profitability (Troy *et al.*, 2010). Understanding consumer eating habits regarding the consumption of various protein sources can help the industry to identify target segments of consumers and how to best approach marketing toward those consumers. Not only is

important to identify why consumers follow purchasing patterns and trends but also can allow the industry to realize and overcome consumer misconceptions while also educating the consumer. Appearance of the product, convenience, shopping environment and product quality among others, are external factors that shape consumers' preference and choice in a market place. In an ideal world, consumers choose the package of food products that offers them the highest level of satisfaction, on the chance that they can absolutely decide the quality characteristics of those food items (Owusu-Sekyere, 2014). However, in cases where important information about product quality and safety is absent, consumers go through considerable challenges when choosing a product because they do not know risks associated with the product (Schroeter, 2005).

Taking into account the impact that various factors have during consumer decision making and their effect on purchasing habits can allow us to better understand what motivates and influences consumers purchasing decisions. When brought to light, different perceptions of consumers can help the industry develop a wider variety of targeted advertising campaigns, educational materials, and quality products to help maintain and enhance consumer confidence. Additionally, price, flavor, nutrition, and emotional issues, such as, how animals are raised, management practices and animal welfare, can be addressed as components of consumer's decision making process. It is essential that the industry gain a better understanding of the importance of each of these 2 factors in order to bridge the gap between producers, distributors, retailers and the consumer.

Much of the previous research regarding consumer perspectives on meat has been on quality attributes and perceived quality; meat has increasingly become a subject of controversies during the past few decades relating to health and safety, the environment, and animal welfare

(Latvala *et al.*, 2012). Understanding consumer perception of beef, pork, lamb, chicken and fish can help the industry understand what drives consumer eating habits and perceptions on nutrition, food safety and animal welfare issues and to ultimately provide a better product for the consumer.

It has been made apparent that consumer attitudes impact consumer-purchasing decisions in regards to food. Such researches no yet studied in Tigray, Mekelle Therefore, the research proposal that are useful in obtaining a more comprehensive result that Meat industries will be able to use this research output to find the appropriate ways to improve consumers' satisfaction and also to increase profits.

1.1 Statement of the problem

The domestic demand for processed meat is becoming very high due to urbanization and increasing income. Migrating to the city from well-established cities, like Addis Ababa, due to existing political instability in the country consumer preferences in terms of type and quality of the processed meat increasing. Researches on consumer preferences of processed meat are not yet studied in Mekelle city, the customer need and expectation is not identified. Meat industries are not able to use research output to find appropriate ways to improve consumers' satisfaction and also to increase their profits.

1.2 Objectives

General objective

The general objective of the study was to determine the consumer preferences and perceptions of processed red meat consumed in Mekelle City, Tigray, Ethiopia.

Specific objective

- To assess the knowledge, and practices of consumers' perceptions and preference of processed red meat
- To assess the most important sensory quality attributes of processed red meat products
- To assess the most important factors that affect consumers' preference and perception towards processed red meat in Mekelle city.
- To determine the types of processed red meat products which are sold and consumed in Mekelle city.

1.3 limitation of the study

The study had limitations in terms of instability of the country, finance and interruption on the overall academic colander.

1.4 Significance of the study

Understanding consumer choice behavior can assist processors, restaurants and marketers when they develop marketing strategies and enable them to select the most salient attributes to attract and retain customers, this study will help to provide a useful framework for future research regarding the consumer preferences and perceptions of processed meat (red meat) in the meat industry This contribution is particularly important due to the limited empirical studies on the consumer preferences and perception of processed meat (red meat) consumed in Mekelle City

2. Literature review

2.1 Processed meat

Processed meat refers to all meat items that are processed for preservation by salting, curing (addition of NaCl containing nitrite or nitrate), smoking, marinating or cooking, or those that have been bought as a ready-to-eat product (Linseisen et al., 2006; Food and Agriculture Organization of the United Nations, 2008). Examples of processed meat include ham, bacon, salami, sausages, processed luncheon meats, beef burgers and chicken nuggets (Linseisen et al., 2006; Food and Agriculture Organization of the United Nations, 2008).

High consumption of processed meat products has been associated with adverse health effects such as coronary heart disease, diabetes mellitus and cancer (Micha et al., 2010; Rohrmann et al., 2013). In 2015, the International Agency for Research on Cancer announced that they classified processed meat as “carcinogenic to humans”, based on sufficient evidence that the consumption of processed meat causes colorectal cancer in humans (International Agency for Research on Cancer, 2015). This announcement brought the health risks associated with this food category once again into the spotlight. Despite such health concerns, a proportion of the meat regularly consumed is in the form of processed meat (Verbeke et al., 2010). In European countries, the total processed meat intake is between 11 and 48 g per day in women and 19 and 89 g per day in men (Linseisen et al., 2006).

Increased intake of processed meat products has been linked to negative health outcomes, including cancer, diabetes mellitus, and coronary heart disease (Micha et al., 2010; Rohrmann et al., 2013). Based on enough evidence showing eating processed meat promotes colorectal cancer in people, the International Agency for Research on Cancer declared in 2015 that processed meat

is "carcinogenic to humans" (International Agency for Research on Cancer, 2015). This announcement refocused attention on the health dangers related to this food category. Despite these health risks, processed meat makes up a percentage of the meat that is frequently

2.2 Perception and preferences

Perception can be defined as a group of feelings and/or beliefs inherent to humans concerning the likelihood that something will happen in a certain way or that a product will have certain characteristics. Expectations imply anticipation and some degree of rational thinking, and they thus include the evaluation of similar or related past experiences and available information and are, by definition, subjective in nature. Everybody has expectations for something in daily life that affects personal reactions and decisions, although sometimes subconsciously (Deliza&MacFie, 1996). Expectations play an important role in the acceptance or rejection of a product, concept, fact or event because they may alter its perception and image even before its test or occurrence. In general, higher expectations imply higher customer requirements and exigencies and accordingly imply a higher likelihood of dissatisfaction and disappointment. As stated by (Hedderely, 2000), the expectation formation process starts with the previous information and experiences that will constitute our prior expectations. These prior expectations together with the informational cues available at the shopping place (e.g., the product itself, its package, appearance, label, context, created expectations are low, the product will probably be rejected, but if expectations are high the product is very likely to be chosen and purchased. After selecting a product, the individual will test and use it, and consequently his/her expectation will be confirmed (agreement with what was expected) or not confirmed (disagreement with what was expected, either in a positive or in a negative sense). In general, consumers have substantial difficulties in forming quality expectations, especially for fresh meat for which little information

about the product is normally provided. According to (Brunsø et.al ,2004), the formation of meat quality expectations is based on a few key cues, principally labeling (including price) and appearance, which do not seem to be very good predictors of its eating quality. The manifest uncertainty that consumers seem to experience when buying meat and meat products can partially explain the importance that butchers' advice tends to have in their buying decision, as shown in many studies on fresh meat (McCarthy & Henson, 2005) or meat products (Barcellos, et al., 2011). Accordingly, it appears that consumers prefer to delegate the purchase decision to an expert, who is supposed to be more competent at predicting the product quality (Grunert et al., 2004). In the same vein and according to (Melfou et.al, 2013), using price (an extrinsic cue) to form quality judgments is also an indication of consumers' uncertainty and the difficulty they perceive in evaluating meat quality. Expected quality seems to be one of the most important factors in consumers' intention to purchase food. It is evident that quality cues are used to infer expected meat quality attributes at the point of sale

2.3 Intrinsic attributes of meat and meat products that affect consumer perception

Meat products greatly influence their attitude. The attributes that can be measured analytically, such as their nutritional composition, can be classified as products' intrinsic characteristics. The intrinsic quality of meat and meat products is related to their characteristics, matrix itself, and formulation and processes. Sensory quality must be considered a critical factor in the perception and acceptance of food, as the consumer seeks food with a specific sensory characteristic. The acceptance of food will depend on whether it meets the expectations of consumers and the degree of satisfaction it can provide (Danijela et al., 2011, [Díaz-Caro et al., 2019](#)).

2.3.1 Nutrition

Meat and meat products are sources of several essential nutrients such as high biological value protein, iron, zinc, selenium, vitamins B₁₂, B₆, and K (Haug, While, Berg, Hove, & Egeland, 2018). The consumption of these products has been important in the evolution and maintenance of the human species, especially the brain and intellectual development (Pereira & Vicente, 2013), and preventing various health conditions such as anemia (Shan et al., 2017; Strijbos et al., 2016; Teixeira & Rodrigues, 2021), mainly due to epidemiological studies that linked high meat products consumption and an increased risk of non-communicable diseases, such as cancer, diabetes and cardiovascular diseases (Apostolidis & McLeay, 2019; Beriain, Goméz, Ibanez, Sarriés, & Ordonez, 2018). The demonstration of that epidemiological relationship does not necessarily correspond to an intolerable risk, as can be inferred from the odd ratios for the specific diseases only slightly higher than the unit (Bernardo, Patarata, Lorenzo, & Fraqueza, 2021). However, the health consequences of processed meat products consumption are real. They have been widely discussed and have made meat production and consumption particularly controversial in the consumers' perceptions (Antoniak, Szymkowiak, & Peplinski, 2022).

2.3.2 Healthy and freshness

Health is an essential motivational aspect to buy food, including meat and meat products (Munekata et al., 2020; Saldana et al., 2019). Many of the aspects that influence consumers' perception of meat products, are related to salt, sugar, and fat, considered unhealthy ingredients (Hung et al., 2016; Magalhaes et al., 2022; Schnettler et al., 2020; Wolfer et al., 2018).

Meat products are seen as a contributor to consumers' intake of salt and saturated fat in their diet. According to Pereira and Vicente (2013), the fat content of meat is highly variable depending on the animal species, origin, feeding system, and cut. Leaner cuts such as pork or beef loin, for

example, do not differ significantly from skinless turkey or chicken breast, and their nutritional richness justifies their inclusion in a well-balanced diet and malnutrition. Nowadays, meat and meat products also have an important role in fulfilling the satisfaction of consumers, many of the negative aspects related to the perceived health risk of meat and meat products could be overcome through reformulations, that is, reduction in the content of unhealthy components, such as saturated fats and salt (Schnettler et al., 2020).

The use of healthy ingredients can improve the perception of the health image of processed meat products (Shan et al., 2017), as shown by Kessler et al. (2019) that developed a hydrolyzed protein-enriched sausage observed good product acceptance without negative impacts on consumer perception.

The health-oriented reformulations of meat products are promising ways to address the growing public health concerns and consumers' individual perceptions. The strategy of reformulating meat products has generated divergences in consumers' perception and, consumer acceptance of these new products cannot be considered guaranteed (Saldana ~ et al., 2021; Schnettler et al., 2020; Shan et al., 2017).

2.3.3 Safety and quality

Due to its high concentration of nutrients and water activity, meat is among the most perishable foods (Odeyemi, Alegbeleye, Strateva, & Stratev, 2020). Bacterial hazards are the most relevant biological hazards in meat and meat products because there is strong evidence of their association with outbreaks. Bacteria involved in human foodborne diseases were *Campylobacter* spp., *Salmonella* spp., *Escherichia coli* O157: H7, *Listeria monocytogenes*, *Staphylococcus aureus*, *Yersinia enterocolitica*, and *Clostridium* [toxins or toxins from other *Bacillaceae*]. In Europe, *Campylobacter* spp. *Salmonella* spp., *L. monocytogenes*, and *Cl. perfringens* are among

the top 10 pathogens, with outbreaks of solid evidence related to meat (EFSA and ECDC, 2021; Fraqueza et al., 2021). Meat can also carry parasites and virus. The presence of parasites in raw meat, such as *Trichinella* spp., *Sarcocystis* spp., *Cysticercus cellulosae*, *C. bovis*, *Toxoplasma gondii*, and *Taenia solium*, should be considered a biological hazard. The meat industry plays a crucial role in reducing the risks associated with these biological hazards (Franssen et al., 2019). Consumers' perception of food safety depends on their confidence in the production system and regulatory institutions, including this aspect as one of the main credence factors (Meixner & Katt, 2020).

2.3.4 Color

Color is intrinsic quality cues highly related with consumers' expectations of meat quality (Grunert, et al., 2009) and their choice at the point of purchase because these characteristics are used to assess food quality (Banović, et al., 2012). Color has been reported to be one of the most important fresh meat characteristics at the point of purchase (Verbeke et al., 2005), probably because consumers use inadequate color as an indicator of spoilage and wholesomeness (Mancini, 2009). Consumers relate red–purple color with freshness and brown color with lack of freshness (Whittier, 2001). Furthermore, consumers familiar with meat consumption use color as an intrinsic cue to predict experienced sensory quality (Banović et al., 2012) although not always eating satisfaction was related with color (Carpenter et al., 2001). Meat acceptability depends on cultural aspects, experience or consumption habits. Preferences for color therefore vary between and within countries and are culturally determined (Cummings, 2004). Thus, it is very important to improve color stability because it will increase the shelf life of meat and meat products by increasing the time that meat will be visually accepted by consumers at the point of purchase. It can be increased by feeding antioxidants (Arnold et al., 1992).

2.3.5 Tenderness and juiciness

Texture is a multi-parameter sensory attribute (Szczesniak, 2002) and consumer perception and the acceptability of tenderness and juiciness. Tenderness and juiciness are eating quality attributes that positively influence (to a greater or lesser degree) most consumers' preferences (Bryhni et al., 2003), experienced characteristics of the meat such as tenderness and juiciness, as well as taste, are highly correlated with the overall experienced quality, intention to purchase and willingness to pay (Koochmaraie et al., 2001). Consumer tenderness scores were higher in more aged beef (Brewer & Novakofski, 2007) while the tenderness of light and concentrate-fed lamb was preferred to heavy and grass-fed lamb (Font iFurnols et al., 2009). Tenderness and juiciness are positively correlated with intramuscular fat content and the type of fat (Straadt et al., 2013).

2.3.6 Flavor

Flavor of the meat is very complex, and it is created mainly when meat is treated thermally because raw meat has only a bloody taste and very little aroma (Mottram, 1998). When cooked, lipids and water-soluble components from several volatile compounds, mainly by means of lipid degradation and Maillard reactions or through reactions between their products. These volatile compounds are the main contributors to meat flavor (Elmore et al., 1998). Additionally, alterations during storage and serving conditions affect the flavor (Tuorila, et al., 2010). Sensory descriptions of flavor and aroma are very complex and can involve a number of attributes. We are not going to focus on the formation of odor and flavor but rather on their perception and acceptability to consumers. Flavor enjoyment is highly correlated with the overall experience of the meat (O'Quinn et al., 2012). The odor and flavor of lamb from grass-fed or grain-fed animals is related to the incorporation of n-3 and n-6 polyunsaturated fatty acids into muscle (Sañudo et al., 2000).

2. 4 extrinsic attributes that affect the consumer's perception of meat products

Much of the product's quality characteristics are unknown before purchasing a product. Thus, the resulting quality uncertainty leads consumers to use quality cues as guidance to form perceptions about the quality of a product. The primary commonly used quality cues include the brand, price, appearance, and product label (Grunert&Aachmann, 2016).

2.4.1 Price

The price of meat and meat products that the consumer is willing to pay is related to the consumer's quality perception of the product (Díaz- Caro et al., 2019; Fernandez et al., 2019). According to Magalhaes et al. (2022) in their study conducted about purchase and consumption of beef, the price was considered to be responsible for the highest or worst quality of both the product and the place of purchase. As Hati et al. (2021) observed, even though frozen meat is cheaper than fresh meat, people tend to choose fresh meat due to the associated sensory and perception factors. Consumers are willing to pay for adequately certified animal welfare-friendly products, primarily based on product quality and human health benefits (Miranda-de-La-Lama et al., 2017). Food safety has also been related as a relevant attribute that leads consumers to pay more for meat (Lai, Wang, Ortega, &Widmar, 2018; Riccioli et al., 2020).

On the other hand, the product's price also influences consumers' total perception of meat products. Cheap products can lead to a negative perception of product quality by certain sociodemographic groups. Although the price is not consistently the most important attribute that influences meat purchasing behaviour, lower prices are usually preferred, as expected, especially for low purchasing power consumers (Font-i-Furnols&Guerrero, 2014).

2.4.2 Reliability

Consumers have different definitions for “what is natural?” (Chambers, Chambers, &Castro, 2018). Consumers perceive naturalness as a desirable product attribute (Michel, Knaapila, Hartmann, &Siegrist, 2021). According to Roman, S´ anchez-Siles, ´ &Siegrist (2017), in their systematic review, the consumers’ perception of naturalness is important for the acceptance of foods and food technologies.

Regarding processed meat products, the perception of naturalness is also directly linked to the perception of healthiness, primarily when related to the absence of chemical compounds in the formulations of these products, such as additives, antibiotics, drug residues (Bearth, Cousin, &Siegrist, 2014; Bearth, Cousin, &Siegrist, 2016). An example is the use of nitrites and nitrates in meat products.

2.4.3 Sustainability

The increasing consumer knowledge about the environmental impact of foods might lead to more sustainable food consumption. Organic foods also influence their perception from a consumer perspective, as they have a positive and substantial environmental impact (Lazzarini, Zimmermann, Visschers, &Siegrist, 2016; Shi, Visschers, Bumann, &Siegrist, 2018; Siegrist, Visschers, Bumann, &Siegrist, 2018). Confidence in the organic origin is a crucial aspect of consumer perception. Once these products are more expensive, if the consumer mistrusts the origin, it can negatively affect his perception (Rabadan, D´ ıaz, Brugarolas, ´ &Bernabeu, 2020´).

2.4.4 Packaging Label and attractiveness

The food label is the main communication channel between the producer and the consumer. Regulation UE 1169/2011 (EU, 2011) defines the food labeling rules in UE to provide accurate

information to consumers. One of the critical pieces of information released to the consumer on the label is the expiration date of the food. This essential information is frequently observed by consumers and determines their purchase intention (Magalhaes et al., 2022). According to Barone and Aschemann-Witzel (2022), the food's expiration dates and sensory characteristics (e.g., color) emerged as the main drivers of choice in store and of use/disposal of the product at home. Also, the ingredients listed on the label are of utmost importance for consumer information. This rule is mandatory and is a preventive measure to avoid food fraud complemented by others food label rules.

2.4.5 Awareness

The potential for awareness-raising campaigns to foster behaviour change is contested. A number of recent studies into food choices and meat-eating describe the subconscious nature of many food choices (Bailey and Harper 2015) and detail the 'value-action' gap that sees more immediate concerns trump sustainability considerations at the point of purchase (Carrington et al. 2014). The sociologist Elizabeth Shove (2010) critiques the 'A, B, C approach' in which attitudes and values are understood to drive behaviours, arguing that individual actions are also informed by social conventions and obligations, and are shaped by social institutions and relationships.

2.5 Factors interrelated with attributes of meat and meat products that affect the consumer's

The factors that influence consumers' perceptions about meat and meat products can be explained by personal factors, such as lifestyle, and environmental factors, such as social, media, and marketing . These factors are crucial to understanding consumers' expectations and achieving their satisfaction (Font-i-Furnols&Guerrero, 2014; Tomasevic et al., 2018a, 2018b).

Consumers who know less about the labels and information they receive are more influenced by common sense, often false beliefs, and information from the mainstream media.

The so-called affective memory can also influence consumers' perception of meat products when the products are part of the culture and refer to particularly positive memories. Meat products can also be perceived as "comfort foods", especially when home-prepared. According to [Spence \(2017\)](#), the term "comfort food" refers to those foods whose consumption provides consolation or a feeling of well-being. Indeed, comfort foods are often prepared in a traditional or straightforward style and may have a nostalgic or sentimental appeal, perhaps reminding us of home, family, and/or friends.

To counteract the misinformation propagated by social media, researchers and institutions have made many efforts to bring accurate information about meat products to the internet. Several pages on Instagram, such as "Meat Quality," disclose information about meat products. In Europe, there are examples such as the "European Commission, Food Safety news," "Global Meat News," "EFSA News," and "Rede Rural News". Additionally, with improved internet access and extensive use of social networks, consumers have started to use digital platforms to expose their perceptions and dissatisfaction with foods and products in general ([Cavalheiro et al., 2020](#)).

3. MATERIALS AND METHODS

3.1. Description of the study area

The study was conducted in the Northern part of Ethiopia, in the Tigray Regional State, Mekelle city. The city is selected by its relevance as it is the most populous city, has higher concentration

of government and private sectors, has an export standard slaughter house and located close to other smaller towns in Tigray region compared to other similar institutions. The city is located about 783 kms away from Addis Ababa, the capital city of Ethiopia. Mekelle is the capital city of Tigray regional state. According to the CSA (2009), the city has a population of 209,000. In 2020 the population was estimated to be 524,000. Based on the primary survey conducted, there were 30 burger houses, 15 international standard hotels and 3 super markets that provide processed meat products to consumers and one export standard slaughter house in the city. The city has seven sub-cities; from these four sub-cities were selected purposively based on the distribution of the standard restaurants, burger houses, slaughter house and super markets, and simple random sampling method was used to select respondents.

3.2 Sample and data collection procedures

A semi-structured questionnaire (annex I) was prepared to assess preferences, knowledge, attitude and practices of processed meat .The information used to frame the questions in the questionnaire survey was obtained from random respondent’s focus group discussion and key informant interviews. Consumers at burger houses, restaurants, super market and butchery houses to understand their preferences and perceptions to quality and safety of processed red meat.

3.3 Sample size determination

Sample size was determined as per the following formulae.

$$N = N/N-1 (e)^2$$

Where; n = required sample size

N = population, 524,000

e = absolute precision, 0.05

Accordingly, the sample size was calculated to be 400, and by considering 10% non-response rate, the final sample size was determined to be 440.

3.4. Data collection procedure

The study relied on primary data sources. Primary data was collected through semi-structured questionnaire. The randomly selected individual respondents were interviewed in different days. The questionnaire consisted of a set of 21 questions and had six sections. Section one was about general information of the respondent. The second section dealt with general approaches of consumption pattern. The third section was about knowledge. The fourth section dealt with attitude. The fifth section dealt with consumption practice. The questions were prepared to measure the respondent's priority of statements and their responses. It used 5 scales to rank the variables where the respondents were requested to give 1 for the most important value and 5 for the least.

3.5 Statistical Analyses

Data were analyzed descriptively (i.e. frequency and percentages) by using Microsoft excel (version 2018), and the results were presented in tables.

4. RESULTS AND DISCUSSION

4.1. Demographic characteristics of respondents

Demographic characteristics of the respondents are presented in Table 1. Majority of the respondents were between the age groups of 26-35 years (47%) and 18-25 years(35%). With regard to gender and marital status, most of the respondents were male (83%) and married (56

%). With respect to educational level, 48% had college/university degree.

Table1. Demographic characteristics of respondents (n = 440)

Characteristics	Category	Frequency	Percentage
Age (Year)	18-25	153	34.77
	26-35	207	47.05
	36-45	62	14.09
	Above 46	18	4.09
Gender	Male	367	83.41
	Female	73	16.59
Marital status	Married	286	56
	Single	154	44
Education	Primary/secondary school	36	8.18
	College/university degree	211	47.95
	Other	193	43.86
Occupation	Student	89	20.23
	House wife	26	5.91
	Government employee	139	31.59
	Private/business owner	65	14.77
	Others	121	27.5
Income (ETB/month)	below 3000	74	16.82
	3001-5000	96	21.82
	5001-10000	216	49.09
	Above 10000	54	12.27

4.2. Type of Processed red meat Consumed in the city

Processed meat refers to all meat items that are processed for preservation by salting, curing (addition of NaCl containing nitrite or nitrate), smoking, marinating or cooking, or those that have been bought as a ready-to-eat product (Linseisen et al., 2006; FAO, 2008). Examples of processed meat include ham, bacon, salami, sausages, processed luncheon meats, beef burgers

and chicken nuggets (Linseisen et al., 2006; FAO, 2008). In the study area only two type of processed red meat were sold and consumed. These were beef sausage and beef burger which implied that the meat industry had less awareness of the products, less product diversification and not strong marketing strategy.

4.2.1 Beef sausage

The beef sausage sold and consumed in the cite was mainly product of the country produced in Addis Ababa and Bishoftu area like Prime and Alema meat processing factories. The products were sold mainly in supermarkets and standard hotels. The mode of selling was in slice type and the selling price was 800 birr per kilogram. The product was ready for selling in a display refrigerant with temperature of -18 degree centigrade.

4.2.2 Burger

The burger sold in the city was beef burger and it was produced in the burger houses and standard hotels by themselves. There was no supplier, and the method of preparation differ from one place to another, i.e. no standard of production, but similar method of storage in refrigerant.

4.3 Knowledge and practice of consumers

The results of the study showed (Table-2) that 94% of the respondents liked processed red meat, and 75% of them consumed at least once in a week and they consumed without any reasons, meaning consumed when they feel hungry. This could imply that the existing meat product appeared to satisfy the need of the consumers which in turn considered it as part of the usual food items. The consumers had sufficient knowledge and awareness about the products and taste was the encouraging factor (86%) which in turn could imply that taste was the main factor that affects consumers' preference. This finding was consistent with Lusk (2017), which stated that taste was of prominent importance on consumer's preferences.

Table 2. Knowledge and practice of respondent's on processed red meat (n = 440)

Questions	Category	Frequency (%)
Do you like	Yes	413 (93.86 %)
	No	27 (6.14 %)
Frequency of consumption	Daily	23 (5.23 %)
	2-4 times	32 (7.27 %)
	More than 4 times	53 (12.05 %)
	Once a week	332 (75.45 %)
	Feel hungry	50 (11.36 %)
Occasions/timing of consummation	without any reason	335 (76.14 %)
	Parties	12 (2.73 %)
	To save time	43 (9.77 %)
	price with quality	23 (5.23%)
What induced you to consume	Healthy food	--
	Status symbol	8 (1.82%)
	Taste	337 (85.68 %)
	Variety	32 (7.27 %)

4.4. Intrinsic attributes that affect consumer preference and perception

The respondent's response to sensory qualities flavor, color, tenderness and juiciness were 88%, 87%, 83%, and 78.91%, respectively. This had an influence on the consumption of processed red meat and on its nutrition, healthiness and safety and quality with 68%, 89% and 71% respectively. This could imply that sensory quality can affect consumer preference, and consumers had more consideration to flavor and next to color. Color as an intrinsic quality attribute influences consumers' expectations of meat quality at the moment of purchase (Carpenter, Cornforth, & Whittier, 2001; Font-i-Furnols & Guerrero, 2014) In this study, the respondents' evaluations on nutrition of the products were positive and they were used as basic factor for their preference. This finding was consistent with Dostálová and Kadlec (2014) and

nutrition could be considered as a motivation. Healthiness, safety and quality had influence on consumption of processed red meat which in turn could indicate that consumers had attention to quality, safety and their health. They believe that the products are , safety and health, and their preferences were affected by this attributes. Such findings complied with Yanwei *et al.*(2016). Another studies indicated that consumers were concerned about the safety of meat, but they have poor ability to differentiate meat quality (Li, 2012; Zhang *et al.*, 2014). The same trend was echoed in responses of consumers where majority of whom judged freshness of meat based on its color which was primary factor for consumer look in meat (Kiran *et al.*, 2011). Most consumers can only judge meat safety from color and appearance of freshness (Li, 2012).

Table -3 Intrinsic attributes of processed red meat (n = 440), frequency (%)

Attributes	SA	A	UN	SDA	DA
Nutrition basis	120 (27.27 %)	300 (68.18 %)	20 (4.54 %)		
Healthy food basis	28 (6.36 %)	390 (88.63 %)	24 (5.45 %)		
Quality and safety	100 (22.72 %)	312 (70.90 %)	28 (6.36 %)		
Freshness basis	-	389 (88.41 %)	12 (2.72 %)	39 (8.86 %)	
Tenderness basis	44 (10 %)	364 (82.72 %)	32 (7.2 0%)		
Juiciness basis	64 (14.54 %)	348 (78.91 %)	28 (6.36 %)		
Color basis	53 (12.04 %)	382 (86.81 %)	5 (1.13 %)		
Flavor basis	30 (6.81 %)	386 (87.72 %)	24 (5.45 %)		

SA= strongly agree, A= agree, UN= undecided, DA= disagree, SDA= strongly disagree

4.5 Extrinsic attributes that affect the consumer’s preference and perception

With respect to extrinsic attributes (Table 4), 91%, 86%, 81% of the respondents ‘agreed’ that reliability, attractiveness and packaging respectively, influenced the consumption of processed red meat, while 92% and 85% of the respondents for price and availability respectively negatively influence consumption of processed red meat. This indicates that price was high and the product was not easily available in all areas of the city which in turn could imply that consumption could be affected by price. This report was consistent with the finding of Font-i-Furnols & Guerrero (2014). Price is the most important attribute that influences meat purchasing behavior, lower prices are usually preferred, as expected, especially for low purchasing power of consumers and the product was not easily available in all areas of the study area. This can influence consumption of processed red meat because the product was not easily available; this result was consistent with Tsegal (2012) that the high degree of variation in meat consumption could be due to availability. The result also showed that attractiveness and packaging affected consumers preference which in turn implies that consumers had attention and consideration to attractiveness and packaging of the product, consumers believe that the mode of display and packaging were attractive. the result was consistent with (Magalhaes et al., 2022) that reported type of packaging can have an impact on purchasing decisions.

Table 4. Extrinsic attributes that affect consumption of processed red meat (n = 440),

Attributes	SA	A	UN	SDA	DA
Low price basis	-	-	-	34 (7.73 %)	406 (92.27%)
Availability basis	-	-	-	372 (84.55 %)	68 (15.45 %)
Reliable product	28 (6.36 %)	400 (90.90 %)	12 (2.72 %)		

basis

Attractive display	40 (9.09 %)	380 (86.36 %)	20 (4.54 %)
Packaging basis	48 (10.91 %)	356 (80.90 %)	36 (8.18 %)

SA= strongly agree, A= agree, UN= undecided, DA= disagree, SDA= strongly disagree

4.6. Factors interrelated with attributes that affect consumption of processed red meat

The result showed (Table5) that 82% of the respondents responded that advertisement had positive effect on their perception and the reason for purchasing (95%) and the reason for not purchasing (81%) is taste and price respectively. The main source of information was window display (97%), and this implied that the issue of advertisement was not yet developed. This finding differ from Richardson (1994).These consumers paid close attention to meat safety based on information from television, newspapers and the internet ,factors such as advertisement, promotion, and advice (of physicians, family, and friends) played a role on meat consumptions.

Table 5. interrelated attributes that affect consumption of processed red meat (n = 440).

Statements	Category	Frequency (%)
Effect of advertisement	Strongly agree	67 (15.23 %)
	Agree	361 (82.05 %)
	undecided	12 (2.73 %)
	Disagree	
Reasons for purchasing	Strongly disagree	
	E/available	20 (4.55 %)
	taste	420 (95.45 %)

	L/family influenced	8 (1.82 %)
	convenient	12 (2.73 %)
	L/ awareness D/the product	20 (4.55 %)
Reasons for not purchasing	high price	360 (81.82 %)
	religious	8 (1.82 %)
	not available	52 (11.82 %)
	television radio	4 (0.91 %)
Source information	newspaper magazine	
	window display	428 (97.27 %)

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

This study revealed that majority of the respondents were male, married, in their active age, engaged in trading and civil service work as their occupation and majority had college and university degrees. Beef sausage and burger were the type of processed red meat sold and consume in Mekelle city. Most of the respondents liked the processed meat and consumed once per week without any occasion just when they felt hungry and taste was the main inducing factor for their consumption, and their consumption is affected by sensory quality (flavor, color, tenderness and juiciness) and nutrition, healthiness and safety and quality. Most of the respondents agreed that the products are reliable; attractive with good packaging while high price and less availability were the challenges that negatively influence their consumption. More over respondents agreed that advertisement had an effect on consumption and their source of information was window display means no electronic advertisement. .

5.2. Recommendations

- ❖ It is recommended that producers should create an excellent external product image rather than concentrating on only intrinsic attributes of the processed red meat.
- ❖ Stakeholders in meat industry should make more of processed red meat available and affordable in the study area.
- ❖ Stakeholders should ensure that the right quality of processed red meat is supplied to consumers in a safe and stable form.
- ❖ Government should make policy to improve standard of living of the consumers as these will influence the quality and quantity of the meat they can consume in the study area and beyond
- ❖ Similar studies should be conducted in other cities of the region in order to compare the preference and perception of consumers. This will contribute to yielding reliable results on the overall preferences and perception in Tigray.
- ❖ Future research should include other attributes such as animal welfare, environmental and issue of certification since these attributes could found to have a significant influence consumers purchasing decision in the future.

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7. ANNEX 1

QUESTIONNAIRE

PERSONAL DETAILS (DEMOGRAPHIC DATA)

Name -

Age - 18-25 26-35 36-45 46-above

Gender – Male Female

Occupation - Student Housewife Govt. Services

Business Owner Others

Education - College/University School Going Others

Marital Status - Married Single Others

Monthly Income(Birr.) - below 3000 5,001-10,000

3,000-5,000 Above 10,000

CONSUMER PREFERENCES FOR PROCESSED MEAT

1) Do you like processed meat foods?

Yes No

2) Frequency of consumption of processed meat in a week?

Daily 2-4 times More than 4 times Once in a week

3) On what occasions, do you often consume the processed meat?

Feeling Hungry Without any reason (just like that)

Parties/ Celebrations To save time

4) What induces you to eat processed meat?

Price with quantity Health Food Status symbol

Taste Variety Advertisement

5) Do advertisements affect your consumptions?

Strongly agree Agree Undecided
Disagree Strongly disagree

6) How do you rate processed meat on Nutrition Basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

7) How do you rate processed meat on Low price Basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

8) How do you rate processed meat on Reliable product basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

9) How do you rate processed meat on Attractive display?

Strongly agree Agree Undecided
Disagree Strongly disagree

10) How do you rate processed meat on suitable packaging Basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

11) How do you rate processed meat on more hygienic food basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

12) How do you rate processed meat on Quality basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

13) How do you rate processed meat on Availability basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

14) How do you rate processed meat on freshness basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

15) How do you rate processed meat on tenderness basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

16. How do you rate processed meat on juiciness basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

17. How do you rate processed meat on color basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

18. How do you rate processed meat on flover basis?

Strongly agree Agree Undecided
Disagree Strongly disagree

Easily Available	
Taste	
Liked by family members	
Influenced by others	
Convenient for use	
Save time for preparation	
Any other	

19. Reasons for purchasing processed meat (Tick the suitable reason)

Lack of awareness of products available in the market	
Dislike the product	
High Price	
Religious/area of slaughtering	
Not available in the shops	
Health conscious	
Any other	

20) Reasons for not purchasing processed meat (Tick the suitable reason)

21) Source of information for awareness (Tick the answer)

Television	
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Radio	
Newspaper	
Magazine	
Window display	
Shopkeepers/ Retailers	
Other	