

The analysis of consumption level and preferences of fresh shallots consumers in Medan

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Abstract. Comprehension about consumer preferences gives a very important contribution to the consumer's decision making process, which eventually affects the level of consumer consumption. This study aims to analyze the level of consumer consumption, consumer preferences, as well as the combination of the most preferred attributes by the fresh shallots consumers in Medan. The number of respondents in this study is 100 households. Consumer preferences were identified using conjoint analysis. Attributes of the product that were observed are the size of the root, aroma, price, and dryness. The result of this study shows that the average level of fresh shallots consumption in Medan is 11.67 grams/capita/day, which is higher compared to the 7 grams/capita/day average of national consumption. Consumers assume that the dryness is a very high importance value in judging and deciding whether to buy the fresh shallots, followed by the attribute of aroma, price, and size of the root. Meanwhile, the combination of attributes that is most preferred are fresh shallots with bulb diameter of 2.5 cm, strong aroma, low price ranging below Rp 35000/kg and dryness level in medium category which means the products are in a rather moist/dry condition, and has a little skin waste.

1. Introduction

Fresh shallot is one of the leading vegetable commodities that has long been cultivated intensively by farmers. This vegetable commodity belongs to a group of unsubstituted herbs that serve as food seasonings as well as traditional medicinal ingredients[1]. Fresh shallot is also a nutrient-dense food which means it contains low calorie and high nutrients and is beneficial as vitamins, minerals and antioxidants [1]. The needs or consumption of shallots in North Sumatra continues to fluctuate, and the production of shallots has not been able to meet the consumption of shallots in North Sumatra. Medan as an administrative city which has a population of 2,135,156 people, with population growth rate of 0.60%, is very dependent on food consumption, including shallots[2]. This is caused the characteristics of people in Medan is very fond of spicy cuisine with the use of shallots as a natural flavoring seasoning.

The diversity of characteristics attached to fresh shallots products raises a variety of preferences from consumers as the ultimate decision-maker to buy. Differences in social status, culture, environmental influences, purchasing power, motivation and lifestyle create different consumer behavior regarding consuming fresh shallots.

This condition simultaneously creates opportunities for producers to provide a wide variety of fresh shallots products with differences in price, moisture/dryness and varying sizes according to the needs and desires of consumers and market segments targeted by traders. With the results, that the level of consumer consumption and preferences with the most preferred combination of shallots attributes, especially in Medan.

Consumer preferences in determining the choice of a particular product are reflected in consumer's attitude towards the product. According to Kotler and Armstrong[3], attitude is an evaluation, feeling, and tendency of someone who consistently likes or dislikes an object or idea.



The needs for fresh shallots are very high. Almost all cuisine use shallots as a flavoring herb. Vegetable commodities are included in the group of spice vegetables that are used to add taste and pleasure to the cuisine. It's also used as a traditional medicine[7].

2. Methodology

2.1 Method of Determining the Research Location

The research was conducted in two districts, namely Medan Deli and Medan Marelan, which were deliberately chosen because they can represent and have the largest of households in Medan. Every household in Medan would use shallots for cooking. Medan Deli District has 40054 household and Medan Marelan has 34423 household[5]. This type of descriptive research can describe and analyze consumer consumption level, consumer preferences and the combination of the most desirable fresh shallot attributes.

2.2 Method of Determining Sample

The nonprobability method was employed to determine the sample. The research population consists of 100 households, assuming all households consumed fresh shallot as a spice. Respondents were chosen by using accidental sampling amount 100 respondents, that is a sampling technique where the person encountered by chance or anyone whom the researcher considers suitable is selected as the data source

Respondents in this study are the final consumers who decided to buy fresh shallots and the majority are women who are housewives. Respondents were found in a condition of buying fresh shallots in traditional markets as well as vegetable stalls in research areas and were found by chance, that the respondents were considered suitable as the source of data. Data used in this study was primary data and secondary data.

2.3 Method of Data Analysis

The first questionnaire was used to identify the attributes and levels desired by the respondents, which will then be used to form various combinations of attributes and levels that have been obtained from the first questionnaire. The combinations created were offered back to the consumer by giving out the second questionnaire to find out the level of attributes that are most desired by consumers. The second stage questionnaire is the result of stimuli from several attribute levels that were assessed using Likert scale (1 = very unlikely the combinations of attribute of shallots, 2 = unlikely the combinations of attribute of shallots, 3 = normal, 4 = like the combinations of attribute of shallots, and 5 = very like).

The level of fresh shallot consumption is the volume of fresh shallots consumed by consumers in units per time. To determine the level of shallot consumption in the research area, descriptive analysis was used by tabulating the primary data of fresh shallots consumer consumption from 100 households in the research area. Then, it was compared with the secondary data of the average shallot consumption at the national level, the level of North Sumatra Province and Medan City so that it will be known whether the average consumption of fresh shallot per gram/capita/day falls into the category of low, medium or high consumption level.

The next analysis tool used in this research was conjoint analysis. This analysis was used to determine consumer preferences on the decision to buy fresh shallots. The results obtained from this analysis are the order of preferences formulation desired by the respondents and the level considered important. Conjoint analysis is very useful in formulating marketing strategies, as well as in determining prices, predicting sales and finding out the characteristics of the market.

2.4 Model Specification and Parameter Testing

Utility is a conceptual basis for measuring value in a conjoint analysis, which is an assessment of subjective preferences that is unique for each individual. Products with higher utility values have a higher preference and a higher chance of being selected.

Characteristics of fresh shallot consumers are reflected by gender, age, occupation, consumption level and income level. Meanwhile, consumer preferences are reflected by several attributes of fresh shallot, which are the size of the bulb, aroma, price and moisture/dryness level, of which the combination is then scored using the Likert scale.

The main output of a conjoint analysis is a series of part-worth (utility) interval scale from each level for each attribute. From the merging of these utilities, predicted preference from each level for each attribute of the product would be obtained.

$$Y = X1 + X2 + X3 + \dots + Xn + Constants$$

Where:

The independent variables are (X1, X2, X3, ...Xn) the characteristic of fresh shallots. The independent variable is in the form of non-metric data, while the dependent variable (Y) is the overall preference of the respondent to the level of each factor of a product. This dependent variable also includes consumer ratings of the importance of factors to the attributes of a product

$$Total\ utility = utility\ X1\ (attribute\ level\ 1\ to-i) + utility\ X2\ (attribute\ level\ 2\ to-i) + utility\ X3\ (attribute\ level\ 3\ to-i) + utility\ X4\ (attribute\ level\ 4\ to-i) \dots + constants \quad (1)$$

Where :

Y : total utility

X1 : utility value of the size attribute

X2 : utility value of the aroma attribute

X3 : utility value of the price attribute

X4 : utility value of the moisture/dryness attribute

Constant: the constant value in the analysis

According to Green and Krieger **Error! Reference source not found.**, conjoint analysis can be utilized for several purposes as follows:

1. Pricing
Predict the level of sale or use of the product (market share), test the concept of new products.
2. Preference segmentation
3. Designing a promotional strategy

Conjoint analysis describes the nature of consumer preferences based on consumer trade-off analysis of various product attributes. Attributes can be defined as the characteristics that differentiate products from other brands or products, or may also be the factors consumers consider in making decisions about purchasing a brand or product category attached to a product or product part

A brief description concerning the level of fresh shallot consumer consumption in Medan that has diverse preferences and the role of the composition of product attributes combination will provide a clearer picture of its contribution in designing the market strategy of fresh shallot products which are most favored by consumers.

3. Result and Discussion

3.1 Characteristics of Respondents

The characteristics of the shallot respondents (combined from two districts, namely Medan Deli and Medan Marelan) were obtained from a total of 100 respondents. From the data, it was found that by gender, 78 respondents are female and 22 are male. They are who make decision in buying the shallots.

Respondents aged between 31-40 years amounted to 46%. In aggregate, most fresh shallot respondents, that is 67%, have more than 3 family members, and as many as 40% of the respondents are working in private institutions. Most of the respondents is earn around Rp.2 million-Rp.5 million/month, whereas respondents with an average consumption level of 50 grams per day comprise 63% of the total respondents, with the assumption that it is for the consumption of one household, family size considered with amount of family members.

3.2 Attribute Combination and Attribute Level Orthogonal Design

To avoid overburdening consumers when choosing a combination of attributes, only a few shallot attributes were selected based on the result of the first stage questionnaire. Only the attributes that were considered essential and easy for respondents to look at and make choices on were chosen. Therefore, by using SPSS orthogonal procedure, a combination of attributes was obtained using the Orthogonal Design.

Table 1. Attribute Combination and Attribute Level

Attribute Combination and Attribute Level				
No.	Size	Aroma	Price (Rp/Kg)	Moisture/Dryness
1	Large	Weak Scent	> 40000	Bad
2	Large	Strong Scent	≤ 35000	Medium
3	Medium	No Scent	> 40000	Medium
4	Medium	Strong Scent	35000-40000	Bad
5	Medium	Weak Scent	≤ 35000	Good
6	Small	Strong Scent	> 40000	Good
7	Small	No Scent	≤35000	Bad
8	Large	No Scent	35000-40000	Good
9	Small	Weak Scent	35000-40000	Medium

Based on the formation of stimuli, the combination of attributes obtained amounted to 81 (eighty-one) combinations. With orthogonal design, the number of combinations of attributes can be simplified into 9 (nine) combinations (see Table 1), to facilitate the consumers to describe their preferences of fresh shallot.

For utility estimates, the greatest positive value from the consumer preferences indicates the most preferred attribute level by the consumer, whereas the smallest negative value indicates the least favorable attribute level by the consumer. Meanwhile, the total value of utility with the largest positive value shows the most preferred combination of attributes.

Table 2. Attribute and Attribute Level of Shallot

No.	Attribute	Level of Attribute	Description
1	Size	1	Small
		2	Medium
		3	Large
2	Aroma	1	No Scent
		2	Weak Scent
		3	Strong Scent
3	Price (Rp/Kg)	1	>Rp.40000/kg
		2	Rp.35000/kg-Rp.40000/kg
		3	≤Rp.35000/kg
4	Moisture/Dryness	1	Bad
		2	Medium
		3	Good

Based on Table 2, there are $3 \times 3 \times 3 \times 3 = 81$ combinations of attributes. It tends to be less practical and consumers would find it difficult to rank the 81 attribute combinations and levels. To overcome this, the fractional factorial design was used instead of the full-factor design. By using this design, a part of the entire combinations of the product that really affects the main effect and design, known as the orthogonal array, was selected. The formation of attribute combinations that satisfy the orthogonal properties is a crucial initial step.

From Table 3, it is found that in general, the most preferred attribute is the attribute of moisture and dryness with good attribute level (0.507) and the least favored attribute is also the attribute of moisture/dryness that has a bad attribute level (-0.877). For the characteristic of aroma, it is found that consumers prefer fresh shallots with a strong scent/aroma (0.460), while the least popular one is a weak scented fresh shallot (-0.637).

Table 3.Utility Value of each Attribute Level (consumers in general)

	Level of Attribute	Utility Value
Attribute 1 (Size)	Small	-0.397
	Medium	-0.020
	Big	0.417
Attribute 2 (Aroma)	No Scent	-0.637
	Weak Scent	0.177
	Strong Scent	0.460
Attribute 3 (Price (Rp/kg))	> 40000	-0.577
	35000-40000	0.303
	≤ 35000	0.273
Attribute 4(Moisture/Dryness)	Bad	-0.877
	Medium	0.370
	Good	0.507
(Constant)		3.053
Pearson's R = 0.985		Significance = 0.000
Kendall's tau =0.915		Significance = 0.000

Where in general most of the consumers like fresh shallots with price ranging from Rp.35000/kg to Rp.40000/kg, and below Rp.35000/kg, and they do not like shallots with price attribute level above Rp.40000/kg. Furthermore, for the shallot bulb size, consumers, in general, are very fond of large bulb size (0.417) and dislike shallots with a small size. It can be seen from its utility value of -0.397.

Table 4.The most preferred combination of Respondents (Maximum Utility Rule)

Number of preferred combination of respondent	Size	Aroma	Price (Rp/Kg)	Moisture/Dryness	Total	Constant	Utilities
2	0.147	0.460	0.273	0.370	1.520	3.053	4.573
5	-0.020	0.177	0.273	0.507	0.937	3.053	3.990
8	0.417	-0.637	0.303	0.507	0.590	3.053	3.643
9	-0.397	0.177	0.303	0.370	0.453	3.053	3.506
7	-0.397	-0.637	0.273	0.877	0.116	3.053	3.169
6	-0.397	0.460	-0.577	0.507	-0.007	3.053	3.046
4	-0.020	0.460	0.303	-0.877	-0.134	3.053	2.919
1	0.417	0.177	-0.577	-0.877	-0.860	3.053	2.193
3	-0.020	-0.637	-0.577	0.370	-0.864	3.053	2.189

The reality found in the research area is that at the level of fresh shallots consumers, the respondents' choices are still dominant with the attribute of low price. Therefore, low price attribute is still used as the benchmark that is considered essential for prospective consumers to decide whether to buy and consume the fresh shallots. From the total value of utility for combination number two, that is 1.52, the average number of consumers who like this combination composition is found to be 28% (28 respondents).

The results of this research will be the right basis for producers/traders to arrange a strategy in marketing fresh shallot. It can also be used by the government as an input in designing market strategy, making shallot export policy, arranging planting season, and arranging patterns distribution of local shallot, as well as stimulating local farmers, especially in North Sumatra to increase the production and quality of fresh shallots, which has a strong aroma, good level of moisture/dryness, competitive price and not inferior to the quality of other local shallots, such as Bima varieties from Brebes, Central Java.

3.3 Average Shallot Consumption per gram/capita/day

The level of shallot consumption in the study area is determined by the amount of shallot consumption at the time of the research conducted in 2016. The amount of shallot consumption can be known from the questions in the questionnaire. Then, the results obtained are compared with three indicators, namely:

Level of Consumption:	kg/cap/ year	kg/cap/ month	gram/ cap/day
National:	2.51	0.21	7
Province of North Sumatera:	2.59	0.21	7
Medan City:	3	0.25	8.33

From the result of the research on 100 respondents, the average of household consumption was 46.7 grams/RT/day, divided by the average number of household members, the average of fresh shallots consumption is 11.67 grams/cap/day. When compared with these three indicators, the level of fresh shallot consumer consumption per gram/ capita/day in the research area is still relatively higher than the consumption level of the three indicators.

In relation to the reality faced by consumers today, many varieties of shallots are offered. However, the results of this study indicate that the emphasis on loyalty to fresh local shallot consumption is still high. This is seen from the conclusion. From the results of research generally local or domestic shallot has the characteristics of the level of attributes with medium size, sharp aroma of the price \leq Rp.35000/kg, humidity / moderate drought. and this study was conducted when the price of fresh onion is very high ranging from Rp.40000/kg- Rp.35000/kg.

4. Conclusion and Recommendation

Average fresh shallot consumption is 11.67 grams/cap/day. It indicates that fresh shallot consumption in the research area is still relatively higher when compared with the national average consumption level (7 grams/cap/day), consumption level of North Sumatera Province (7 grams/cap/day), and consumption level of Medan City (8.33 grams/cap/day).

Combination model preferred by fresh shallot consumers in general is the combination number two, that is fresh shallot with combination composition of large shallot bulb size, strong scent, price ranging below Rp. \leq 35000/kg and has medium moisture/dryness level, which means it is moist/slightly dry and has a little skin waste.

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