

## Journal of Engineering Science and Technology Management

| ISSN (Online) 2828 -7886 |



Article

# Analysis of Consumers' Willingness to Pay for Ginger Sugar Herbal Drinks and Its Determining Factors

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DOI: 10.31004/jestm.v5i2.375

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### ARTICLE INFORMATION

Volume 5 Issue 2

Received: 12 January 2025

Accepted: 15 June 2025

Publish Online: 20 September 2025

Online: at <https://JESTM.org/>

### A B S T R A C T

Increasing competition in the herbal beverage industry has prompted MSMEs producing ginger sugar herbal beverages to improve product quality. The implementation of this measure is expected to increase production costs and selling prices, necessitating an analysis of consumer willingness to pay. This study aims to determine the price limit that consumers are willing to pay and the factors that influence Willingness to Pay. This study involved 100 respondents selected based on purposive sampling. The analysis methods used in this study include descriptive analysis, Contingent Valuation Method (CVM), and Logistic Regression. The results show that consumers are predominantly women, aged 17–35 years, employed as students, with a monthly income in the range of IDR 2,000,001 – IDR 4,000,000, a bachelor's degree or equivalent, a consumption pattern of 1–2 times per week, and a reason for consumption that is a healthy lifestyle. The maximum average Willingness to Pay value is IDR 19,305.56, which is 37.9% higher than the current price of IDR 14,000 per package. The analysis shows that consumer characteristics simultaneously have a significant effect on Willingness to Pay, with the dominant factors including gender, consumption pattern, and reason for consumption.

### Keywords

Willingness to Pay

Consumers

Ginger Sugar Herbal Drinks

Logistic Regression

## 1. Introduction

Public awareness of the importance of maintaining good health continues to increase as more information becomes available about the benefits of a healthy lifestyle. Over the past few years, lifestyle changes that focus more on health, as well as increased attention to the benefits of nutrition and fitness, have brought about significant changes in consumer behavior (Nazzaro et al., 2024; Ali & Ali, 2020). They are now more selective in choosing foods and tend to look for products with natural ingredients that are believed to support optimal health. This has led to an increase in the consumption of herbal-based natural products, which are considered safer and more beneficial to health.

Spice-based products are increasingly in demand by consumers due to their bioactive compounds that are beneficial to health. Ginger (*Zingiber officinale*), which is popular in traditional and modern medicine, contains compounds such as gingerol, shogaol, and zingerone, which are antioxidants and anti-inflammatories, and boost the immune system (Baptista et al., 2022). To enhance its flavor and benefits, ginger is often combined with brown sugar as a natural sweetener that contains various nutrients, such as iron and calcium. Brown sugar not only provides a distinctive sweetness, but also complements ginger drinks with health-supporting nutrients that purify the blood, aid digestion, and improve lung health (Pathirana et al., 2022). The combination of ginger and brown sugar produces a refreshing drink that provides a soothing warming effect, making it ideal as a health drink that supports the body's immune system.

One of the prominent products on the market is ginger sugar herbal drink, which is made from a mixture of brown sugar and ginger. This drink is widely known for its health benefits and distinctive taste that consumers desire (Pramuja et al., 2023; Syamsul et al., 2023). In the face of increasingly fierce competition in the herbal beverage industry, MSMEs as producers of ginger brown sugar herbal drinks need to improve product quality. Research on improving ginger sugar herbal drinks has been conducted with a primary focus on standardizing product quality and improving

the production process, with the aim of increasing consumer acceptance (Niha et al., 2024).

Efforts to improve quality are expected to increase production costs, which may affect the selling price of products on the market. With a more balanced composition and a more efficient production process, producers hope to create products that are not only tastier but also more attractive to consumers. Therefore, knowing and understanding consumer views on potential price increases is very important in the marketing strategy to be implemented. Willingness to Pay (WTP) analysis is highly relevant in this context.

WTP is the maximum amount that consumers are willing to pay to obtain a product or service (Andrianto et al., 2021). WTP reflects how consumers value a product, taking into account various influencing factors such as economics, lifestyle, consumption habits, product quality and benefits, and personal preferences (Vajdi & Farhangi, 2020). Therefore, WTP can serve as an important indicator in evaluating the extent to which consumers feel comfortable with the price set and assess whether the price is commensurate with the expected quality and benefits.

Based on this, this study focuses on analyzing Willingness to Pay (WTP) for ginger sugar herbal drinks. This analysis aims to provide information and understanding about the price limits that consumers are willing to accept and the factors that influence their willingness to pay. By understanding consumer WTP in greater depth, this study can serve as a basis for producers in formulating more competitive pricing strategies that reflect the value perceived by consumers, thereby helping to set optimal and sustainable prices in the long term.

## 2. Literature Review

### 2.1 Contingent Valuation Method (CVM)

The Contingent Valuation Method (CVM) is a method for estimating customer WTP by assessing natural resources and the environment through questions about willingness to pay based on benefits received in monetary terms. This method can estimate environmental benefits comprehensively, completely, and practically when compared to other environmental valuation methods. Determining WTP using CVM consists of five stages, namely

creating a hypothetical market, determining auction/bid values, calculating the estimated average WTP value, estimating the bid curve, and aggregating the total WTP data (Hanley & Barbier, 2009).

In the first stage, the hypothetical market needs to be clearly described so that it can provide an overview to respondents in the research instrument. In creating a hypothetical market, the problem and price must be described in detail so that respondents can understand and provide an accurate WTP value.

Then, the auction/bid value is displayed on the instrument to obtain the maximum WTP value. The auction value is obtained through structured questions. This study uses a bidding game auction value, which allows researchers to set a range of auction values from the smallest to the largest to identify the maximum amount that customers are willing to pay.

Then, the average value estimate is calculated using a measure of data centralization, namely the mean or median of the auction results. In this process, it is necessary to consider the possibility of outliers, which are values that deviate significantly from the average. The average WTP value is obtained through calculation using the following equation:

$$EWTP = \frac{\sum_{i=1}^n Wi(Pfi)}{n}$$

Where:

$EWTP$  = Average maximum WTP value (rupiah)  
 $Wi$  = WTP value to - i (rupiah)  
 $Pfi$  = Relative value of respondent to - i  
 $i$  = Respondent to - i who is willing to pay for goods or services  
 $n$  = Number of respondents (people)

Furthermore, the auction curve is formed based on the cumulative number of respondents who choose an auction value. This curve illustrates the relationship between WTP and the number of respondents willing to pay at a certain value level. The curve estimation is done by aggregating the WTP value and several independent variables through the following equation:

$$WTP = f(X_1, \dots, X_n)$$

Where:

$f$  = Population/Respondents (People)

The final step in CVM is to aggregate the total WTP, which is to convert the average WTP value into a population scale. The total WTP is calculated using the following equation:

$$TWTP = EWTPi \times P$$

Where:

$TWTP$  = Total WTP (Rp)  
 $EWTPi$  = Average WTP value of respondent i (Rp/kg)  
 $P$  = Population (people)

## 2.2 Logistic regression

Logistic regression is used to describe the relationship between independent variables, which can be metric or non-metric data, and dependent variables that are categorical in scale, i.e., zero for failure and one for success (Roflin et al., 2023). Logistic regression does not assume a linear relationship and therefore does not require classical assumptions such as linear regression. In logistic regression, the outcome variable is binary or dichotomous. Another difference between logistic regression and linear regression is reflected in the choice of parametric models and assumptions. The logistic regression analysis method is used to identify factors that influence consumers' WTP for ginger sugar herbal drinks. In this study, logistic analysis will be performed using SPSS 25 software. The model used in this study is as follows:

$$\ln \left[ \frac{p}{1-p} \right] = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$$

Where:

$p$  = Consumer willingness to pay for ginger sugar herbal drinks (yes/no)  
 $X_1$  = Gender  
 $X_2$  = Age (years)  
 $X_3$  = Occupation  
 $X_4$  = Income (rupiah/month)  
 $X_5$  = Last Education  
 $X_6$  = Consumption Pattern (times/week)  
 $X_7$  = Reason for Consumption

## 3. Research Methodology

This study was conducted on the product "Alami" Ginger Sugar as one of the MSME products in Purworejo. Data collection was carried out from July 2025 to August 2025.

### 3.1 Data Collection

The research data sources used primary and secondary data. Primary data was obtained directly through interviews with the help of a questionnaire that had been prepared in advance. The primary data used was obtained through questionnaires given to respondents and supported by interview results and documents from the MSME. Meanwhile, secondary data was obtained from publications by other parties, such as the Central Statistics Agency, the internet, books, and journals that supported and were relevant to the research conducted.

### 3.2 Sampling Technique

The first step in Willingness to Pay analysis is data collection through questionnaires submitted to consumers as respondents. Sampling in this study was conducted using purposive sampling techniques. This sampling technique was carried out by selecting samples randomly (non-probability sampling) and must meet the specified criteria in order to answer the research questions. The criteria for respondents in this study were respondents aged at least 17 years who had consumed ginger sugar herbal drinks for the past three months.

The sample size for this study was determined using the Lemeshow formula, which is a formula used to calculate the sample size when the population size is not known with certainty. The formula is presented as follows:

$$n = \frac{z^2 p (1 - p)}{d^2}$$

Where:

$n$  = number of samples  
 $z$  = z score at 95% confidence = 1.96  
 $p$  = maximum estimate = 50% = 0.5  
 $d$  = sampling error = 10% ( $\alpha$  = 0.10)

Based on the calculation, the required sample size is 96 respondents, while this study involved 100 respondents. This number is also in line with Roscoe's statement in Sugiyono (2021), which states that a suitable sample size for research ranges from 30 to 500 respondents. Therefore, 100 respondents are within the criteria for a suitable number of respondents.

## 4. Results and Discussion

### 4.1 Consumer characteristics

The characteristics of respondents used in this study consisted of gender, age, occupation, income level, highest level of education,

consumption patterns, and reasons for consumption. The sample size was 100 respondents with criteria of being at least 17 years old and having consumed ginger sugar herbal drinks for the past three months. Demographically, there were more female respondents than male respondents, with a percentage of 53% for women and 47% for men. This indicates that women pay more attention to the products they consume, so they tend to take on a greater role in purchasing decisions (Anam et al., 2024).

In terms of age, 35% of respondents were between 17 and 25 years old, followed by 25% who were between 26 and 35 years old. The results were dominated by respondents aged 17 to 35 years, who are in the late adolescence and early adulthood categories, as well as belonging to the millennial and Generation Z groups. These dominant respondents are considered capable of making their own decisions, including purchasing products, and have a digital lifestyle, are highly adaptive to trends, and are always challenged to try new things, including trying ginger sugar herbal drinks (Anam et al., 2024).

In terms of occupation, the respondents in this study were predominantly students, accounting for 23% of the total respondents, followed by private sector employees and state-owned enterprise employees, each accounting for 17%, civil servants accounting for 16%, housewives accounting for 14%, and entrepreneurs accounting for 13%. These percentages are actually quite evenly distributed across all types of occupations, which illustrates that ginger sugar herbal drinks are familiar among people from various occupational backgrounds. Furthermore, the income level was dominated by the category ranging from IDR 2,000,001 to IDR 4,000,000 per month with a percentage of 28%, which is closely related to occupational characteristics.

The survey results for the highest level of education were dominated by respondents with a bachelor's degree/equivalent (S1/D4) as their highest level of education, accounting for 56% of the total respondents, followed by respondents with a high school diploma/equivalent as their highest level of education, accounting for 20%, and 15% of respondents with a postgraduate degree (S2/S3) as their highest level of education. Meanwhile, there were no respondents with an elementary school/equivalent or junior high

school/Equivalent education background. This data indicates that the benefits of ginger sugar herbal drinks are better known among certain educational groups who are assumed to have a higher level of health awareness (Nanda, 2021).

Respondents' behavior towards ginger sugar herbal drinks is demonstrated by their consumption patterns and reasons for consuming ginger sugar herbal drinks. Most respondents consume ginger sugar herbal drinks 1-2 times per week (43% of total respondents), followed by those who consume it 3-4 times per week (33%). This indicates that the majority of respondents are accustomed to and familiar with consuming ginger sugar herbal drinks.

Furthermore, the most common reason for consuming ginger sugar herbal drinks is as a daily drink to support a healthy lifestyle, with a percentage of 33%, followed by the health benefits obtained from ginger sugar herbal drinks, with 31% of the total respondents. These results are related to consumers' understanding of the positive effects of consuming ginger sugar herbal drinks on the body, which influences consumers' assessment of innovative ginger sugar herbal drinks (M. Sa'roni, 2023).

#### 4.2 Willingness to Pay

In this study, 90 out of 100 respondents were willing to pay more than the current price for ginger sugar herbal drinks, while the remaining 10 were unwilling. The majority of respondents, namely 90%, showed a willingness to pay more. This indicates a positive perception of the value and benefits offered by ginger sugar herbal drinks. These consumers value the health aspects, natural flavors, and ingredients used in the product.

Conversely, 10% of respondents stated that they were not willing to pay more. The main reasons cited were high prices, with some respondents feeling that herbal products in general tend to be more expensive than other beverage products, as well as their lack of interest in herbal products. A small number of respondents did not like the taste of herbal products, so they were not interested in spending more money. This data indicates a large market potential for ginger sugar herbal drinks with the right pricing strategy.

The maximum average WTP value was obtained by multiplying the initial product price or WTP value by the relative frequency of respondents, where the WTP value used was the

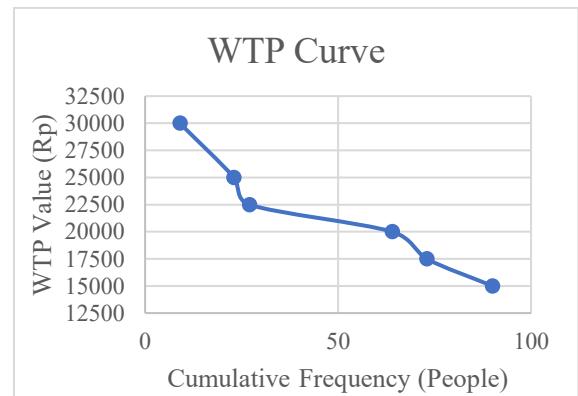
median. The maximum average WTP calculation results are presented in Table 1.

**Table 1.** Maximum average WTP

Wi	n	Pfi	EWTP
Rp 15.000,00	17	0,19	Rp 2.833,33
Rp 17.500,00	9	0,10	Rp 1.750,00
Rp 20.000,00	37	0,41	Rp 8.222,22
Rp 22.500,00	4	0,04	Rp 1.000,00
Rp 25.000,00	14	0,10	Rp 2.500,00
Rp 30.000,00	9	0,10	Rp 3.000,00
<b>Total</b>	<b>90</b>	<b>1</b>	<b>Rp 19.305,56</b>

Source: Primary Data Analysis, 2025

The initial price of ginger sugar herbal drinks is IDR 14,000 per package containing 10 pieces, with each piece weighing approximately 40 grams. From the price range of IDR 15,000 to IDR 30,000 offered, respondents had different WTP values. Table 1 shows that most respondents are willing to pay IDR 20,000 for ginger sugar herbal drinks. The maximum average WTP value obtained is IDR 19,305.56, an increase of IDR 5,305.56 or 37.9% from the initial price. This shows that consumers consider the current price of ginger sugar herbal drinks to be quite affordable and are willing to spend more to get a better quality product.



**Figure 1.** WTP curve for ginger sugar herbal drinks

The respondents WTP curve was obtained based on the cumulative number of respondents who chose a WTP value. This curve illustrates the relationship between the WTP level that respondents are willing to pay and the number of respondents who are willing to pay at that WTP level. Figure 1 presents the WTP curve for ginger sugar herbal drinks. The negative slope indicates that the higher the product price, the fewer respondents are willing to pay at that

price. This is because the number of respondents is the cumulative sum of the previous price increases.

The movement of the curve varies from one point to the next, with some parts of the curve steeper than others. This curve shape adjusts to the number of respondents who choose the WTP value. The greater the difference in the number of respondents between WTP points, the flatter the curve will be. Conversely, the curve becomes steeper if the difference in the number of respondents from one WTP point is smaller at the next WTP point.

The total aggregation of WTP for ginger sugar herbal drinks is the total value that all research respondents are willing to pay. WTP aggregation is determined by multiplying the average WTP of the product by the number of respondents at each WTP value. Producers need to know the WTP aggregation value in order to obtain information about the maximum potential sales amount that consumers are willing to pay. The WTP aggregation calculation shows a figure of IDR 1,930,555.56. This information provides useful insights for pricing and product development strategies, as well as helping to understand consumer purchasing power for ginger sugar herbal drinks.

#### 4.3 Factors Affecting Willingness to Pay for Ginger Sugar Herbal Drink Products

The factors that influence consumers' willingness to pay for ginger sugar herbal drinks were analyzed using binary logistic regression. In this analysis, WTP is the dependent variable, while the independent variables include gender, age, occupation, income level, highest level of education, consumption patterns, and reasons for consuming ginger sugar herbal drinks. The results of the logistic regression analysis using SPSS 25 can be seen in Table 2.

**Table 2.** Logistic regression calculation results

<b>Omnibus Tests of Model Coefficients (Model)</b>		
Chi-square	df	Sig.
<hr/>		
44.069	7	.000
<b>Model Summary</b>		
-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
25.234 <sup>a</sup>	.356	.713
<b>Hosmer and Lemeshow Test</b>		
Chi-square	df	Sig.
5.616	8	.690

#### Classification Table

Overall Percentage	95.0
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Source: Primary Data Analysis, 2025

The G test or simultaneous test in the Omnibus Test of Model Coefficients table obtained a significance value of  $0.000 < 0.05$ , indicating that the independent variables as a whole have a significant effect on the dependent variable, namely WTP. The results of the analysis in the Model Summary show that the independent variables are able to explain the dependent variable with a Nagelkerke R Square value of 0.713, which means that 71.3% of the variability in WTP can be explained by the independent variables, while 28.7% is explained by other factors outside this study.

The Hosmer and Lemeshow Test is used to evaluate the accuracy of the model created. The significance value of the Hosmer and Lemeshow Test is  $0.690 > 0.05$ , which indicates that the logistic regression model can explain the data well without significant differences between the model and the observation values. This indicates that the logistic regression equation can be used to explain the relationship between the independent and dependent variables.

Based on the Classification Table output results, the accuracy of the logistic regression model used is 95.0%, so this model is considered valid. Then, an analysis of the factors that partially influence consumers' willingness to pay for ginger sugar herbal drinks was conducted. The Wald test was conducted on all independent variables listed in Table 3. The partial test results show that there are three independent variables, namely gender, consumption patterns, and reasons for consumption, which have a significant effect on WTP at a 95% confidence level. Meanwhile, independent variables such as age, occupation, income level, and highest level of education do not have a significant effect on WTP.

**Table 3.** Wald test results

Variable	Coefficient (B)	Wald	P-value (Sig.)	Odds Ratio (Exp(B))	Conclusion
Gender	3,150	4,939	0,026	23,336	Significant
Age	0,327	0,096	0,757	1,387	Not Significant

<b>Occupation</b>	0,26 6	0,19 5	0,65 9	0,767	Not Significant
<b>Highest Level of Education</b>	0,25 8	0,08 7	0,76 7	0,773	Not Significant
<b>Highest Level of Education</b>	0,64 8	1,02 8	0,31 1	1,912	Not Significant
<b>Consumption Patterns</b>	3,02 5	6,76 4	0,00 9	20,59 4	Significant
<b>Reasons for Consumption</b>	1,00 9	4,91 7	0,02 7	2,742	Significant

Source: Primary Data Analysis, 2025

The gender variable has a significance value of 0.026, which is less than 0.05. This indicates that the gender variable has a significant effect on the WTP of the product. Respondents of ginger sugar herbal drinks, who are predominantly women, tend to pay more attention to the ingredients and composition of the products they consume, especially if the product offers long-term benefits for health and beauty (Bella & Artanti, 2021). Women also tend to perceive that products with higher prices are premium products with good quality.

The test results for the age variable show a significance value of 0.757, which is greater than 0.05. This means that age does not have a significant effect on the WTP of ginger sugar herbal drinks. This study shows that age is not an important factor in determining WTP because respondents from various age groups understand the health benefits of ginger sugar herbal drinks. This confirms the research conducted by Fajria et al. (2020), where the age variable did not have a significant effect on the WTP of a product.

The significance value for the occupation variable is 0.659, which is greater than 0.05. This means that occupation does not have a significant effect on WTP for the product. Most of the respondents in this study were students who did not have a steady income (Anam et al., 2024). However, respondents with various types of jobs have become consumers of ginger sugar herbal drinks. This shows that the market for ginger sugar herbal drinks is very broad and not limited to certain types of jobs.

Based on the analysis for the income level variable, a significance value of 0.767 was obtained, which is greater than 0.05. This means that at a 95% confidence level, income level does not significantly affect consumers' willingness to pay more for ginger sugar herbal drinks. These results do not show a significant positive relationship between income level and willingness to pay, as in the study conducted by Ulfa et al. (2023), where the income variable did not significantly affect the WTP of a product. This is because the product price is very affordable, making it accessible to consumers from various social classes. Even low-income consumers can easily enjoy this product and feel its benefits.

Meanwhile, the significance value for the education variable is 0.311, which is greater than 0.05. This indicates that education does not have a significant effect on the WTP of ginger sugar herbal drinks. The same results were also obtained by Jamal et al. (2020), where the education variable did not have a significant effect on the WTP of a product. However, the majority of respondents had a bachelor's degree, indicating that a high level of education correlates with a fairly high WTP. This study shows that respondents with higher education obtained more information about the benefits of ginger sugar herbal drinks, which is in line with the increasing health awareness and environmental concerns among highly educated people.

Meanwhile, the significance value of the consumption pattern variable is 0.009, which is less than 0.05. This indicates that the frequency of consumption of ginger sugar herbal drinks has a significant effect on WTP. This study confirms that consumption patterns have a positive and significant effect on WTP. Consumers who regularly consume ginger sugar herbal drinks tend to maintain this habit to continue enjoying the benefits. Although it takes a long time, ginger sugar herbal drinks have almost no side effects, making them safe for continuous consumption (M. Sa'roni, 2023). Those who have experienced the benefits of this product will tend to be more loyal.

The consumption reason variable significantly affects consumers' WTP for ginger sugar herbal drinks, with a significance value of 0.027, which is less than 0.05. These results indicate that consumers' reasons for consuming ginger sugar herbal drinks, namely for a healthy

lifestyle and to reap the benefits of the product, greatly influence their WTP for ginger sugar herbal drinks. Consumers who pay attention to quality and health benefits when choosing food products tend to be willing to pay more even if there is a price increase. Consumers have expectations that the product will function well (performance expectation) and use these expectations as a quality standard. These expectations are then compared with the actual performance and quality of the product (actual performance), which actually corresponds to consumer perceptions (Sangadji & Sopiah, 2013).

## 5. Conclusion

The characteristics of consumers of ginger sugar herbal drinks are dominated by female consumers, aged 17–35 years, employed as students, with an income level in the range of IDR 2,000,001–4,000,000, a bachelor's degree or equivalent, a consumption pattern of 1–2 times/week, and a reason for consumption to meet healthy lifestyle needs. The maximum average WTP value obtained is IDR 19,305.56, an increase of IDR 5,305.56 or 37.9% from the initial price of IDR 14,000 per package. The analysis results show that simultaneously, consumer characteristics have a significant effect on WTP. Partially, the factors that have a significant effect include gender, consumption patterns, and reasons for consumption.

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