



# Uncovering Consumer Preferences and Emerging Trends in the Sweet Cherry Market: Evidence from China

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**Abstract.** We have employed a blend of qualitative and quantitative methodologies to delve into consumer preferences and their willingness to pay (WTP) for sweet cherries. Utilizing semi-structured interviews and a discrete choice experiment, we have discerned crucial cherry attributes. Subsequently, a mixed logit model has been employed to gauge consumer preferences regarding these attributes and their associated WTP. Our findings underscore that consumers of sweet cherries accord significant importance to attributes about appearance and taste. Moreover, they exhibit a willingness to pay the highest premiums for cherries characterized by elevated sweetness, a deep red hue, and a diameter surpassing that of a one-yuan coin. Conversely, their willingness to pay premiums for distinct attributes related to domestically produced cherries is comparatively lower. The outcomes of this study furnish valuable insights for sweet cherry suppliers, especially aiding domestic sweet cherry producers in aligning their strategic planning with the localization trend in the fruit market.

**Keywords:** sweet cherry, consumer preference, semi-structured interview, discrete choice experiment, willingness to pay

## 1 Introduction

Cherries, as a type of fruit, are widely cherished worldwide due to their distinctive flavors and diversity. According to the recent "China Tree Fruit Annual Report" published by the United States Department of Agriculture (USDA), it is projected that during the 2022-2023 season (from April 2022 to March 2023), China's cherry production will reach an impressive 650,000 tons. In contrast, the import volume of cherries is expected to decline by nearly 6%, down to 300,000 tons<sup>6</sup>. Furthermore, cherry consumption is estimated to increase by 3.5% in the current fiscal year, reaching an approximate total of 950,000 tons. These statistics indicate the continuous expansion of the local cherry market. However, in this highly competitive fruit market, gaining insights into consumer preferences and market trends is of paramount importance for the success of the cherry industry. This is particularly significant in a country like China, characterized by its vast population and a growing middle class, where the cherry market holds immense potential.

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The primary objective of this research is to delve deeply into the sweet cherry market, with a special focus on understanding the preferences of Chinese consumers and unveiling emerging trends. To achieve this goal, we will employ a series of research methodologies, including text analysis and discrete choice experiments. These methods will aid in comprehending Chinese consumers' preferences in the sweet cherry market, encompassing factors such as taste, price, and quality. Additionally, we will explore potential emerging trends, such as the rise of local brands, sustainable practices, and the dynamics of competition between imported and local cherries. These findings will not only provide valuable insights to stakeholders in the cherry industry but also offer consumers a wider array of cherry choices.

## 2 Literature Review

Research on cherry consumption preferences has predominantly focused on sweet cherries that are suitable for direct consumption. Cherries can be broadly categorized into two types based on taste: sweet and sour cherries. Sweet cherries are favored by consumers for their vibrant color, exceptional taste, and nutritional richness. They are suitable for direct consumption and find applications in various pastries, fruit salads, and beverages. Over the past two decades, sweet cherries have emerged as one of the fastest-growing fruit trees in China due to their early market entry, high per-unit area value, and substantial market demand, making them a pivotal tree species for fruit production in various suitable regions<sup>3</sup>. The emphasis on the attributes of sweet cherries is closely tied to consumer choices. Cherries exhibit significant diversity in genetic resources<sup>2</sup>, particularly in terms of fruit size and color<sup>1</sup>. With improved living standards and a growing preference for diverse fruit flavors among Chinese consumers, cherries have gained immense popularity, becoming one of the primary choices for consumers and representing a typical high-value fresh fruit crop<sup>4</sup>. This indicates that the market share of local cherries is continuously expanding. Local cherries usually enter the market from early May to the end of July, aligning with China's summer season. In terms of production areas, regions with favorable climate and soil conditions, such as Liaoning, Shandong, Shaanxi, and Sichuan, are conducive to the growth of local cherries. Consequently, local cherries adequately meet the summer consumption demands of the domestic market. Imported cherries (mainly from Chile and the United States), on the other hand, typically enter the market after the local cherry season, filling the gap in market demand and satisfying consumers' ongoing cherry cravings. With the annual growth in cherry demand, local cherries are also actively improving their varieties, extending their market presence, and enhancing their competitiveness in the cherry market<sup>5</sup>.

What specific attributes are of concern to Chinese consumers? Regarding intrinsic attributes, these encompass aspects such as the color, texture, firmness, and juiciness of cherries. Hong Li<sup>1</sup> noted in their research on cherry germplasm resources that cherries come in various types, including the deep purple "cherries" and brightly colored yellow varieties. Jia Hai Hui<sup>7</sup> pointed out that imported sweet cherries may lack sweetness and have a milder flavor, making Chinese cherries more appealing in

terms of texture. Cherries come in various varieties, both imported and domestic, each with unique characteristics such as color, size, and flavor. China primarily uses imported cherry varieties in its sweet cherry production<sup>8</sup>, especially from European, American, Chilean, and other international sources<sup>10</sup>. Cherries are highly nutritious, have a short supply period, and have maintained high prices for many years, earning them the nickname "golden industry". Consequently, there are stringent requirements for packaging, logistics, and delivery methods throughout the cherry supply chain<sup>12</sup>. Consumers typically prefer fresh cherries, making freshness a key attribute. This involves factors such as harvesting time, external storage conditions, and more<sup>15</sup>. The cherry marketing cycle also influences consumer purchasing decisions, as cherries from different hemispheres have out-of-season advantages<sup>13</sup>.

Concerning external attributes of cherries, price is a significant factor. Some studies focus on exploring factors affecting cherry selling prices, including varieties, origins, packaging forms, and existing issues<sup>11</sup>. The cherry's origin is also a point of consumer interest, as cherries from different regions may differ in quality and taste. Chile, Australia, and New Zealand are major sweet cherry-producing and exporting countries in the southern hemisphere, while imported sweet cherries to China primarily come from the United States and Canada<sup>8</sup>, with a significant contribution from Chile. Chilean sweet cherries can supply the northern hemisphere's year-end and the Chinese Spring Festival markets<sup>10</sup>, giving them a distinct advantage in terms of seasonal availability. For cherry producers and sellers, the origin can be used to establish a brand, emphasizing its uniqueness, and thereby increasing the product's added value<sup>17</sup>. Additionally, cherry packaging garners attention because the packaging method can influence consumer purchase intent. X Xin's<sup>15</sup> research explored the impact of different post-harvest treatments on the quality of cherries under express packaging. Xu Li<sup>16</sup> studied the effect of different packaging materials on the storage of Black Pearl cherries. As awareness of sustainability grows, consumers are increasingly concerned about cherry production methods, including organic cultivation and environmental measures<sup>24,25</sup>. This research primarily focuses on exploring the purchasing behavior of Chinese cherry consumers in the context of localization. Our research questions are: What attributes of cherry products are currently of interest to consumers, and how do the preferences and willingness to pay for each attribute vary?

In recent years, local fruit markets have been gradually gaining prominence on a global scale. Some countries and regions are actively promoting the cultivation and sale of local fruit varieties. This trend is not only improving local agricultural economies but also increasing the market share of local fruits<sup>17</sup>. We also anticipate studying whether there is a trend of localization in the fruit market and if it is evident in the cherry market. What are the current indications in the market regarding this?

### 3 Research Methods and Experimental Design

In this study, we employed the semi-structured interview and discrete choice experiment (DCE) as the primary research method to investigate the impact of cherry attributes on consumer choice behavior.

#### 3.1 Semi-structured Interview

Before conducting the choice experiment, this study conducted a pre-survey to understand consumers' experiences when purchasing cherries. Through a questionnaire distributed to Chinese consumers on a specialized platform (Credamo), this research recruited 260 participants in May 2023, during the early season of domestic cherry availability. The survey was conducted anonymously to ensure the authenticity and reliability of participants' responses, resulting in 200 valid responses (a response rate of 76.92%).

The questionnaire in this study was designed with multiple questions covering cherry purchase experiences and the degree of importance consumers placed on various cherry attributes. It consisted of two main sections: identification questions and questions related to cherry purchasing behavior. In the identification section, the study aimed to determine whether participants had purchased cherries within the past two months, thereby excluding participants who had not bought cherries for an extended period. The questions related to cherry purchasing behavior encompassed both qualitative and quantitative aspects. In the qualitative section, responses to open-ended questions were coded and analyzed using NVivo 12 software, resulting in Table 1. The questionnaire was semi-structured and open-ended, with four primary dimensions: appearance, taste, brand, and price. After categorizing and refining the raw text data, a total of 983 text segments were obtained. The semi-structured interview questionnaire is in Chinese, and the sample content in Table 1 has been processed using Google Translate, which may introduce some understanding biases but does not affect the qualitative analysis results. Building on the initial coding of the raw text data, subcategories were created within the four main dimensions, resulting in a total of 20 subcategories. In the quantitative section, additional questions were posed regarding cherry purchase frequency, price range preferences, and other factors to provide further reference information for the subsequent discrete choice experiment.

#### 3.2 Discrete Choice Experiments

The Discrete Choice Experiment is a commonly used research tool for assessing individual preferences and the relative importance of different attributes in the decision-making process. In the field of agricultural economics, it is frequently utilized to evaluate consumers' willingness to pay for various attributes of agricultural products and the extent to which these attributes influence willingness to pay.

After confirming the six cherry-related attributes and attribute levels to be used in the choice experiments through open-ended preliminary surveys, market research, and

literature review (Table 2), we conducted discrete choice experiments. These experiments were carried out by distributing questionnaires to Chinese consumers on a professional platform (Credamo). In July 2023, we recruited 1037 consumers as research participants, and the survey was conducted anonymously to ensure the authenticity and reliability of participants' responses. In the end, 1000 valid questionnaires were collected, resulting in an effective response rate of 96.43%.

In addition, this study will also consider consumers' demographic characteristics (including individual and family features), consumption habits, and other factors to explore the sources of heterogeneity in consumer preferences for cherry attributes.

The choice experiment sets were generated using orthogonal design in JMP Pro 17, resulting in 11 choice sets. An example of one of the selection sets is shown in Figure 1. These choice sets were created in Chinese because the target group is Chinese consumers. The D-efficiency of the choice sets was 94.47%. Each choice set consisted of three options: Option A, Option B, and Option C. Option C allowed respondents to reject the purchase of cherries. Each choice set was formed by randomly combining 22 product options, along with alternative options.

### 3.3 Econometric Models

In this study, we employed econometric models based on the Discrete Choice Experiment (DCE) method to analyze consumer purchasing behavior in greater depth. The modeling within the choice experiment is rooted in consumer theory and random utility theory, with its core concepts drawn from Lancaster's consumer theory. It emphasizes the contribution of product attributes to consumer utility, which can be decomposed into individual utilities to reflect this contribution. Our approach is based on choice modeling and aims to reveal the prices consumers are willing to pay for each attribute.

Based on random utility theory<sup>18,19</sup>, we assume that consumers are rational decision-makers who maximize utility by choosing options that provide the highest level of satisfaction within the available choices. Subsequently, if an alternative option offers higher utility than others, the likelihood of an individual choosing that alternative option will be greater. Within this framework, we explain the influence of attributes on purchase decisions by estimating the unknown vector of marginal utilities.

In our study, the utility that consumer *n* derives from selecting the *i*-th cherry profile unit in scenario *t* can be represented as follows:

$$U_{nit} = \beta X_{nit} + \varepsilon_{nit}$$

In the above equation, the utility that the *i*-th product can provide to the consumer is denoted as *Unit*, where  $\beta X_{nit}$  represents deterministic utility, reflecting the part of observable consumer utility that depends on the product attribute combination of the alternative options. Here,  $\beta$  is the utility score vector representing individual preferences, and the random term  $X_{nit}$  is the attribute vector for the consumer's choice of the *i*-th cherry profile in scenario *t*.  $\varepsilon_{nit}$  represents the random disturbance term, which is unobservable.

In this study, we assume that the deterministic utility,  $U_{nit}$ , follows a linear equation in terms of the product attribute combination, and it can be specifically expressed as:

$$U_{nit} = \gamma \times ASC_{nit} + \beta_0 Price_{nit} + \beta_1 Color_{nit} + \beta_2 Size_{nit} + \beta_3 Sweetness_{nit} + \beta_4 Firmness_{nit} + \beta_5 Origin_{nit}$$

To conduct heterogeneity analysis, we introduced Selective Correction Parameters (ASC), which represent the utility level generated by consumers when they choose not to select any option. In the choice experiment model, an ASC parameter was incorporated for each respondent to gauge whether they chose the "no-choice" option. We defined the ASC parameter as a binary variable, taking values of 0 or 1, indicating whether the respondent chose the "no-choice" option. Other variables included price, color, diameter, sweetness, firmness, and origin, denoted by  $\gamma$  and  $\beta_0$  through  $\beta_5$ , respectively, representing the coefficients for the corresponding attribute levels.

Through the application of random parameters mixed logit model, we were able to consider the influence of different attributes on purchase decisions and overcome the limitations associated with the standard Logit model. In this model, the parameters, including those for price and other attributes, were assumed to follow a normal distribution, while the price coefficient was assumed to follow a log-normal distribution. Respondents ultimately maximized their utility by selecting the option with the highest utility<sup>20,23</sup>. Thus, for an individual consumer ( $n$ ) selecting an alternative ( $i$ ) from a choice set ( $t$ ) and generating the highest utility<sup>21,22</sup>, the probability can be expressed as follows:

$$P_{nit} = \frac{\int_{\beta} f(\beta|\theta) d\beta}{\sum_j \exp(U_{njt})}$$

The Random Parameters Mixed Logit model includes controls for the attributes in the choice experiment (price, color, diameter, sweetness, firmness, and origin). Apart from price, which is specified as a continuous variable, all other attribute controls are specified as discrete variables. Diameter, sweetness, and firmness are two-level variables, while color is a three-level variable, and origin is a four-level variable. Each parameter is assumed to follow a normal distribution.

To calculate the Willingness-To-Pay (WTP) for each participating consumer ( $WTP_i$ ), the estimated marginal utility  $\beta_i$  for each consumer is divided by the estimated marginal utility of the monetary attribute (price), denoted as  $\beta_{price}$ . The resulting ratio is used to represent the consumer's willingness to pay:

$$WTP_i = \frac{\beta_i}{\beta_{price}}$$

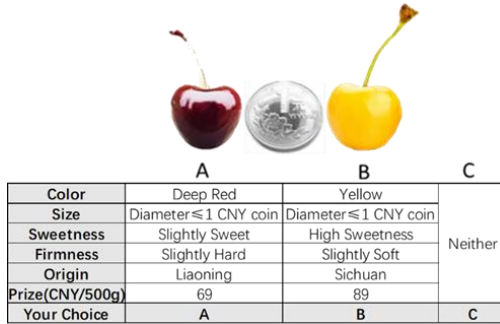


Fig. 1. One example of choice sets

Table 1. Text Data Coding Classification

Main Category	Subcategory	Example of encoded paragraph
<b>Appearance</b>	Color	Look at the color of the cherry, the dark
	Size	Generally, choose a slightly larger than a
	Shape	The shape is more round.
	Packaging	Packaging is better if there is a protective
	Glossiness	The bright colors and the bright ones are
	Integrity	Cherry should be selected for no obvious
	Branch	The color of the branch must be green
<b>Taste</b>	Sweetness	It is sweet and slightly sour.
	Moisture	More juice.
	Firmness	That hard, full, is the crispy texture I
	Flesh	The meat quality is delicate.
	Store	Fengze Garden is generally selected
<b>Brand</b>	Location	I usually buy cherries from itinerant
	Variety	Big cherry no. 8, red light big cherry,
	Origin	I generally like to buy Shandong
	Reputation	The brand was introduced by my friends,
<b>Price</b>	No	I don't usually focus on the brand.
	Range of price	Cherries are generally worth 30 yuan a
	Taste test	If they are in the cherry season, I will try
	Price	I usually choose cherries that are too low

Table 2. Cherry Attributes and Attribute Levels

Attribute	Attribute Level	Attribute Description
<b>Color</b>	Deep Red Bright Red	Cherries are categorized into dark-colored and light-colored fruits. In this study, dark-colored cherries are represented by "Deep Red," and light-colored cherries are represented by "Bright Red."
<b>Size</b>	Diameter > 1 CNY coin	The size of cherries is explained by comparing the diameter of cherries to that of a 1 CNY coin.

<b>Sweetness</b>	Diameter≤1 CNY coin	Sweetness is a key attribute describing the taste of cherries, categorized into "Slightly Sweet" and "High Sweet."
	High Sweetness	
<b>Firmness</b>	Slightly Sweet	Firmness is a key attribute describing the texture of cherries, categorized into "Slightly Hard" and "Slightly Soft."
	Slightly Hard Slightly Soft	
<b>Origin</b>	Sichuan	Main cherry-producing regions in China are used as origin attributes.
	Shandong	
	Liaoning Shaanxi	
<b>Price</b>	49 CNY/500g	Price per 500g of cherries.
	69 CNY/500g	
	89 CNY/500g	

**Table 3.** Demographic Characteristics of the Sample

<b>Feature</b>	<b>Category</b>	<b>Number of People</b>	<b>Percentage (%)</b>
<b>Gender</b>	Male	385	38.5
	Female	615	61.5
<b>Age</b>	24 and below	204	20.4
	25~34	511	51.1
	35~49	230	23.0
	50~64	50	5.0
	65 and above	5	0.5
<b>Education</b>	Junior high school and below	8	0.8
	High school / Technical school	47	4.7
	Junior college / Vocational school	84	8.4
	Bachelor's degree	711	71.1
	Master's degree and above	150	15.0
	5000 yuan and below	68	6.8
<b>Monthly Family Income</b>	5001~10000 yuan	246	24.6
	10001~15000 yuan	204	20.4
	15001~20000 yuan	201	20.1
	20001~25000 yuan	133	13.3
	25001-30000 yuan	73	7.3
	30001-35000 yuan	27	2.7
	35001-40000 yuan	22	2.2
<b>Occupation Type</b>	40000 yuan and above	26	2.6
	Teacher, doctor, scientist	74	7.4
	Business employees	630	63.0
	Students	153	15.3
	Government and public sector	79	7.9



<b>Cherry Purchase Frequency</b>	Self-employed or freelancers	58	5.8
	Retired or unemployed	6	0.6
	More than once a week	192	19.2
	Once a week to once a month	579	57.9
	Once a month or less often	229	22.9

**Table 4.** Text Data Coding Analysis

<b>First-level</b>	<b>Second-level</b>	<b>Number of points</b>	<b>Attention</b>
<b>Appearance</b>	Color	150	15.25
	Shape	20	2.04
	Packaging	47	4.78
	Glossiness	30	3.05
<b>Taste</b>	Sweetness	175	17.81
	Moisture	65	9.15
	Firmness	90	6.41
	Flesh	30	3.05
<b>Brand</b>	Taste	360	36.63
	Store	10	1.02
	Location	8	0.81
	Variety	10	1.02
	Origin	8	0.81
	Reputation	17	1.73
	No preference	47	4.78
<b>Price</b>	Brand	100	10.17
	Range of price	80	8.15
	Taste test	10	1.02
	Price correlation	21	2.4

## 4 Data Analysis

### 4.1 Data Source

The open-ended survey pre-research and the choice experiment survey for this study were both conducted through the professional platform, Credamo. In the pre-research phase, 260 questionnaires were distributed, with 200 valid responses collected, resulting in an effective response rate of 76.92%. Subsequently, the content for the choice experiment survey was prepared and 1037 questionnaires were distributed, with 1000 valid responses collected, achieving an effective response rate of 96.43%.

### 4.2 Descriptive Statistical Analysis

Descriptive statistical data for the choice experiment survey sample ( $n = 1000$ ) are presented in Table 3. The sample is comprised of 61.5% females and 38.5% males, with a significantly higher proportion of females. The age distribution of the sample is concentrated below 50 years, accounting for 93.7% of the total respondents. In terms

of educational attainment, the majority of the sample holds a bachelor's degree (71.1%), followed by postgraduate or higher degrees (15.0%), indicating a higher level of educational attainment among the participants. Regarding household income, the highest proportion of the sample reports a monthly income between 5,000-10,000 CNY, indicating a moderate income level. In terms of occupational types, the majority of the sample comprises employees in various enterprises (63.0%). All participants in this experiment have prior experience with cherry consumption, with the majority reporting consumption frequency ranging from once a week to more than once a month, accounting for 57.9% of the sample. In conclusion, given that this study distributed questionnaires through an online platform, and considering internet accessibility and lifestyle habits, the sample exhibits a trend of being younger, more highly educated, and with a focus on moderate income levels and employment in enterprise-related roles, which aligns with the positioning of cherry products.

### 4.3 Semi-Structured Interview Analysis

As shown in Table 4. The total reference points for the attributes are as follows: 412 for appearance (41.87% of the total), 360 for taste (36.63% of the total), 100 for brand preference (10.17% of the total), and 111 for price (11.31% of the total). The average number of reference points for primary keywords is calculated as 245.75. Therefore, it can be concluded that both appearance and taste, which have reference numbers above the average, are significant factors influencing cherry purchasing behavior. To further investigate the topic comprehensively, a more in-depth study of the subcategories within each parent node is necessary, focusing on the secondary keywords. The average number of reference points for secondary keywords is calculated as 49.15. Among them, color (150/15.25%), size (105/10.69%), integrity (52/5.20%), sweetness (175/17.81%), moisture (65/6.41%), and hardness (90/9.15%) all have reference numbers above the average. This guides the design of the experimental set for the next choice experiment.

### 4.4 Empirical Analysis of Choice Experiment

This study examined a total of six cherry-related attributes in the choice experiment, comprising four binary-level attributes - color, size, firmness, and sweetness; one ternary-level attribute - price; and one quaternary-level attribute - place of origin. Each participant had to assess 11 choice sets, each containing three alternatives, resulting in a total of 33,000 observations (1000 participants  $\times$  11 choice sets  $\times$  3 alternatives). Table 5 presents the parameter estimates of the mixed logit model, where the price is assumed to be a fixed parameter variable, and the other cherry attributes are treated as random parameter variables following a normal distribution.

Based on the results of the random parameter mixed logit model (Table 5), we observe a significantly negative coefficient for price, which aligns with economic theory. The reference group for all choice experiment attributes is enclosed in parentheses. Our regression results indicate the practicality of most cherry attributes in influencing consumer purchasing behavior. For the color attribute, we observe

positive and significant price coefficients for both "Deep Red" and "Bright Red," with the estimated coefficient for "Deep Red" being significantly higher than that for "Bright Red." Thus, deep red cherries are more attractive and preferred by consumers, exerting a stronger positive influence on purchase intentions. Regarding the size attribute, described by the comparison of diameter with that of a one-yuan coin, "Larger than a one-yuan coin diameter" shows a positive and significant coefficient. This implies that larger-size cherries have a greater effect in promoting consumer purchases. In terms of taste attributes, we investigated both sweetness and firmness. "High Sweetness" and "Slightly Hard" textures both exhibit positive and significant estimated coefficients, indicating that consumers prefer cherries with higher sweetness and a firmer texture. Lastly, in the case of the place of origin attribute, only cherries originating from Shaanxi exhibit a positive and significant estimated coefficient, albeit with a limited impact. This could be attributed to the superior marketing strategies of Shaanxi-origin cherries compared to those from other regions. Additionally, all place of origin attributes generate positive utility for consumers, thus stimulating purchasing behavior.

In this study, using the estimated coefficients, we calculated the Willingness-to-Pay (WTP) values for cherry attributes (Table 6). It was found that consumers are willing to pay an additional 32.395 yuan per kilogram for cherries with a deep red color and 7.825 yuan for cherries with a bright red color. Consumers are also willing to pay an extra 34.591 yuan per kilogram for cherries with a diameter greater than that of a 1-yuan coin. For cherries with a high level of sweetness, consumers are willing to pay an additional 35.693 yuan per kilogram, while for cherries with a firm texture, the premium is 12.234 yuan per kilogram. Regarding the origin attribute, consumers are willing to pay an extra 4.220 yuan per kilogram for cherries from Sichuan, 2.886 yuan for cherries from Liaoning, and 4.317 yuan for cherries from Shaanxi compared to cherries from Shandong. From the perspective of the color attribute, deep red is often considered a symbol of ripeness and sweetness in cherries, making it preferable to consumers. This premium may reflect consumers' preferences for cherries that are riper and tastier. Although not as popular as deep red, bright red still attracts some consumers. In terms of size, larger-diameter cherries may be considered more valuable for consumption, leading some consumers to be willing to pay extra for them. Regarding the texture attribute, cherries with high sweetness are generally more popular because they offer a better texture and taste. This premium reflects a preference for sweeter cherries, while the firm texture may provide cherries with more bite, which is likely preferred by most consumers. Concerning the origin attribute, although most did not show significant effects in the mixed logit model analysis, they still have a positive influence. Consumers may perceive cherries from these regions as having special quality or taste characteristics, or they may have a brand image associated with cherries from these areas. Therefore, they may be more willing to pay a premium for cherries from these regions, even if the effect is not yet significant.

In summary, the reasons for these price premiums can be attributed to individual consumer preferences and perceptions of specific attributes or origins. These premiums reflect the importance of different attributes and origins for cherry

purchasing behavior, as well as the additional costs consumers are willing to pay to satisfy their needs and preferences. This information is highly valuable for pricing strategies and market positioning.

**Table 5.** Results of the Random Parameter Mixed Logit Model

Variable	Mean		Standard Deviation	
	Estimated	Standard	Estimated	Standard
Price	-0.033***	0.002	0.030***	0.002
ASC(Specific)	3.358***	0.170	1.710***	0.160
Color (ref: Yellow)				
Deep Red	1.360***	0.088	1.007***	0.084
Bright Red	0.307***	0.063	0.229	0.170
Size (ref: ≤1 CNY)				
>1 CNY Coin	1.194***	0.070	0.917***	0.071
Sweetness (ref:				
High Sweetness	1.219***	0.081	2.128***	0.086
Firmness (ref: Slightly				
Slightly Firm	0.333***	0.069	1.498***	0.071
Origin (ref: Shandong)				
Sichuan	0.018	0.050	0.005	0.394
Liaoning	0.081	0.054	0.022	0.149
Shaanxi	0.124**	0.053	0.007	0.115

*Number of obs=33,000*

*Log likelihood=-8,496.198*

*Note: \*\*\*, \*\*, \* indicate statistical significance at the 0.01, 0.05, and 0.1 levels, respectively.*

#### 4.5 Cherry Attribute Preference Ranking

This study conducted a preference ranking analysis of the attributes of cherry products among 1,000 participants. The results are presented in Table 7, where scores were assigned based on the reverse order of preference ranking values: 7 points for the top-ranked attribute, 1 point for the seventh-ranked attribute, and so forth, with unselected attributes receiving 0 points. The most highly preferred attributes, in descending order, were sweetness, color, firmness, size, moisture content, price, and place of origin.

These findings align closely with the results of the Willingness-to-Pay (WTP) calculations. Sweetness exhibited the highest premium in terms of preference, while color, firmness, and size followed closely in the second tier. Moisture content, which is a component of texture, ranked lower in the preference ranking, likely due to less favorable feedback from the pre-survey and thus not being considered in the choice experiment. Lastly, the place of origin attribute garnered the least attention from cherry consumers, consistent with the empirical analysis results, highlighting the ongoing need for brand image and perception improvement for domestically produced cherries.

**Table 6.** Willingness-to-Pay for Cherry Attributes

Variable	Mean (CNY/500g)	95% Confidence Interval
<i>Color (ref: Yellow)</i>		
Deep Red	32.395	[25.885, 38.906]
Bright Red	7.825	[4.050, 11.601]
<i>Diameter (ref: ≤1 CNY Coin)</i>		
>1 CNY Coin	34.591	[30.431, 38.750]
<i>Sweetness (ref: Sour-Sweet)</i>		
High Sweetness	35.693	[30.190, 41.195]
<i>Firmness (ref: Slightly Soft)</i>		
Slightly Firm	12.234	[8.370, 16.097]
<i>Origin (ref: Shandong)</i>		
Sichuan	4.220	[1.441, 6.999]
Liaoning	2.886	[-0.140, 5.913]
Shaanxi	4.317	[1.262, 7.373]

**Table 7.** Cherry Attribute Preference Ranking

Option	Ran k	Mean Score	Varianc e	Ran k 1	Ran k 2	Ran k 3	Ran k 4	Ran k 5	Ran k 6	Ran k 7
Sweetne ss	1	5.872	1.3144	430	255	166	88	36	17	8
Color	2	4.743	1.8191	230	165	178	169	113	93	52
Firmness	3	4.433	1.6969	111	212	191	177	154	104	51
Size	4	4.274	1.6932	106	174	176	201	167	127	49
Moisture	5	3.388	1.4675	8	100	140	163	285	221	83
Price	6	3.186	2.0207	96	76	99	143	115	175	296

## 5 Conclusion

China holds a crucial role in the cherry market, serving as both a consumer and producer. In recent years, China's cherry industry has seen remarkable growth, becoming a significant player in the global cherry market. Our study focuses on the Chinese market, representing a typical case of emerging markets within the cherry industry. While previous research has explored willingness to pay for cherry attributes, it has not specifically focused on the Chinese market. To ensure that the results of our choice experiments are not influenced by an excessive number of attributes, we carefully selected key attributes. Our study begins with semi-structured interviews to determine the crucial attributes of the Chinese cherry market. This qualitative and quantitative research design allows us to delve into details while also quantitatively analyzing trends and relationships.

## 6 Marketing Recommendation

Based on results of this study, we propose the following recommendations:

Develop a sensible pricing strategy to attract a broader range of consumers. Producers can consider differential pricing strategies based on popular attributes such as deep red color, large size, high sweetness, and firm texture to attract a wider range of consumers. For key attributes like sweetness, color, firmness, and size, producers can position their products differently in the market to cater to diverse consumer needs. For instance, cherries, being a common high-end fruit, can adopt premium pricing strategies to target consumers who prioritize quality. Alternatively, in the mass market, regular price elasticity tests can be conducted to understand consumer reactions to different price changes. This can help optimize pricing strategies to ensure competitiveness while maintaining profitability.

Enhance the image of the cherry's place of origin by improving product quality and brand image, establishing a strong regional brand, and conveying the value and story of the origin to consumers. Despite the relatively lower level of attention given to the origin attribute among participants, building a favorable image of the cherry's place of origin remains crucial for domestically produced cherries. Producers can increase the attractiveness of the origin by improving product quality and brand image. They can establish a strong regional brand that highlights the uniqueness and characteristics of the origin. Through marketing activities, convey the value and story of the origin to consumers. Producers should also actively seek certifications such as green food labels, organic food certifications, and national geographical indication certifications to prove that the origin's products meet high-quality standards, thus increasing consumer trust.

Adjust marketing strategies to highlight key attributes of cherries, such as color, size, sweetness, and texture, using appealing visuals and language to enhance product desirability and educate consumers about the impact of different attributes on cherry quality and taste. Additionally, develop new promotional approaches to educate consumers about the impact of different attributes on cherry quality and taste, providing information on how to select cherries that best suit their preferences.

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