

## Factors Influencing Consumer Preference Towards Horticulture Geographical Indications (GIs): A Case of Udupi Brinjal from South India

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### Abstract

Consumers' attention towards fruits and vegetables in recent times has shifted to regionally grown geographical indications (GI) due to the quality and origin of these products. This research work aims to explore the factors influencing consumer preference towards Udupi Brinjal, a horticulture GI grown in Udupi District of South India. The present study has used a mixed-method approach to gather and analyze data collected from local consumers of Udupi District. The qualitative study design involved a survey of key informants in the local region. Subsequently, data collected from consumers through a structured questionnaire were analyzed using factor analysis and regression techniques. Results from data analysis revealed that quality factors show greater importance in predicting consumer preference, followed by sensory attributes and health-related aspects. The results will help formulate marketing strategies for horticulture GIs. Agri-business marketers and State-owned agriculture promotion agencies can adopt these strategies to promote GIs and gain consumer acceptance. The results and discussions of this research work are consistent with Sustainable Development Goals (Goals 2 & 12) and contribute to sustainable agriculture.

### Keywords

Consumer preference, Geographical Indications (GIs), sustainable agriculture, marketing strategies, horticulture marketing, territorial specialties, region-of-origin products.

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### Introduction

Geographical Indications (GIs) have attracted great literary attention in recent years. GIs are goods or products originating from a particular territory, region, or locality with a special characteristic, attributed to its geographical origin. GIs are recognized for the tremendous benefits they carry, the value they provide, and their ability to contribute to territorial development (Vinayan, 2017). From the consumers' perspective, GIs act as an assurance tool that protects against unfair competition arising out of counterfeiting and imposterism from other competing varieties. In India, consumers have realized the need to consume safe and healthy products. A large portion of the Indian market constitutes young consumers who are aware of sustainability and health. Considering safety and good health, consumers have attached greater importance

to products with GI tags, as they offer assurance of quality and have raised consumer expectations regarding the originality of the products (Kokthi and Kruja, 2016).

Several studies have reported that GIs provide additional revenue to the producers by influencing the consumers to pay a premium value (Cardoso et al., 2022; Biljana, 2022; Durand and Fournier, 2017; Vinayan, 2017). Additionally, studies conducted on GI products in developing countries have emphasised the need for better protection against counterfeiting (Ihsaniyati et al., 2022; Zhan et al., 2017). At the field level, many agricultural goods and services (GIs) are prone to counterfeiting and faking in India. The problem of counterfeiting and faking was referred to in another study, which revealed that consumers appreciate GI certification and brands as they provide an advantage of origin-guaranteed products (Toklu et al., 2020).

The subject of Geographical Indications is of global importance, given the growing number of traditional products grown and manufactured in the current times. India has registered 643 Geographical Indications as of February 2025 (Office of the Controller General of Patents, Designs & Trademarks, Ministry of Commerce, Government of India). The agriculture sector has been a second major contributor to the list of traditional products, with 202 products registered as GIs. Several researchers have examined the trends and consumer preferences (Kaliji et al., 2019) toward GI products. Studies have reported that GI tagging is an effective marketing tool that provides premium value to farmers and makes their products competitive in the market (Yin et al., 2024). GIs support the economic growth of rural livelihoods and contribute to regional development (Lambada-Lehnhardt et al., 2021). From the ecological perspective, studies have revealed that branded agricultural products with GIs can facilitate the reduction of agricultural carbon emissions and favourably affect consumer attitudes (Uzar et al., 2022; Zhang et al., 2024).

In India, the subject of Geographical Indications is under immense scrutiny by policymakers. The National Bank of Agriculture and Rural Development (NABARD) is an apex development bank set up by the Government of India to foster rural prosperity. NABARD has taken Udupi Brinjal as a select case to promote sustainable, equitable agriculture and support rural development. At the local level, promoting human health and providing quality products have been identified as the main pillars of responsible consumption (Sustainable Development Goals 12). Hence, increasing consumption by determining and adopting effective marketing strategies is key to the sustainability of GI products.

#### **About Udupi Brinjal – A snapshot**

Udupi Brinjal is a Geographical Indication (GI) eggplant grown in the Udupi District of South India. It is grown by 200 farm families in Mattu village with GPS coordinates of 13°15'33"N 74°44'16"E. The Geographical Indication tag was awarded to the farmers of Mattu village as a community right in 2011. The field-level operations of Udupi Brinjal are consistent with the business model owned and operated by the members of the local community, popularly known as the Community-Based Enterprises (CBE) model. The Udupi Brinjal Growers Association demonstrates the characteristics of a business

enterprise that is set up to meet the common good of the local people. Additionally, Udupi Brinjal operates on local knowledge and relies on local culture, local resources, and local capacity, similar to the features of a Community-based Enterprise (Peredo and Chrisman, 2006). Therefore, Udupi Brinjal is consistent with the Community-based Enterprise (CBE) model and has been considered an effective tool to alleviate poverty at the local level and achieve sustainable development of a collective enterprise (Handy et al., 2011; D'Souza and Joshi, 2020).

Udupi Brinjal, a kharif crop, is grown between October and June. It is locally popular as "Mattu Brinjal". This green-coloured aubergine is normally spherical in shape and low in moisture content. Scientifically known as "Solanum melongena" from the Solanaceae (potato) family, this fruit is rich in vitamins and minerals (Nandi et al., 2021; Nadeeshani et al., 2021). Popularly classified as a vegetable, the brinjal is a fruit belonging to the botanical family of berry (FoodData Central Food Details Eggplant, Raw, 2018). Brinjal is a staple in Indian cuisine as well as in Bangladesh and other Mediterranean diets. It is used in preparing different types of curry and pickle. Udupi Brinjal farmers first offer the yield to the Udupi Krishna (deity) temple, and then a part of the harvest is used to recover seeds for the next cropping season. Rest is sold in the market (Peschard, 2022).

Even though the GI tag has bestowed a special status on Udupi Brinjal, the farmers have not been able to leverage its true market potential (Vinayan, 2017; Tan et al., 2024). Some of the main reasons for poor distribution and low consumer patronage for Udupi Brinjal are a) Poor market infrastructure coupled with weak market linkages in the local and neighbouring districts b) Low consumer acceptance due to lack of availability and awareness of Udupi Brinjal c) Lack of effective marketing practices that is needed to create awareness in untapped markets and boost sales d) Poor branding efforts and the inability of the farmers to understand the power of the brand which is made up of its tools like the GI logo and GI certificate. Given this scenario, the study is undertaken to examine the key factors affecting consumer preference towards Udupi Brinjal. With this background, this study proceeds to answer the following research questions:

1. What are the main factors affecting consumer preferences towards Udupi Brinjal?

2. What is the impact of such factors on consumer preference towards Udupi Brinjal?
3. What are the marketing strategies that can be formulated to increase the consumer preference for Udupi Brinjal?

This research has used a mixed-method approach to predict consumer preference towards Udupi Brinjal. In the first stage, the key informant's survey was used to identify factors affecting consumer preference for Udupi Brinjal. Subsequently, in the second stage, quantitative methods were used to analyse data collected from consumers.

The succeeding section of this work presents a review of previous studies on Geographical Indication products encompassing consumer attitudes, preferences, sustainable consumption, and consumer demographics.

### **Review of literature**

In the context of emerging economies, limited studies have analysed health consciousness and food safety as the key determinants driving consumers' preference towards GI fruits and vegetables. It has been observed that health-conscious consumers (Wang et al., 2021) pick their purchases from local farmers who grow GIs and from organic food stores (Yu et al., 2024) and direct farm-to-store outlets. It has been found that risk aversion has a positive effect on consumer choice towards fruits and vegetables. Results reveal that higher-income groups and level of education influence the purchase of vegetables (Palaniappan and Radhakrishnan, 2020). Regarding product attributes, value-driven aspects, health-related aspects (Vijayan et al., 2019), and purchasers' lifestyles are found to influence purchase decisions towards GI fruits and vegetables. In the case of seasonal vegetables, price, quantity, and frequency of intake, liking, and intention to pay positively affect consumer preference (Herath, 2019).

Consumers in the lower-income group are driven by affordability and the availability of convenience foods. The consumption of traditional foods is influenced by both sensory attributes and cognitive aspects (Moyo et al., 2023). Consumer lifestyle attributes serve as a basis for segmenting consumers into distinct groups to analyse their behaviour toward vegetables and fruits. Studies that have used choice models (Zhu et al., 2022; Ortega et al., 2016) have reported that marketing mix variables, price, family, cost,

and demographics of the consumer predicted the purchase of food products. Other studies (Vijayan et al., 2019; Rejeki et al., 2021) have reported a radical shift in consumer choice towards organic vegetables and fruits. Food preferences are largely influenced by customer loyalty (Kosciarova et al., 2020). Studies that applied the Theory of Planned Behaviour (Ajzen, 1991) have revealed that price and quality, packaging, consumer attitudes, behavior approved by an individual or group of important people (subjective norms), and perceived behavioral control aspects influenced consumer purchase intention towards organic vegetables (Uzar and Filipovic, 2023; Choudhury et al., 2020). Also, nutrients present in Brinjal have the properties to cure several chronic diseases (Naem and Ugur, 2019). Further, consumer preference towards the quality of fruits is influenced by the location where the fruits are grown. Consumers are ready to pay more for premium quality organic products (Wang et al., 2019; Lee et al., 2020). However, there are limited studies that test the effect of allergic reaction, deterioration in the quality of vegetables and fruits due to pest attack, and availability of chemical-free products that influence consumer choice. Our research work has identified such quality-related items to study their impact on consumer preference. A study conducted on Brinjal in India has highlighted the need for farmers to adopt sustainable management practices and improve the chances of consumer acceptance (Gautam et al., 2019). Studies have observed that the consumer is the central entity while considering and settling supply chain issues (Raut et al., 2020; Berkile et al., 2019). Due to this, marketing margin driven by consumer choices is the most important component in determining overall profitability in the supply chain.

Results have confirmed that consumers regarded high knowledge, region of origin, and education as the main indicators influencing the consumption of GIs (Uzar et al., 2022). A study by Zhan et al. (2017) has revealed that brand loyalty towards GIs is determined by consumers' attitudes toward growing areas, perceived quality, and cognition of protection. Currently, food consumption and food safety have been topics of intense scrutiny and debate in India. Regulators involved with Food Safety Standards (Food Safety and Standards Authority of India) are closely monitoring deviations, especially in the case of misleading advertisements circulated by companies, leading to unfair trade practices.

Food safety issues prevalent in the local food industry pose a serious threat to public health.

Udupi Brinjal was awarded the GI tag for its unique taste, which is a sensory attribute. Several studies have reported that sensory attributes and consumer preference are related (Caskey et al., 2021; Moyo et al., 2023). Considering the importance gained by sensory attributes in earlier studies and their significance to our study, the sensory factor has been included and analyzed in the proposed model. A study by Chen (2021) analysed the combined effect of sensory attributes and quality aspects on consumer preference and reported that the taste (Bytyci et al., 2024) of joy of quality has a higher influence compared to price-related concerns. Another study analysed the relationship between taste experiments and brain responses of coffee consumers to observe preference patterns (Artencio et al., 2021). Empirical results from earlier studies have not fully covered the combined effect of quality aspects, health factors, and sensory attributes on consumer preferences in the case of agricultural GIs. Our research work has attempted to bridge this gap by placing thrust on sensory attributes, quality, and health aspects as the three key factors influencing consumer preference towards Udupi Brinjal. GIs are unique products, and examining the combined effect of key factors influencing the consumers' preference is likely to provide interesting results. Such results will enable marketers to formulate strategies and increase the chances of consumer acceptance. Given this background, the objective of the study is to:

1. determine the factors affecting the consumers' purchase of Udupi Brinjal.
2. examine the impact of these factors on consumer preference towards Udupi Brinjal.
3. formulate and suggest marketing strategies to improve consumer acceptance of Udupi Brinjal.

The study is hypothesised as:

H1: Health factors positively affect consumer preference towards Udupi Brinjal

H2: Sensory factors positively affect consumer preference towards Udupi Brinjal

H3: Quality factors positively affect consumer preference towards Udupi Brinjal

The next section presents the research instrument used to collect that information from participants,

the sampling design, and the techniques used for data analysis.

## **Materials and methods**

This study was conducted using the mixed-method approach in three stages. In the first stage, the researchers conducted a Focused Group Discussion (FGD) of key informants (7 Nos) (Chazdon and Lott, 2010; Whittaker, 2012). The key informants included three retail vegetable and fruit merchants, two community leaders of the Udupi Brinjal Growers' Association, and two agri-business experts from the Udupi District Horticulture Board. The key informants were purposively selected for the FGD from Mattu village based on their expertise and experience in the production and sale of Udupi Brinjal. The researchers have a collective experience of over two decades in horticulture marketing. Moreover, their close connection with the Udupi Brinjal ecosystem, dating back to 2012, has played a vital role in the recruitment of key informants. It is believed that the informants purposively selected have firsthand knowledge about the community, which comprises farmers and consumers of Udupi Brinjal, gained through their roles as community leaders or influencers. Further, key informants are recruited for this study as they are familiar with the research topic. The three vegetable and fruit merchants selected have been in the wholesale and retail trade of vegetables and fruits in the Udupi district for over 30 years. Moreover, their distribution network is spread across other taluks of Udupi. Hence, merchants operating from Mattu junction (2) and Agriculture Produce Marketing Committee, Udupi (1) were recruited for this purpose. The merchants thus selected are in close contact with Mattu farmers and local consumers. They also serve as intermediaries in the agri supply chain. It is felt that the merchants can provide diverse information about consumer preferences towards Udupi Brinjal. Also, farmer community leaders (2) who were instrumental in securing the GI tag for Udupi Brinjal in 2011 were interviewed based on their seniority and experience. The leaders selected possess extensive experience in profiling consumers during the process of filing GI applications. Community leaders who were selected have frequent interactions with Mattu farmers and local consumers, as well as local agriculture development agencies such as the Horticulture Board and the Agriculture Produce Marketing Committee. Also, agriculture

experts (2) who have worked in projects related to the promotion of farmers' producer organisations. were recruited for the study. The Focused Group Discussion of key informants was conducted in August 2023 in Mattu village. Research associates trained in ethnography and in-depth interviews conducted the discussion with key informants. The discussion was recorded and documented, and the inputs collected were used to carry out quantitative analysis.

Thus, key informants are felt to be the right source of useful and reliable information. The Focused Group Discussion (FGD) with key informants is believed to bring to light diverse issues regarding consumers' purchase preferences for Udupi Brinjal. Additionally, this method has the quality to identify items that are important to include as variables in a survey. To conduct the FGD, a discussion guide (Hennink et al., 2020) was used, which included opening questions, main questions, and closing questions. The opening questions solicited participation on issues like the nature of business/work, type of customers, ways of interacting with the community, farmers, and consumer profiles linked to Udupi Brinjal. The participants shared their knowledge and experience on consumers' choices and preferences, likes, dislikes, motivations, opinions, and views as a response to the main questions in the discussion. Interestingly, the key informants stated that health-related aspects like diet, nutrition, oil-free intake, attributes like taste and flavour, different types of preparations of Udupi Brinjal, and quality of the produce motivated consumers to buy Udupi Brinjal. The Focused Group Discussions have generated statements required for the questionnaire. Such statements have evolved from open discussions among participants, their diverse perspectives based on their experience, and in-depth insights. The vegetable and fruit vendors stated that consumers seek more information regarding the freshness of produce and the ease of preparation. A few consumers raise concerns about the allergic reaction that Brinjal is likely to cause occasionally, especially on the lips and tongue. Also, pest invasion on the crop has been a menace that has affected the quality of the crop. Also, the vegetable and fruit vendors referred to the growing demand for organically grown vegetables and fruits. Such consumers are health-conscious and believe in maintaining a 'wellness-oriented' lifestyle, mainly focused on nutrition, fitness, and diet, and free from stress. The vendors also

mentioned that Udupi Brinjal is facing tough competition from other local varieties. According to the merchants, Udupi Brinjal is preferred over the local competing variety mainly due to its unique taste. Halfway into the discussion, the community leaders were requested to provide their perspectives on challenges and issues they encounter in marketing and selling Udupi Brinjal. Community leaders stated that increasing the regularity of purchases has been a major issue that has hindered sales. Given this situation, community leaders expressed support from the academic community and marketers who could deep dive into exploring and understanding consumers' preferences and buying behaviour. During the discussion, the agriculture experts brought up the aspect of the size of Udupi Brinjal being a key determinant that influences its purchase. It was also suggested that the Udupi Brinjal Growers Association should scale up its branding and labelling efforts to stay relevant in the market. Thus, the views, opinions, and observations collected from the focus group discussion were transcribed, and the variables of research interest were identified. In the second stage, the transcribed information went through a text analysis of these inputs/descriptions to identify the main items and factors related to the study. After performing a text analysis of the descriptions, the items were put forth as statements in a structured questionnaire suitable for quantitative analysis. In the third and final stage, a survey questionnaire was designed to collect the data from the respondents. The first section of the questionnaire invited respondents to provide their demographic details. The next section included questions on variables in the form of statements. These statements were presented to the respondents anchored on a '5-point' Likert scale as 1 = strongly disagree, 2 = Disagree, 3 = neither agree nor disagree, 4 = Agree, 5 = Strongly agree. Likewise, consumer preference (CP) was also anchored using a 5-point Likert scale.

The opening section of the survey contained a consent form that had a detailed explanation of the research objectives. In the beginning, the participants were asked to tick their free consent with a yes/no box before proceeding with the other questions. The consent form also provides the right for the participants to leave the survey at any time before participating. The consent was obtained in written form. Regarding the selection of consumers for the survey, the researchers used the 'Customer Ledger' maintained by the Udupi Brinjal Growers Association. The customer's

ledger had a list of 1036 customers who visited the warehouse of the association between October 2023 to June 2024. For screening, the researchers further filtered this list to select customers who had visited the warehouse at least twice during this period. Repeat purchases by a customer within one season were considered a testament of loyalty towards Udupi Brinjal. Out of 1036 customers, it was found that 367 buyers have purchased Udupi Brinjal at least twice directly from the association during the survey period. The respondents were contacted based on the available consumer group of loyalists. The researchers contacted all 367 buyers through the residential addresses/cell phone numbers available with the Udupi Brinjal Growers Association. However, only 307 respondents volunteered to participate in the survey. Thereafter, the researchers discarded three questionnaires that were considered unsuitable for data analysis after the data cleaning process. Hence, 304 responses were included in the final analysis.

Regarding data analysis, factor analysis was performed to validate the statistical significance of variables using factor loadings to label the factors. Further, the study has performed regression analysis with factors as independent variables and consumer preference as the dependent variable. The succeeding section of this research work will present and discuss the results of the study.

## Results and discussion

Consumer responses towards Udupi Brinjal consumption trends (Tan et al., 2024) were summarized using the factor analysis technique to identify and label factors. Also, this technique has been useful to overcome the problem of multicollinearity and satisfy the assumption that all the independent variables are statistically independent. A higher KMO value (.702) and a statistically significant Bartlett's test of Sphericity (p-value 0.000) have been observed, indicating that the correlation between variables is statistically significant (refer to Table 1).

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.702	
Bartlett's Test of Sphericity	Approx. Chi-Square	223.669
	df.	45
	sig.	.000

Source: Survey results

Table: 1 KMO and Bartlett's test.

Further, the rotation component matrix (refer to Table 2) with factor loads supported the labelling of factors. Factor loadings represent the reliability of the items under study and confirm the measurement fit of the model. In most cases, the study has maintained 0.7 or higher factor loads that explain sufficient variance of a construct.

Components	Factor 1	Factor 2	Factor 3
Fresh Produce	.278	.715	.095
Free from pest attack	.756	.023	.015
Ease of preparation	.253	.701	.056
Allergic reaction	.783	.047	.035
Taste	.082	.736	.349
Organic Produce	.805	.127	.301
Regular consumption	.749	.032	.004
Reasonable size	.400	.093	.442
Label and Grade	.191	.058	.707
Better than other local variety	.267	.257	.702

Source: Survey results, Analysis method: Principal Component Analysis & Varimax Rotation Method

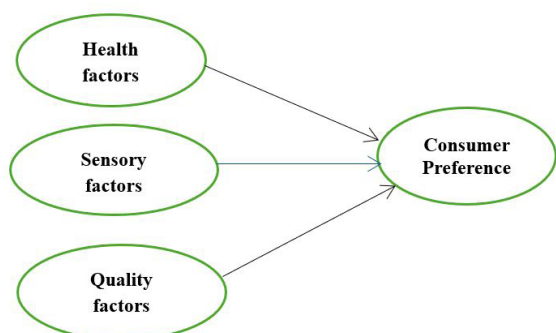
Table 2: Rotation component matrix.

In this way, the study has identified three factors using a cut-off of 0.70 to extract variables under each factor. Free from pest attack (0.756), allergic reaction (0.783), organic produce (0.805), and regular consumption (0.749) represent the first factor, which is labelled as 'Health Factor'. Similarly, ease of preparation (0.701) and taste (0.736) represent the second factor labelled as the 'Sensory factor'. Finally, label and grade (0.707) other local varieties (0.702) make the third factor, 'Quality factor'. All factor loading values are > 0.70, which is suitable to perform regression analysis. The profiles of these clusters are explained as:

Consumers of the first cluster are health-conscious and execute their purchase action and consumption responsibly. They seek information on health, nutrition, and ingredients, and are concerned about the impact of the products on their overall well-being. They favour foods that are natural and organic, free from additives and chemicals. Hence, health factors and proposed to impact the nature of their consumption preferences. Sensory attributes like colour, taste, smell, and touch impact the consumer's overall preference and dining experience. For this group, sensory properties are crucial in determining how much consumers choose and enjoy the food that they consume. Regarding the quality factor, it is found that nutritional aspects, variety

of vegetables and fruits available for purchase, and grading of the crop by labels determine consumers' purchases. According to Bharadwaj et al. (2024), an alarming decline in the consumption of nutritional quality of foods in India is posing health-related threats to future generations. Hence, it is felt that consumers in the future will be quality-conscious and demand vegetables and fruits, and food without compromising quality.

The proposed relationship (refer to Figure 1) is explained using the following theoretical model:



Source: Developed by authors

Figure 1: Theoretical framework of the study.

The three factors were used to obtain factor scores using Statistical Package for Social Sciences Software (SPSS 27.0) with health factor (HF), sensory factor (SF), and quality factor (QF) as independent variables to predict the dependent variable, consumer preference (CP). For data analysis, the items for Health Factors are coded as HF1- free from pest attack, HF2 - allergic reaction, HF3 - organic produce, and HF4- regular consumption. For Sensory Factors, they are coded as SF1 – ease of preparation, SF2 - taste, and for Quality factors, they are coded as QF1 - labelling and grading, and QF2 – competing variety. The dependent variable, consumer preference, is denoted as CP.

The relationship between the independent variables and the dependent variable is hypothesized

as follows:

H1: Health factors positively affect consumer preference towards Udupi Brinjal

H2: Sensory factors positively affect consumer preference towards Udupi Brinjal

H3: Quality factors positively affect consumer preference towards Udupi Brinjal

The hypothesis is tested using a regression equation presented as follows:

$CP = f(HF, SF, QF)$ , where HF = Health factor, SF = Sensory factor, and QF = Quality factor.

The regression results (refer to Table 3) indicate that 32.4 per cent of the variance in the dependent variable is predicted by the model, i.e., further, a higher value ( $f = 17.016$ ) shown by the ANOVA table (refer to Table 4) indicates a good model fit in predicting the dependent variable. Consumer preference level is explained by three factors, i.e., health factors, sensory factors, and quality factors. The coefficients (refer to Table 5) of these three factors (health factor 0.022, sensory factor 0.008, quality factor 0.000) are statistically significant ( $p$  values are  $< 0.05$ ).

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the estimate
1	.568	0.324	.311	1.029

Source: Survey results: Dependent variable: Consumer preference (CP), Independent variables – Health factor, Sensory factor and Quality factor

Table 3: Regression model.

Model	Sum of Squares	d.f	Mean square	F	Sig.
	50.368	3	18.123	---	---
Regression	101.632	96	1.067	17.016	.000b
Residual	153.000	99	---	---	---

Source: Survey results

Table 4: ANOVA.

Model	Coefficients				
	Unstandardized coefficients	Standardized coefficients	t	Sig	
Constant	3.590	.104	---	34.718	.000
Health factor score	.239	.105	.190	2.299	.022
Sensory factor score	.279	.105	.226	2.637	.008
Quality factor score	.615	.106	.489	5.829	.000

Source: Survey results – Dependent variable: Consumer preference

Table 5: Factor regression output.

The Unstandardized coefficients obtained (refer to Table 5) after data analysis indicate a positive relationship between health factors (0.23), sensory factors (0.279), quality factors (0.61), and consumer preference. In this regression model, a higher ‘t’ value of the factors (health factor 2.29, sensory factor 2.63, quality factor 5.82) indicates greater predictive power of the factors on the dependent variable (consumer preference). Generally, a ‘t’ value of > 2 for a factor (independent variable) reveals strong evidence to predict the dependent variable. The results also reveal that the quality factor (0.48) is the most important in explaining the variation in Consumer Preference level, as the standardized coefficient of this factor is higher than the values of the sensory factor and health factor. The results are consistent with what is witnessed in the local market as ‘quality’ as a preference indicator for agriculture. In India, the increasing popularity of plant-based diets and eco-friendly consumption is motivating farmers to go organic. Geographical Indications (GIs) assume great importance in predicting consumer preference and purchase intention. The results of this study have significant implications for marketers to design suitable strategies to improve the marketing and sales of Udupi Brinjal. The next section will compare earlier studies on consumer preferences towards agricultural products and Geographical Indications with the present study.

### Discussion

The present study aims to analyze the factors influencing consumer preference towards Udupi Brinjal, a locally grown horticulture GI produce. Data analysis has been performed to indicate key empirical findings, which are presented as follows (refer to Table 6).

The results of the study reveal that health factors, sensory factors, and quality factors positively affect consumer preference towards Udupi Brinjal. The p-values (< 0.05) in H1 (.022), H2 (0.008),

and H3 (.000) indicate that the findings provide support for the hypothesis proposed by the study. Further, the ‘t’ values of H1 (2.29), H2 (2.63), and H3 (5.82) indicate a positive relationship between the predictor variable and outcome variable. Thus, the study's results are consistent with the proposed hypothesis. In this study, it is observed that the quality factor has a greater influence (‘t’ value of 5.82 > 2) on consumer preference compared to the other two factors.

### Quality factors and consumer preference

There are limited studies that have explored the quality dimension of consumer preference in the case of Horticulture GIs. A study has observed that grading, labelling, and packaging that represent quality assume greater importance and should be standardized (Berkile et al., 2019). Consumers’ selection of a product with a GI is prompted by a perception that the label indicates superior quality of the product (Tabanlı and Akdoğan, 2022). In the case of Udupi Brinjal, the term quality is denoted by Grade labels (based on size). These labels are used to categorise the produce into different grades (Grade A, B & C). It is observed that the local markets are flooded with other varieties of Brinjal, which look like Udupi Brinjal. Hence, releasing Udupi Brinjal produce without labelling may lead to imposter by the local producers and retailers of other competing varieties. Grading and labelling were introduced in 2022 to protect Udupi Brinjal from counterfeiting and imposter by local varieties. A small label sticker carrying the Udupi Brinjal logo is placed on the crop for easy identification on Grade A & Grade B. However, it is felt that packaging should complement grading if the marketing is to be effective. Results of our study indicate that grading and labelling influence consumers' decisions to buy Udupi Brinjal.

Regarding quality parameters, other studies have referred to reliability (Tabanlı and Akdoğan, 2022; Zhang and Du, 2023) as the key determinant

Hypothesis	Description	‘t’ values	Sig <.05	Remarks
H1	Health factors positively affect consumer preference towards Udupi Brinjal.	2.299	.022	Results are consistent with the hypothesis
H2	Sensory factors positively affect consumer preference towards Udupi Brinjal.	2.637	.008	Results are consistent with the hypothesis
H3	Quality factors positively affect consumer preference towards Udupi Brinjal.	5.829	.000	Results are consistent with the hypothesis

Source: Authors survey results

Table 6: Results of hypothesis testing.

in driving consumer attention towards GI-based local agricultural produce. Focusing on quality and maintaining consistency in quality has significant implications for how consumers prefer (Rao et al., 2024) and accept Udupi Brinjal. Our study emphasises the need for a unique packaging strategy required to position Udupi Brinjal as a 'distinct brand' in the local, domestic markets and international markets. Also, in the quality aspect, it is seen that activities like cleaning, sorting, and grading of produce are important to prevent Udupi Brinjal from going out of favour in the local market. Other studies have reported that consumers are willing to pay a higher price (Kirsten et al., 2017) for premium products with GI tags. Our study emphasizes the need to leverage the GI tag for branding purposes by positioning it as a symbol of quality to increase consumer awareness towards premium agricultural products. Another study (Ihsaniyati et al., 2022) has revealed that promoting quality among consumers may need optimizing collaboration between farmers and relevant associations. There is an information asymmetry (Cardoso et al., 2022) between producers and consumers, as producers are focused on distribution rather than customer centricity. Greater awareness of factors impacting consumer preference will serve as a tool to bridge this gap by adopting the right marketing mix. This disconnect can be resolved by organizing agricultural product exhibitions at regular intervals where producers and consumers meet and interact. Regarding Quality attributes, GIs protect consumers against faking and give a sense of security towards nutrition and information labels (Zhan et al., 2017; Albayram et al., 2014). Post-COVID-19 outbreak, organic fruits and vegetables consumption has witnessed increased consumer attention. Organically grown fruits and vegetables represent the brand of quality (Dangi et al., 2020). Concurring with these views, we believe that the producers should adopt a customer-centric approach and use natural fertilizers and manuring systems to provide organic produce. This approach will be consistent with the responsible consumption Sustainable Development Goals (SDG 12) announced by the United Nations.

Further, we also highlight that the Udupi Brinjal logo, with its local dialect, has limited literary and visual appeal to international consumers. Hence, the Branding strategy for Udupi Brinjal needs serious attention. Post-COVID-19 outbreak, organic fruits and vegetables consumption has witnessed increased consumer attention. Organically grown

fruits and vegetables represent the brand of quality (Dangi et al., 2020). The findings of our study present useful input to formulate a strategy for marketers of agricultural GI products in emerging economies to improve the core quality function of labelling, grading, and packaging.

### **Sensory factors and consumer preference**

Regarding sensory attributes, results from an earlier study have stated that sensory factors positively affect the purchase intention of GI products (Moyo et al., 2023). Additionally, other studies have reported that the consumption of traditional foods has a unique sensory experience (Van Der Hoeven et al., 2013; Caskey et al., 2020). Similarly, Dias and Mendes (2018) and Cheung et al. (2021) stated that consumers are interested in sensory-related characteristics in the case of products attributed to a specific region. Another study (Bytyci et al., 2024) revealed that sensory attributes and taste, fragrance, safety, and freshness of fruits motivate the purchase of GI fruits and vegetables. The melt-in-your-mouth texture and soft pulp of Udupi Brinjal make it the homemakers' choice for tasty dishes like Sambar (soup), gojju (salad), and palya (dry dish). Slight bitterness and rawness with subtle sweetness give Udupi Brinjal the edge over other competing local varieties. This study shows that the 'unique taste' of Udupi Brinjal influences consumer preference and loyalty.

Research work by Zhu et al. (2022) has found that brand labels, grade labels, informative labels, and descriptive labels are used as marketing tools based on sensory appeal. This study also revealed that brands' visual appeal and gustatory attributes influence consumer fruit and vegetable buying intentions. In the current study, we have introduced the ease of preparation and taste of value-added products of Udupi Brinjal. Ease of preparation is a significant factor in consumers' buying decisions, as it determines whether food is consumed or not. Consumers are more likely to prefer those vegetables whose dishes or salads are easy to prepare or can be eaten raw. In today's fast-paced life, which is more inclined to food orders from online food distributors, ease of preparation would motivate the Indian kitchen to prepare food at home. Recipes of Udupi Brinjal are easy to prepare. Snacks like Brinjal fritters (fried snack) are easy to prepare. Brinjal salads go well with lunch. Notably, marketers have a strong message to market Udupi Brinjal value-adds using the ease of preparation positioning strategy. It is also felt that consumers, especially women, who

cook meals for their family, are driven to buy those items that can be prepared easily with quick hands. Further, vegetables that can be cut easily are preferred over those that are difficult and time-consuming. Udupi Brinjal is known for its unique taste in its preparations like Sambar (curry), salad, and fritters (oil fry). It is felt that marketers must consider the sensory experience of consumers as a powerful tool to increase consumer acceptance of perishable products. Visual merchandising at the store level and visual prompts on online platforms may be a good way to attract consumers to stores and online dashboards using sensory experience.

### **Health factors and consumer preference**

Regarding consumption and health, studies have reported that modern consumer is motivated by sustainable food habits and are not price sensitive (Lizcano-Prada et al., 2024). Consumers continue to adopt new food consumption behaviour with local food being replaced by health-value products (Baliga et al., 2024; Chen and Warden, 2020; Caskey et al., 2020; Cheung et al., 2021). Consumer markets for GIs in India are different from other parts of the world, with the dominance of vegetable and fruit-based GIs in local markets. This research work has highlighted the impact of pest attacks on production, the use of fertilisers and chemicals, and allergic reactions as some of the factors that influence the buying behaviour of health-conscious Indian consumers. Udupi Brinjal consumers prefer products free from pest attack, organically grown produce, and products that are free from allergic reactions. The results of this study reveal a higher loading of organic produce (0.80) for Udupi Brinjal, confirming the consumers' preference for organically grown produce. Increased use of herbal spraying methods to combat pest attacks and focusing on organic growing methods will shift consumers' attention towards purchase.

Consumers who are particular about their health view GI as a tool to execute the correct purchase decision by avoiding the mistake of picking counterfeit and adulterated products. Hence, health marketing campaigns should encourage health-conscious consumption by promoting health-value products guided by the adoption of nutritional labels. The results of our study reveal a lower impact of health on consumer preference compared to sensory attributes and quality factors. This shows the eagerness of consumers to shift consumption preference from sensory attractions

towards quality products. Of late, there has been a clear shift in food consumption patterns among Indians towards organic food, which is driven by the need to maintain good health.

### **Marketing and managerial implications**

This study presents managerial implications for marketers. In the case of locally grown GIs (Bytyci et al., 2024), quality indicators accompany key aspects of responsibility and accountability for producers (Cardoso et al., 2022; Yin et al., 2024). Hence, it is felt that producers of Udupi Brinjal should embrace a strong quality culture. First, to promote customer centricity by using quality as a tool, producers can adopt guidelines on packaging as follows: a) follow the criteria for packaging on a) appearance, b) identification, c) instructions for use, d) information about contents, e) carry the brand name, and f) provide sales aid.

Second, producers should focus on brand building in the local market using the Udupi Brinjal logo. The authors concur with the views of the research work done by Uzundumlu and Topcu (2016) that consumer satisfaction can be maximised by augmenting actual product images as a tactic for brand building. For Udupi Brinjal, promoting quality will enable brand building by leveraging tools like labels and logos. Further, other studies have referred to branding as a powerful activity to secure premium prices (Aggarwal et al., 2014). This will ensure that the State government's objective of promoting Geographical Indications (GIs) products is achieved by breaking counterfeiting and imposter-related barriers. The study finds 'ease of Udupi Brinjal preparation' as a strong marketing tool to increase consumption. Items like dishes, pickles, and salads can be prepared very easily, thereby increasing consumption and reducing preparation time and spoilage, and wastage. When preparations are easy to prepare, consumers are more like to consume, increasing consumption and leading to a greater vegetable and fruit intake. Further, the time involved in washing, peeling, and chopping may be a significant deterrent to busy consumers. This section of consumers will welcome the 'easy to prepare' solution. Furthermore, easy-to-prepare recipes will significantly reduce spoilage and wastage, which is a major concern for consumers. Also, the easy-to-prepare solution aligns with consumer habits. Once the consumer gets adjusted to a particular recipe that is easy to prepare, it requires less effort to automate that behaviour, resulting in repeat action. In essence,

ease of preparation accompanies convenience, which removes a significant hurdle for consumers. This makes consumption of vegetables and fruits more accessible and actionable for consumers. Marketers should target social media campaigns that promote ease of preparation as a 'convenience tool' to gain consumer attention. In the case of Udupi Brinjal marketing, it is often seen that 'ease of preparation' is veiled under the shadows of 'unique taste'.

The Udupi Brinjal Growers Association can design consumer education programs by combining brand awareness campaigns with health marketing campaigns to eliminate information asymmetry between producers and consumers. Also, awareness and education programs on organic farming should be extended to both farmers and consumers. The Government of India has launched various schemes to promote agriculture, like the 'Paramparagat Krishi Vikas Yojana' (PKVY) and Modern Organic Value Chain Development (MOVCDNER), to encourage organic farming using natural fertilizers. Effective promotion of such schemes by government agencies will go a long way in reducing this information asymmetry between producers and consumers. The final section presents a summary of the aim of this research work, the results achieved, and the limitations of this study. Directions for future research are also presented in the next section.

## **Conclusion**

This research work has analyzed the effects of quality factors, sensory attributes, and health aspects on consumer preference towards Udupi Brinjal. The results indicate that the evidence of the predictive power of quality, sensory, and health-related factors is statistically significant. Given this background, the research has provided marketing and managerial observations to academicians and marketers.

The current research work has a few limitations.

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The limited sample size of 307 respondents made it difficult to generalise the findings to a larger consumer pool. However, it is felt that the findings of the study are valuable and informative for semi-urban and rural consumer markets in emerging economies. Also, consumers selected for the survey have self-reported their responses. A significant part of the purchase actions is determined by community-driven mechanisms of the local region. Therefore, social factors play an important role in influencing consumers' purchase decisions. Thus, this survey may have included self-desirability bias due to self-perception to a certain extent.

Regarding future research, the area of sustainable community-based enterprises is a good area for further research. Deeper insights on Branding (Aggarwal et al., 2014) place branding (Choo and Kim, 2015) of region-of-origin GI products, Packaging of GIs should attract more literary attention considering the large volume of registered agriculture GIs. Similarly, literary attention towards GI products and consumer preferences and their impact on cultural differences is limited (Wang et al., 2021). For a large country like India, responsible consumption may be driven by quality-related parameters. Additional quality-related parameters like the importance of the consumption of branded products, nutritional value, information, types of labels, and utility are unknown to many consumers. Future research can focus on brand awareness, nutritional aspects of premium products, determinants of consumer acceptance of GIs and elements of a good packaging strategy. Also, studies can determine a suitable pricing strategy for Agriculture GIs, especially in emerging economies that lack minimum support price guidelines. The outcome of the current study is consistent with the Sustainable Development Goals (SDG 2 & 12) that cover promoting Sustainable Agriculture (SDG 2) and Responsible Consumption (SDG 12).

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