

# Household Consumer's Perception towards Frozen Beef

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## ABSTRAK

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Pemerintah Republik Indonesia melakukan impor daging sapi beku dari negara lain untuk memenuhi kecukupan daging sapi di Indonesia. Namun, sebagian besar masyarakat Indonesia lebih suka membeli daging segar (daging sapi yang baru disembelih) daripada daging sapi beku. Penelitian ini bertujuan untuk mengetahui persepsi konsumen rumah tangga di wilayah Jakarta dan Bogor terhadap daging sapi beku dan menganalisis faktor-faktor yang mempengaruhi konsumen untuk mengambil keputusan dalam pembelian daging sapi. Total 200 responden rumah tangga diwawancarai secara langsung menggunakan kuesioner terstruktur. Kuesioner dibagi menjadi tiga bagian, yaitu karakteristik responden (umur, tingkat pendidikan, pekerjaan, pendapatan, dan jumlah keluarga), perilaku pembelian yang dianalisis secara deskriptif, dan persepsi responden terhadap daging sapi beku yang dianalisis dengan menghitung nilai rata-rata persepsi yang kemudian dikelompokkan berdasarkan level kategori persepsi. Hasil penelitian menunjukkan bahwa persepsi konsumen terhadap daging beku dari beberapa aspek memiliki skor yang rendah (skor akhir rata-rata 2.37) yang mengindikasikan bahwa konsumen memiliki persepsi yang buruk terhadap daging beku. Lebih lanjut, sebagian besar responden yang membeli daging sapi adalah ibu rumah tangga yang membeli daging di pasar tradisional yang hanya menyediakan daging sapi yang tidak dibekukan, mereka berasumsi bahwa daging yang tidak dibekukan adalah daging segar yang mempunyai kualitas sangat bagus karena berasal dari sapi yang disembelih pada hari yang sama. Responden tersebut menyatakan pembekuan menyebabkan efek negatif pada daging sapi yaitu dapat menurunkan kualitas dan kandungan gizi daging sapi. Berdasarkan hasil penelitian diperoleh bahwa sosialisasi tentang daging beku dan proses penanganan daging beku diperlukan bagi konsumen rumah tangga, sehingga kualitas daging sapi dapat dipertahankan dan meningkatkan kepercayaan konsumen untuk membeli daging beku.

**Kata Kunci:** Persepsi Konsumen, Daging Sapi Beku, Konsumen Rumah Tangga, Perilaku Pembelian

## ABSTRACT

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Demand of beef in Indonesia is higher compared to the domestic beef supply, hence the Indonesian government has established policy to import frozen beef from other countries in order to support the high demand of Indonesia people. However, most of Indonesian people prefer to purchase fresh meat (freshly slaughtered beef) rather than frozen beef. The aims of this study were to identify the characteristics of household consumers who bought beef meat and their perceptions towards frozen beef; including to analyze the relationship between perceptions and consumer characteristics of frozen beef, and to analyze the consumer behavior in making decision to buy frozen beef in Bogor area and DKI Jakarta. Total about 200 households were directly interviewed using structured questionnaire. The questionnaires includes general characteristics of respondents (age, education level, occupation, income, number of family member), purchasing behavior which was analyzed descriptively, and respondents perceptions toward frozen beef which was analyzed by calculating the average value of perception and then categorized based on the level of perception category. Results showed that consumer's perceptions toward frozen beef according to several aspects had a low score (average final score 2.37), indicated that consumers had a poor perceptions towards frozen beef. Furthermore, most of the respondents who buy beef were housewives who buy meat in traditional markets which only provide fresh meat, they assumed that fresh meat had very good quality because the meat came from slaughtered beef. Those respondents think that freezing causes negative effects on beef, freezing treatment reduce the quality such as changes of meat color and flavour; and reduce nutritional content of beef. It was discovered that socialization about frozen beef and the process of handling frozen meat is required for household consumers to control the quality of beef as well as to increase the consumer's trusts in purchasing frozen beef.

**Key Words:** Consumer Perception, Frozen Beef, Household Consumer, Purchase Behavior

## INTRODUCTION

Livestock Sub-sector plays an important role in fulfilling community nutrition, due to livestock produces a lot of food products with high protein content, which one of those products is beef. Beef contain a lot of nutrition substances, especially protein, which is important for child growth and also important for damaged cells repairment (Prasetyo et al. 2013). However, Beef consumption in Indonesia is still below the world average in 2021 (OECD 2021). The average consumption of Indonesian people is 2.2 kg per capita while the world average is 6.4 kg per capita. Therefore, Indonesian government conduct some efforts to increase beef consumption into minimum 20 kg beef/capita/year by increasing beef supply through encouraging domestic beef production (especially beef from NTT), and importing frozen beef. The demand in Indonesia is higher than the domestic supply, hence the government made policy to import frozen beef from other countries for supporting the high beef demand in Indonesia. Indonesia is an archipelago country, cold beef chain management become the main factor in achieving the government's goal. However, Indonesian society in general prefers "warm beef" (freshly slaughtered beef) than frozen beef. Fresh beef or "warm beef", which is sold and marketed in room temperature, will be very vulnerable and has a very short shelf life. Another problem in beef consumption pattern of the most Indonesian society, was low public awareness in health problem, especially the danger of consuming the "warm beef".

Meat is skeletal muscle and its associated tissues derived from mammalian, commonly slaughtered for human consumption (Boler and Woerner 2017). There are various forms of beef available in the market, such as fresh beef, cold beef, and frozen beef. Fresh beef is the meat that still has a time span of 1-2 days after slaughtered (Nafiasari and Handayani 2019). Meanwhile, frozen meat is chilled meat subjected to freezing in appropriate equipment in such a way that the product is maintained at a temperature of  $-18^{\circ}\text{C}$  or lower (Aidani et al. 2014). The freezing process can inhibit the growth of microorganisms, thus the meat products have long shelf life (Aidani et al. 2014; Ockerman and Basu 2014). The appearance of frozen meats after thawing are not much different from fresh beef (Aidani et al. 2014; Pham 2014; Coombs et al. 2017).

Beef consumers, in this case household consumers, were concentrated in DKI Jakarta, Banten, and West Java which Bogor is one of the areas in West Java that is close to DKI Jakarta. In 2019, West Java is a province that has the largest total consumption of beef for household consumer compared to other provinces,

which reached around 41.91 thousand tons followed by East Java at 48.54 thousand tons and DKI Jakarta 23.4 thousand tons (Badan Pusat Statistik 2019). Meat consumption for household consumers in DKI Jakarta and West Java has increased about 0,73 kg/capita and 0.05 kg/capita, respectively, from 2017 to 2019 (Badan Pusat Statistik 2019). This meat consumption also can be represented by per capita expenditure per month for meat products which increased from Rp 28.144 to Rp. 37. 231 in 2015 (Badan Pusat Statistik 2015). Whereas, meat consumption in DKI Jakarta is represented by percentage of expenditure per capita per month for meat products which increased from 2.34% in 2019 to 2.36% in 2021 (Badan Pusat Statistik 2021).

Household consumers are individual consumers who directly consume or process beef (Sumarwan 2015). These consumers will go through several stages to finally decide whether or not to consume the products. The final decision of purchase is influenced by various factors, including consumer perceptions, consumer characteristics, and product attributes such as price, brand and origin of the product (Kotler and Armstrong 2012). Consumer perception is the result of information processing, which is the initial view of consumers of a product. A good perception will lead consumers to consume a product (Istiqlal 2013; Sumarwan 2015). Perception is a process in selecting, organizing, and interpreting stimuli after receiving sight, feeling, hearing, smelling and touching to produce an image. The decision to buy the goods is influenced by individual's perception of a certain situation and sometimes what is perceived can be different from the objective reality (Agyekum et al. 2015; Venkatachalam and Surumbarkuzhali 2018). Therefore, the perception of each individual can be different or subjective. According to Dermawan (2016), perception is a cognitive process which can make it easier to understand something.

The aims of this study were to identify the characteristics of household consumers who bought beef and their perceptions towards frozen beef; including to analyze the consumer behavior in making decision to buy frozen beef in Bogor area and DKI Jakarta. In order to meet the increasing of beef consumption in Indonesia as described above, the government has implemented a policy to import frozen meat, therefore the research about consumer perceptions and behavior of frozen beef is important, in this case is household consumers in DKI Jakarta and Bogor areas, because both regions have the highest consumption of beef compared to other regions in Indonesia. Results of this study can be used to make strategies in determining market segmentation and establishing the right marketing strategy for frozen beef. Thus, the government policy can be targeted and can increase meat consumption in Indonesia.

## MATERIALS AND METHODS

This study was conducted in Jakarta and Bogor, Indonesia. Those areas were selected as study location due to Jakarta and Bogor reflect the urban areas in Indonesia in which the community have high regional minimum wage, thus they have more ability to buy and consume beef compared to community in other area. Moreover, based on BPS 2019, DKI Jakarta and West Java (in this case Bogor) have the highest beef consumption compared to other regions in Indonesia. Data collected consisted of primary data and secondary data. The primary data was collected using questionnaire both open and closed questions as a tool and guidance in conducting interviews. The secondary data was collected from the BPS of Jakarta and Bogor, Trade and Industry Services of Jakarta and Bogor.

The questionnaires in this study included characteristic of respondents such as age, occupation, income, level of education, and total of family member; purchasing behavior, and respondents perceptions toward frozen beef.

### Sample

Total of 200 household respondents were used in this study. Respondents were selected with non probability sampling using purposive sampling technique. The respondents were women over 18 years old, who purchased frozen or fresh beef. In addition, it also depends on the willingness of respondents to be interviewed. The respondents were chosen by the Slovin method with the following formula (Riyanto and Hatmawan 2020):

$$n = \frac{N}{1 + Ne^2}$$

where n is the amount of sample, N is the amount of population and e is error tolerance limit.

### Data analysis

The descriptive analysis was used in this study to describe consumers' perceptions, consumer characteristics, and purchasing decision processes by consumers. The data was presented as frequency, mean, percentage, and average score. Relationship between perceptions and characteristics of business consumers was analyzed using Rank Spearman correlation test.

### Test of validity and reliability

Validity test was carried out in order to find out whether the questionnaire is able to measure the variables. Validity test would be valid if it has strong support for the total score. The correlation of the

questionnaire items must be strong and the chances of errors are not too large (maximum 5%), and the correlation must have a positive direction, the r score higher than r table (Yusup 2018). The validity test was conducted on 30 respondents, as a minimum requirement for validity test. Test of validity was analyzed using statistical SPSS software. The results showed that the assessment of 30 respondents, the data was 100% valid, which indicated that the questions had the r score higher than r table.

In addition, reliability testing was carried out on the research questionnaire to see the level of confidence in the questionnaire. If the results of repeated measurements produce relatively the same results, thus these measurements have high reliability (Yusup 2018). The test was analyzed using SPSS software on a reliable test obtained a high Cronbach's alpha value, this indicated that the questions on the questionnaire were reliable, thus the research can be continued.

### Perception score

Calculation of the final perception score was carried out by leveling the aspects of perception, including Nutrition and Health aspects, Product quality, Product Handling, and Price (Table 11). The perception score was calculated using a Likert scale with a range of 1 to 4 (Joshi et al. 2015). The statement strongly does not agree had score 1, the statement does not agree had score 2, the statement agrees had score 3 and strongly agree statement had score 4. Determination of the scale was done using the following formula:

$$\text{Scale range} = \frac{\text{the highest score} - \text{the lowest score}}{\text{number of scales}} = \frac{4-1}{4} = 0.75$$

**Table 1.** Scale of respondents' perceptions based on the calculation of scale range

Perception level	Score
Very Poor	1.00-1.75
Poor	1.76-2.50
Good	2.51-3.25
Very good	3.26-4.00

## RESULTS AND DISCUSSION

### Characteristics of household consumer

Characteristics of consumer were used to determine the diversity of consumers based on age, education, occupation, income, and number of family members. The general characteristics will provide an overview of

the consumer condition who make a purchase of beef in DKI Jakarta and Bogor and also to find out the correlation between consumers characteristics and consumers' perceptions about frozen and fresh meat. According to Agyekum et al. (2015), consumers have different ideas or perception on the product quality based on their ages, income levels, and educational background and this goes a long way to influence them on the criteria used in determining the quality of product when making a purchase. The general characteristic of respondents is presented in table 2.

Age as a demographic characteristic that will influence on how consumers behave, act, and think. Based on Table 2, it is concluded that the majority of consumers who buy beef were above 50 years old, representing 39% from total respondents. Ages above 50 years are classified as advanced adults. This result showed that the elderly were financially able to buy beef as daily meals for their family. They are more established and can reach higher food prices than other respondents. Moreover, consumers who buy beef were family members who usually arrange food menus and make decisions in fulfilling household needs which are usually carried out by mothers or older people in the house.

Most household consumers in DKI Jakarta and Bogor had a high level of education. There were 37% of consumers of beef had experience in bachelors's degree (Table 2). The level of education will relate to informations they received and would determine a person's decision to make a purchase. Higher education respondents will receive more information and knowledge related to the nutrition of food then it will affect their decision in purchasing beef. According to Sumarwan (2015), consumer with higher education will be more responsive in processing information. Consumers with the higher education will look for more information regarding what products to buy, thus consumer needs will change as education increases. Education is an individual (personal) factor that can indirectly influence consumers in making decisions, consumers with higher education have different views about the assessment of a product compared to consumers with lower education (Rondonuwu 2013).

About 40.5% of respondents were housewives (Table 2). The high number of respondents who were housewives could be related to the high percentage of respondents who were above 50 years old. Housewife consumers were family members who buy beef because they arrange a daily food menus for family and make decisions in fulfilling household needs.

The study also analyzed income level of the respondents. This analysis will help the income level of respondent who buy beef based on price. Income is an important source for consumers to be able to meet their needs. Almost 80% of respondents had a monthly income above IDR 3,500,000 which according to the

Central Statistics Agency/ Badan Pusat Statistik (2013), people with income more than IDR 3,000,000 per month were classified as a very high income people. High income people tend to have ability to purchase beef. Income is one of the factors that determine the consumption of a product by consumers. There is a relationship between income and consumption. High income can increase interest in consuming a product. Thus, the higher the income will increase the purchase of products (Hasanah et al. 2018). Financial capability is one of the important things that influence consumer behavior in consuming products.

Number of family members affect households' decision in purchasing decisions. Most of respondents (54% of respondents) had 3-4 members in family (Table 2). Number of family members and the existence of children in family would influence the decisions in consuming beef where the parents have a willingness to provide nutritious and healthy food for their children (Adiana and Karmini 2012; Akbari et al. 2016; Jafrinur et al. 2018).

### **Consumers behavior in purchasing beef meat**

Consumer behavior is an activity related to the process of buying an item or service. Consumer behavior can appear after getting a perception. Consumers, in deciding to buy the food product, will consider some aspects such as product quality, packaging, price, function or use, promotion and place of the product (Rajan et al. 2021). This study will discuss factors that influence consumers behavior in purchasing frozen beef and fresh beef.

### ***Needs recognition***

The process of needs recognition arises when consumers face a problem (Sumarwan 2015). In this case, consumers face the problem to fulfill the protein source and one of the options available in the market is beef, either frozen or fresh beef. Respondents had various reasons to consume beef. The majority of respondents, about 72% chose to consume beef due to beef is good nutrition for health and had been recommended by many nutritionists. Education may also influence consumers who buy beef for good nutritional reasons, because most of the respondents had a bachelor's education. Furthermore, DKI Jakarta and Bogor are urban areas, thus very easy to access information related to food and health issues. The distribution of reasons for respondents in consuming beef can be seen in Table 3.

### ***Information source of product purchased***

The main factor in product marketing is providing product information in various media that can be easily

**Table 2.** The characteristics of household consumer

No	Characteristics	Variable	Frequency	Percentage (%)
1	Age (years old)	<20	1	0.5
		21-30	24	12.0
		31-40	53	26.5
		41-50	44	22.0
		>50	78	39.0
		Total	200	100.0
2	Educational status	Elementary school	2	1.0
		Junior high school	10	5.0
		Senior high school	63	31.5
		Diploma	32	16.0
		Bachelor	74	37.0
		Post Graduate	9	4.5
		Total	200	100.0
3	Occupation	Housewife	81	40.5
		Employee	49	24.5
		Government employees	50	25.0
		Entrepreneur	10	5.0
		Total	200	100.0
4	Income (Rp)	<3,500,000	39	19.5
		3,500,000-7,000,000	86	43.0
		7,000,000-20,000,000	54	27.0
		>20,000,000	21	10.5
		Total	200	100.0
5	Number of family members	2	200	100.0
		3-4	26	13.0
		5	108	54.0
		7	63	30.5
		Total	3	1.5
Total	Total	200	100.0	

**Table 3.** The reason for consuming beef meat

Reasons for consuming	Frequency	Percentage (%)
Good in nutrition content	145	72.5
Price	5	2.5
Good in taste	46	23.0
Others (such as feast day, lifestyle, allergy etc.)	4	2.0
Total	200	100.0

accessed by consumers (Nadaraja & Yazdanifard 2013). Information is important in influencing purchasing decisions because more knowledge obtained. Moreover, the information of product can lead consumer in making decisions to buy a product (Dewati and Saputro 2020). Generally, consumers would search the information about the product of frozen beef and fresh beef before doing the purchase of beef. Information about a product can be obtained through two sources, including internal sources by remembering their experience and knowledge and external sources such as internet, news, television or other people experiences. There are many factors that influence the information search process including the characteristics of consumers which consist of consumer knowledge and experience, consumer personality and demographic conditions (Sumarwan 2015). Ibrahim & Adinugraha (2020) found that higher intensity of someone to search the product information can cause high possibility they buy the product.

About 73% of respondents in this study received information about frozen beef and fresh beef through personal experience (Table 4). They believe that frozen meat is not as tasty as fresh meat, the quality of meat decrease because it has been kept for a long time. They prefer to buy fresh beef meat and then store the meat in freezer by themselves or directly cooked. Consumers who already have a lot of experience may not be motivated to find more information.

**Alternative evaluation**

Alternative evaluation is an activity in which consumer process information about their choices to make the final decision (Istiqlal 2013). Consumers will look for the positive and negative effects before buying frozen beef. Results of this study showed that around 21.48% of respondents considered nutrition content of frozen beef before buying it, followed by flavour, colour, appearance and microbial content, 19.69%, 18.16%, 16.62%, 14.59%, respectively (Table 5). This result related to the result above that based on their experiences the quality of frozen meat such as flavour,

**Table 4.** Information sources of product purchased

Information source	Frequency	Percentage (%)
Consumers experiences	146	73.0
Family	29	14.5
Friend	10	5.0
Newsprint and television	15	7.5
Total	100	100.0

**Table 5.** Factors considered by consumers in consuming frozen beef

Attributes	Frequency	Percentage (%)
Nutrition content	84	21.48
Microbial content	57	14.58
Tenderness	37	9.46
Flavour	77	19.69
General Appearance	65	16.62
Colour	71	18.16
Total	391*	100.00

\*Respondents could choose more than one answer

colour, and appearance were not as good as fresh meat. This result also in line with the study of Tzimitra-Kalogiani (1996), that most of people especially older people believed that frozen meat had negative effects for health due to nutritional reasons, and also change meat’s characteristics. They believed that frozen meat was harmful, it did not looks nice, it has been kept for a long time, and because the conditions of its preservation cause unpleasant odor.

**Family member who responsible in making decision to buy beef**

The next process after alternative evaluation, the consumer would decide whether to buy beef or other meat. The decision to consume beef in household consumers were made by one of member in the family. 88.5% of the family member who responsible in making purchase decision was mother (Tabel 6). Housewife consumers or mother were family member who buy beef because they arrange a daily food menus for family and make decision in fulfilling household needs. Akbari et al. (2016) reported that the existence of children in family would influence decision in consuming beef where the parents, in this case mother, have a willingness to provide safe and healthy food for their children.

**The place to buy beef**

The desire to buy beef will encourage consumers to look for the seller. Sumarwan (2015) stated that the purchasing process is divided into four stages, such as dealing with the seller, looking for the products, transactions and consumption. Contact with the sellers will determine the place where consumers buy the beef. The distribution of beef seller is presented in Table 7.

The result showed that 60% of respondents bought beef in traditional markets. The respondents might

**Table 6.** Family member who responsible in making decision to consume beef meat

Person in charge	Frequency	Percentage (%)
Mother	177	88.5
The oldest children	8	4.0
Servant	15	7.5
Total	200	100.0

**Table 7.** Place to buy beef meat

Place	Frequency	Percentage (%)
Traditional market	120	60.0
Supermarket	79	39.5
Slaughterhouse	1	0.5
Total	200	100.0

**Table 8.** Amount of beef purchase

Beef quantity	Frequency	Percentage (%)
<1 kg	57	28.5
1 kg	59	29.5
2 kg	79	39.5
3 kg	5	2.5

**Table 9.** Frequency for buying beef

Purchasing frequency	Frequency	Percentage (%)
Everyday	41	20.5
Once a week	70	35.0
Once a month	58	29.0
One a quarter	16	8.0
Every Religion Holiday	31	15.5
Total	200	100.0

**Table 10.** Respondents opinions about the effect of the freezing process

Respondents opinions	Frequency	Percentage (%)
Positive	67	33.5
Negative	83	41.5
No effect	50	25.0
Total	200	100.0

believe traditional markets was the only place that provide unfrozen beef, they assume that unfrozen beef was fresh meat that had very good quality because the meat came from slaughter house. Those respondents assumed that freezing causes negative effects on beef, freezing treatment can reduce the quality and nutritional content of beef (Tzimitra-Kalogiani 1996). Meat sold in traditional markets was a fresh meat, which slaughter on that day, and had very good quality and condition. In addition, respondents can bargain the prices and choose meat directly. This study also in line with Agustina's reseach (2018), people tend to choose traditional markets as a place to shop because the consumers were able to bargain the products with the seller directly, thus they can get the products with the lower prices than the other places or modern market.

In addition, traditional markets also provide convenience in finding the products needed. According to Angriva and Sunyigono (2020), the consideration of buying place is one of consumer behavior in making purchases of a product. Furthermore, the easiness of access and obtaining a product can save consumers time and energy, thus consumers do not have to go far for shopping.

#### ***Quantity of beef purchased***

The majority of respondents, about 39.5% respondents bought beef 2 kg in one purchase. The distribution of the amount of beef purchases is presented in Table 8. The respondents who generally housewives were not always cook the beef meat directly. They stored the beef meat after they bought from the market. They will store the meat in freezer as food stock.

#### ***Frequency for buying beef***

About 35% of respondents bought beef meat once a week. Household consumers did not cook the meat immediately after they bought. Respondents would store the beef in the freezer and cooked the meat later. The distribution of frequency for buying beef is presented in Table 9.

#### ***Consumer behavior after decision making***

Consumer will have experiences and knowledges of the products after doing the purchase and consume the beef meat, both fresh beef meat and frozen beef meat. This process is referred to as an alternative evaluation process. The majority of respondents about 41.5% said freezing cause a negative effect on beef. According to respondents in this study, freezing can reduce the quality and nutrition content of beef. However, based on the research of Ernawati et al.

(2018) showed that nutrition content did not differ between frozen and fresh beef meat in both traditional markets and supermarkets. Moreover, frozen meat will lose nutrients during the thawing process and when cooked, not when freezing process (Saraswati and Karang 2016).

About 33.5% of respondents thought that the freezing process had a positive effect on beef, which extends shelf life and easier to process. While 25% of respondents thought that freezing did not change the condition of beef (Table 10).

#### ***Household consumer perception of frozen beef***

Consumer perceptions of frozen beef were in terms of several aspects, such as nutritional and health values, product quality, product handling, and price (Rahman 2020). The average score of respondent's perceptions is shown in Table 11. The aspects of nutrition and health content had score about 2.28, this value was categorized as poor perception based on the scale of perception levels in Table 1. This result might related to consumer's education and the easiness to access the information in urban areas about frozen food issues. This result in line with the study of Tzimitra-Kalogiani (1996) about the Greece perception toward some different meats, that most of people believe frozen meat was as nourising as fresh meat frozen meat due to nutritional content issue. According to Saraswati and Karang (2016) protein denaturation can occur during the freezing process as a result of increased ionic strength in intracellular tissue followed by water migration to extracellular tissue. Fatty levels drop during frozen processing and storage due to loss of triglyceride fraction caused by fat oxidation. However, according Ernawati's research on the quality of macronutrients in frozen meat and fresh meat, showed that nutrient content did not differ between frozen fresh beef (Ernawati et al. 2018).

According to Permana (2013), product quality becomes one of the factor to consider in making purchasing decisions by consumer. The average score of consumer perception from the whole aspects of product qualities was 2.29 which categorized as poor perception (Table 11). The respondents assumed that freezing treatment on meat causes pale meat color. The pale color of frozen meat indicates a decline in quality of meat. The chemical color of fresh meat is bright red oxymyoglobin (Dewi 2012; Gunawan 2013). The consumer perception in this study was in contrast to research conducted by Gunawan (2013) which showed that frozen meat will retain its quality, which can be seen in the meat color that still have a bright red color during storage.

The decreasing of meat fat can affects the taste of meat. Respondents who have poor perceptions toward



**Table 11.** Average score of respondent perception toward frozen beef meat

No	Aspects	Sub aspects	Variable	Average Score
1	Nutrition and health aspects	Nutrition content	Frozen beef has good nutritional content	2.30
		Health	Frozen beef is good to be consumed	2.26
2	Product quality	Physical quality	Frozen beef has good quality	2.24
			Frozen beef has soft texture	2.20
			Frozen beef has good taste	2.30
			Frozen beef has typical fragrance of meat	2.23
			Frozen beef has attractive colour	2.13
		Cleanliness	Frozen beef is a clean and hygiene meat	2.61
3	Average aspect score			2.29
	Product handling		Frozen beef is not easy to rot	2.60
			Frozen beef could be stored for a long period	2.39
	Average aspect score			2.50
	Price		Frozen beef has economies price	2.40
	Average aspect score			2.40
	Average final score			2.37

frozen beef because they thought frozen beef not only cause change in color but also cause bad taste, bad odour and bad texture. This poor perception might be caused by bad experiences. According Haq et al. (2015), factors that can affect meat quality after slaughtered were not only influenced by storage methods but also other factors such as carcass pH, cooking methods and meat aging. However, the responden still believed that frozen beef meat was a clean and hygiene meat because freezing can restrain the rate of microbial growth during storage. Thus the responden still had good perception (score 2.61) for the cleanliness.

Consumer perceptions of frozen beef were also reviewed from the aspect of product handling. This perception was measured by the statement that “frozen beef is not easy to rot and can be stored for a long time”. Respondents had an average perception score of 2.51 which was classified as a range of poor perception scores (Table 11). This misperception occurred because of a lack of information on consumers that the freezing process is one of the preservation technologies that can extend the shelf life of beef (Rahman 2020).

Price is one of the important attributes of a product (Sumarwan 2015). The factors that influence beef demand in Indonesian are economic factor and price (Puradireja et al. 2021). Measuring perceptions of

prices used the statement that “frozen beef has a more affordable price”. The average perception score in the price aspect, which was 2.40 which indicated that respondents had poor perception of frozen beef prices. Based on the average aspects of the four aspects above, the final average score of perception was 2.37 which indicated that the general perception of household consumers on frozen beef meat for whole aspects in Bogor and DKI Jakarta was poor (Table 11). This result was contrary to other research about the perception of business consumers towards frozen beef which had a good perception of frozen meat. Business consumers such as restaurants, hotels and modern markets consider frozen meat to be more hygienic, less perishable, longer shelf-life, easier to store and handle, and had a more affordable price. The shorter distribution chain causes the price of frozen beef to be cheaper than fresh beef (Apriantini et al. 2021).

## CONCLUSION

The consumer’s perceptions toward frozen beef according to several aspects was low indicated that consumers had a poor perceptions towards frozen beef. Furthermore, most of the respondents who buy beef were housewives who buy meat in traditional markets

which only provide fresh meat. The attitude that frozen meat does not look nice was mainly taken by the older people with age above 50. It was found that those respondents had a negative perception towards frozen beef meat for nutritional content and meat quality. The findings suggest that counseling and campaign about the quality, the safety and handling of frozen beef are needed for household consumers, thus the quality of beef could be maintained and increases the consumers trusts in buying frozen beef.

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