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Fruit consumption: Exploring consumer demand for exotic fruits in India - Trends and preferences

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Abstract

Exotic fruits, characterized by their unique flavors, vibrant colors and diverse nutritional profiles, have gained significant popularity in the Indian retail market, reflecting changing consumer preferences and a growing awareness of health benefits. This study explores the fruit consumption, import statistics of fruits and consumer preferences for exotic fruits in Coimbatore city, focusing on demographic characteristics, market availability and the intrinsic and extrinsic attributes influencing purchasing decisions. A survey was conducted to assess the demographic profile of exotic fruit consumers, revealing a predominantly educated and diverse group, with a significant proportion aged 31-45 years. Market analysis identified a wide range of imported fruits, highlighting their price points and seasonal availability. A conjoint analysis was performed to understand the importance of various attributes, including fruit appearance, taste, price and packaging size. Results of the study indicate that vibrant colors and competitive pricing are critical factors in consumer choices, with taste preferences favoring mild sweet and tangy flavors. The study also presents utility values for different product combinations, emphasizing the importance of aligning marketing strategies with consumer preferences. Ultimately, this research contributes to the understanding of consumer behavior regarding exotic fruits and offers practical recommendations for stakeholders in the fruit supply chain.

Keywords

conjoint analysis; consumer preferences; exotic fruits; market availability; purchasing decisions

Introduction

The fruit market in India has long been prosperous, owing to its extensive range of fruits that includes both indigenous and exotic varieties. Recently, the westernization of Indian culture and a growing emphasis on health among consumers have contributed to a surge in the demand for imported fruits across the nation. In the global context of fruit and vegetable production, India ranks second, surpassed only by China. The National Horticulture Database (2nd Advance Estimates) from the National Horticulture Board indicates that in the 2023-24 agricultural year, India yielded 112.62 million metric tonnes of fruits and 204.96 million metric tonnes of vegetables. The land dedicated to fruit cultivation was 7.04 million hectares (1). The country holds a leading position in the production of various fruits, specifically ranking first in Bananas (25.56%), Mangoes (including mangosteens and guavas) at 44.46% and Papayas at 38.64%. During 2023-24, India exported fresh fruits and vegetables valued at Rs. 15039.27 crores, equivalent to 1814.58 million USD, with fresh fruits alone accounting for Rs. 8178.22 crores or 986.32 million USD (2). Exotic fruits are typically defined as fruits with unique sensory characteristics and limited market share (3). They encompass fruits

imported into a country from various botanical families (4). According to the National Nutrient Monitoring Bureau, the consumption of fruits and vegetables is significantly below recommended levels. Individuals typically consume only 100 to 200 g of these food groups daily, whereas the recommended intake is 500 g per day. Fruits alone, suggested for a balanced diet, is about 150 g per day (5).

The consumer market in India is showing a growing trend in the consumption of fruits with rising interest in plant-based diets, healthy lifestyles, etc. However, there is an increase in fruit consumption in India, but per capita consumption is less than the recommended level. Fresh fruit import statistics indicate that India imported 59.3 thousand metric tons, facilitated by 1051 importers who sourced from a total of 2581 suppliers. Countries such as Thailand, Vietnam and Chile are the primary countries from which India procures its fresh fruit, positioning India as the second largest importer of fresh fruit globally next to China. There has been a significant transformation in consumer preferences regarding exotic fruits, indicative of an increasing desire for varied culinary experiences and a commitment to healthier living. Consumer preferences for exotic fruits vary across different markets and demographics. This may be due to their flavor and nutritional information being key factors influencing purchase intent (6). The freshness was also a top priority for consumers of imported fruits and vegetables. Research on tropical fruit seeds in Indonesia highlighted their potential as sources of nutritional and bioactive compounds for functional food development (7). The origin, seasonality and freshness when purchasing fruits and vegetables, with sociodemographic factors like age, income and family composition influencing preferences and choice of purchase location (8).

Consumption of fruit in India

Fruit and vegetable (F&V) consumption in India is inadequate across all income groups, with diets falling short of recommended levels (9). Socioeconomic factors, particularly income and caste, play a significant role in F&V consumption patterns (10). Lower caste groups consume less F&V, primarily due to income disparities (11). Rural Indian women face multiple barriers to F&V consumption, including personal factors, household dynamics, social norms, workload, time pressures, environmental factors and cost (12). The average Indian diet is characterized by an excess of cereals and processed foods, with insufficient intake of fruits, vegetables and non-cereal proteins (9). The average consumption of fruits across various age and gender groups in both urban and rural settings in India is illustrated in Fig. 1.

From Fig.1 the average fruit consumption across all age groups is approximately 31 g per day, with urban populations consuming about 42.55 g and rural populations consuming 19.73 g. In children (1-3 years), rural areas show an average consumption of only 12 g per day, compared to 30 g in urban areas. Among adolescents (4-17 years), consumption steadily increases with age, ranging from 14 to 24 g in rural areas and 37 to 47 g in urban settings, with urban adolescents consistently consuming more fruits. For adults, the highest intake is observed, with urban males averaging 53 g daily compared to 26 g in rural males. Urban females consume 46 g, while rural females consume just 25 g per day.

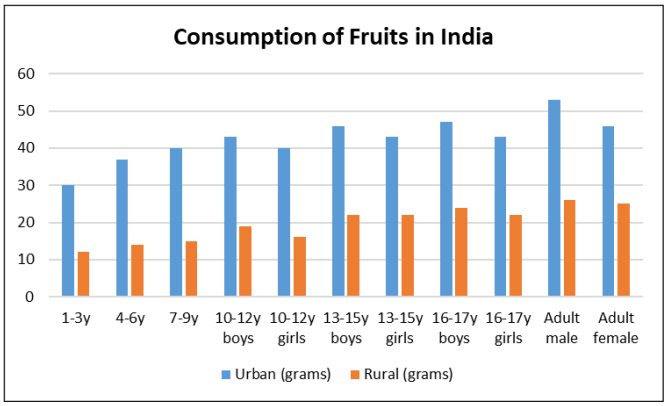

Fig. 1. Average consumption of fruit in India. Source: National Nutrition Monitoring Bureau (NNMB) reports, 2016.

Import of fruit in India

India's fruit market has seen significant growth in production and exports, with fruit production increasing at a higher rate than global production (13). The import of fruits has also gained importance, particularly after the elimination of quantitative restrictions in 2000 (14). Consumer perceptions of imported fruits are influenced by factors such as health, safety, taste and extrinsic attributes like storage conditions and country of origin (15). The potential for increased apple consumption in India is substantial, with free trade potentially leading to significant welfare gains (14). The import statistics of fruits and vegetable seeds are illustrated in Fig. 2.

From Fig. 2 the market for F&V seeds for the financial year 2014-15 to 2023-24, has experienced substantial growth, with quantity increasing from 14115.24 million tonnes (MT) to 27351.48 MT, reflecting a remarkable rise of approximately 93.6%. The most significant year-on-year growth occurred between 2021-22 and 2022-23, where quantity surged by about 38.5%. Similarly, the monetary value rose from US$ 100466.33 thousand to US$ 164004.21 thousand, marking a cumulative increase of around 63.4%. The most notable annual growth in value also took place between 2021-22 and 2022-23, with an increase of approximately 18.0%.

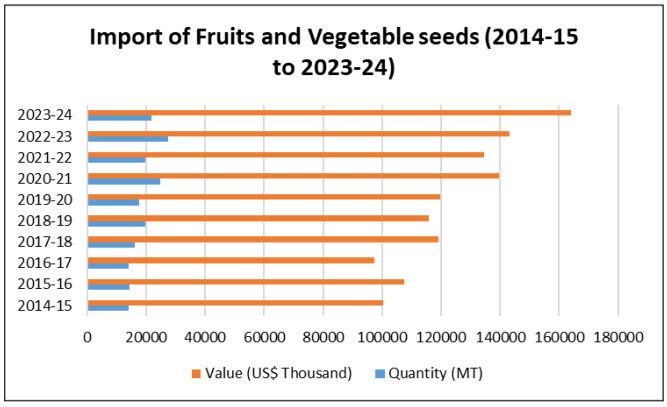

Fig. 2. Statistics of import of fruits and vegetable seeds. Source: APEDA, 2024 (48).

Consumption of exotic fruits in India

An exotic fruit is typically defined as a fruit that is not native to the region where it is being consumed but is instead grown in a different climate or region, often with unique characteristics such as taste, appearance, or nutritional benefits. These fruits are often considered rare or unusual in the region where they are being consumed (16). Recent studies indicate a growing trend in exotic fruit consumption in India, driven by factors such as

health benefits, taste and family preferences (17). The import of fresh fruits has surged from 2019 to 2022, reflecting increased demand (17). Exotic fruits like dragon fruit are gaining popularity due to their attractive appearance, nutritional value and potential for cultivation in India (18). Many exotic fruits and vegetables possess bioactive compounds with medicinal properties, including anti-inflammatory and anti-carcinogenic effects (19). However, fruit consumption in India is influenced by various factors, including price, income and awareness of health benefits (20). The major exotic fruits consumed in India are (Table 1):

They contain bioactive compounds like polyphenols, flavonoids and anthocyanin, which exhibit antioxidant, anti-inflammatory and anti-carcinogenic effects (19, 21, 22). These fruits have shown positive impacts on plasma lipid profiles and antioxidant activity in animal studies (22). The import and consumption of exotic fruits are increasing, driven primarily by health benefits, taste and family preferences (17). Exotic fruits also play a crucial role in supporting pollinator biodiversity, particularly stingless bees, which are essential for the reproductive success of many tropical fruit trees (23). The growing market for exotic fruits offers opportunities for businesses, emphasizing the importance of health, taste and effective marketing strategies (17).

The fruits like dragon fruit, rambutan and carambola are becoming more popular due to their nutritional value and attractive appearance, consumption is still relatively low in many regions. Factors such as price, income and awareness of health benefits play a significant role in the adoption of these fruits. Exotic fruits like blackberries, mulberries and pistachio nuts are more commonly consumed in temperate and tropical regions, but overall, there is room for growth in both cultivation and consumption across India.

Export fruits in India

India's fruit import dynamics have undergone notable changes from 2020 to 2023 provided in Table 2, with apples, dates and kiwi fruits being the top imports. Apple imports surged from 373505.68 MT in 2020-21 to 459251.82 MT in 2022-23, with Turkey, Italy and Chile as major suppliers (APEDA, 2023). Dates followed a steady increase from 342966.16 MT in 2020-21 to 364502.56 MT in 2022-23, primarily imported from Iraq, UAE and Iran. Kiwi imports rose to 64779.38 MT in 2022-23, with major sources being Chile, Greece and New Zealand.

The Ministry of Agriculture & Farmers Welfare (2021) has also prioritized the promotion of 10 exotic and 10 indigenous fruits, aiming to cultivate 8951 hectares of exotic fruits and 7154 hectares of indigenous crops. Exotic fruits like imported apples, oranges, kiwi, grapefruit, avocado, mangosteen, dates, blueberries, persimmons and plums have gained popularity in Indian retail markets, reflecting the growing consumer preference for diverse and health-conscious options. These fruits, known for their unique flavor profiles and nutritional value, have reshaped consumer trends by offering new culinary experiences and promoting health awareness.

Study area

The research was conducted in eight retail outlets located in Coimbatore city, which were specifically selected for the study. Primary data collection involved direct interviews with consumers visiting these stores, facilitated by a carefully crafted and detailed questionnaire. A total of 120 consumers of exotic fruits were interviewed through a convenience sampling method. In addition, secondary data was gathered from various published sources, including reports and journals. The analytical approach employed descriptive analysis, focusing on average and percentage calculations to explore the general characteristics of the consumers, including age, gender, marital

Table 1. Per capita consumption of exotic fruits in India

S.No	Fruit	Scientific Name	Per capita Consumption/ year (in g)	Geographical Zones in India
1	Blackberries	*Rubus fruticosus*	50-75	
2	Black currants	*Ribes nigrum*	10	
3	Blueberry	*Vaccinium corymbosum*	-	
4	Raspberry	*Rubus niveus, Rubus ellipticus*	10	
5	Cape gooseberry	*Physalis peruviana*	50	
6	Mulberry	*Morus spp.*	30-50	Temperate fruit and nut crops
7	Quince	*Cydonia oblonga*	10	
8	Persimmon	*Diospyros virginiana*	<10	
9	Pecan nut	*Carya illinoensis Koch*	50-100	
10	Hazelnuts or Filbert	*Corylus spp.*	10-20	
11	Pistachio nut	*Pistacia vera L.*	50-100	
12	Chestnut	*Castanea sativa*	10	
13	Longan	*Dimocarpus longan*	10	
14	Rambutan	*Nephelium lappaceum*	20-30	
15	Carambola	*Averrhoa carambola*	50	
16	Durian	*Durio zibethinus*	5	
17	Dragon Fruit	*Selenicereus undatus*	10-20	
18	Mangos teen	*Garcinia mangostana*	10	Tropical and subtropical fruits
19	Loquat	*Eriobotrya japonica*	20	
20	Soursop	*Annona muricata L.*	<10	
21	Manila Tamarind	*Pithecellobium dulce*	10-20	
22	Malay Apple	*Syzygium malaccense*	<10	
23	Passion Fruit	*Passiflora edulis Sims*	10-20	
24	Macadamia Nut	*Macadamia spp.*	<5	

Source: Growth of Exotic fruits in India, 2022 (21)

Table 2. Major exotic fruits imported in India

S. No	Fruits	2020-21		2021-22		2022-23		Major exporting countries
		Qty (in MT)	Rs (in	Qty (in MT)	Rs (in Crore)	Qty (in MT)	Rs (in Crore)	
1	**Apples**	2,72,435.30	1,777.08	4,59,251.82	2866.20	3,73,505.68	2348.68	Turkey, Italy, Chile
2	**Dates**	3,42,966.16	1365.37	3,47,319.81	1428.55	3,64,502.56	1657.91	Iraq, UAE, Iran
3	**Kiwi Fruits**	49,483.10	393.23	64,779.38	52,7.77	50,920.04	560.95	Chile, Greece, New Zealand
4	**Oranges**	53,735.11	256.81	1,65,812.10	717.28	1,30,372.06	545.71	Egypt, South Africa, UAE
5	**Avocados**	600.24	13.04	1,223.37	26.44	2,210.54	54.65	Tanzania Rep, Netherland, New Zealand
6	**Plums & Sloes**	6,623.09	39.72	4,260.53	33.19	6,139.03	45.55	China, South Africa, Spain
7	**Cranberries, Bilberries & Other Fruits of The Genus *Vaccinium***	187.83	8.61	493.63	19.10	797.49	43.25	Netherland, Peru, Chile
8	**Grapefruit Including Pomelos,**	215.37	0.98	381.2	2.26	715.65	3.79	South Africa, Egypt, UAE
9	**Peaches, Including Nectarines,**	212.47	2.21	297.72	2.30	222.55	2.70	Netherland, South Africa, Turkey
10	**Mangosteen**	26.41	0.79	47.73	1.23	38.45	1.57	Thailand, Vietnam, UAE
11	**Persimmons**	57.27	1.00	39.26	0.75	37.72	0.85	Spain, South Africa

Source : APEDA, 2023 (2)

status and educational level.

The objectives of the study are

- To examine the market availability of exotic fruits in selected organized retail stores.
- To study the consumer buying behavior towards exotic fruits.

Materials and Methods

Percentage analysis

The percentage analysis is an essential tool for comparing groups, allowing for the examination of demographic variables like age, gender,

$$\text{Percentage analysis} = \frac{\text{Number of respondents}}{\text{Total Number of samples}} \times 100$$

education level, annual income and marital status (16).

Conjoint analysis

The conjoint measurement allows estimation of the impact of individual attribute levels on the overall utility of a product. Conjoint analysis is generally considered to be a useful method for assessing consumer acceptance of novel foods (16, 17). This study used conjoint analysis that produces preference information for each respondent. For retrieval decision, the results of the conjoint analysis end with a general rating display (SPSS subfile summary) which applies to all respondents. The basic model of conjoint analysis is systematically formulated as follows:

$$\mu(x) = \sum_{i=1}^{m} \sum_{k=1}^{ki} aij\ kij$$

where: μ (x) = the total utility of each stimulus/combination

aij = utility (value use) from attribute to -i (i = 1, 2, 3….m) and level to -j (j = 1, 2, 3, k)

k = the number of attribute levels i

m = the multitude of attributes

kij = 1, if level to - j of the i attribute occurs 0, otherwise.

Factors influencing the purchasing of exotic fruits

Health consciousness has emerged as a significant factor influencing consumers' intentions to purchase fruits and healthy foods due to their perceived naturalness and nutritional value (18, 19). Environmental concerns also play a role in driving fruit purchases, with both health and environmental motivations positively affecting attitudes and purchase intentions (20). Consumer involvement mediates the relationship between health consciousness, food safety concerns and purchase intentions for organic food and also the psychological benefits and perceived naturalness explain the link between health consciousness and purchase intention (18, 21).

Taste is a significant factor influencing consumers' fruit purchasing behaviour (22) and is the primary determinant of consumer preference, with sweetness positively correlated and astringency negatively correlated (23). Sweetness and smell are important attributes, with different sensory preferences driving purchases of oranges, clementines and tangerines (24). For imported fruits in India, taste is associated with health and safety perceptions, while extrinsic factors like appearance and price also play a role (15). Industry experts largely agree that postharvest handling affects fruit flavor and that better taste quality leads to increased purchasing and consumption (25). family size influences the choice between locally grown and imported (26). Families with children are also identified as a discriminating factor in fruit and vegetable preferences and purchasing behavior (8). The factors that influence the purchasing of exotic fruits are provided in Table 3.

Different lifestyle factors significantly influence fruit-purchasing behaviors (27, 28). Increased F&V variety in corner stores was associated with a higher likelihood of customers purchasing produce (29). The physical availability at the point of sale positively affects purchase intention (30). Consumers associate imported fruits with health, safety and taste, while

Table 3. Factors influencing the purchasing of exotic fruits

Factor	Segment Derived
1	Health conscious
2	Price conscious
3	Sensory satisfaction (Taste)
4	Accessibility and Exploration
5	Personal taste and preference

extrinsic factors like appearance and price influence willingness to purchase (15) whereas consumers tend to devalue unattractive produce and lowering their willingness to pay (31). Social influence such as opinions and actions of relatives and friends strongly impact individuals' decisions to buy enterprise brand fruits (22). Similarly, stronger social networks and supportive social norms are associated with increased fruit and vegetable intake (32). The financial incentives and discounts can effectively promote fruit and vegetable purchases. Rewards-based programs offering led to increased purchases of fruits and vegetables (33, 34). Price discounts have been found to significantly influence purchasing behavior, with higher odds of buying (35).

Attributes level for conjoint analysis

The intrinsic and extrinsic quality attributes are important in shaping consumer behavior toward traditional food products (36). Consumers used attributes like vibrant color, irregular shape and spiked or fuzzy exteriors to assess the freshness of produce. The taste and flavor, particularly sweet, tangy and mildly sweet flavors, are key determinants of fresh product preferences (37). Price plays a crucial role in purchase decisions (38). Based on these insights, price levels for this study were set at "Less than Rs. 250," "Rs. 300 to < Rs. 500" and "More than Rs. 500". Additionally, packaging size preferences (250g, 500g and 1kg) were informed to be found that consumers typically prefer products priced per kilogram (39). The attribute levels used in this study are detailed in Table 4 and the different combinations generated from the orthogonal design output are presented in Table 5.

Table 4. Attributes level for conjoint analysis

Attribute	Attributes level
Fruit Appearance	Vibrant color Shape Spike or fuzzy exterior
Taste	Sweet Tangy Mild sweet and tangy
Price	Less than Rs. 200 Rs. 200 – < Rs. 500 More than Rs. 500
Packaging Size	250 g 500 g 1 kg

Results

Descriptive statistics

Table 6 presents a summary of the demographic attributes of the 120 respondents surveyed in the study on exotic fruit consumption. The distribution of respondents by gender shows a slightly higher proportion of females (63.33%) compared to males (36.67%). In terms of age, the largest group falls within the 31-45 age range, representing 41.67% of the sample. Those aged 46-60 make up 29.17%, while younger consumers aged 18-30 comprise 18.33%. The smallest group is those aged over 60, accounting for 10.83% of respondents. Regarding educational status, most respondents have completed graduation (63.33%), while smaller percentages have achieved post-graduation (18.34%), secondary education (13.33%) and primary education (5.00%). Occupation-wise, private employees form the largest group (35.00%), followed by government employees (27.50%), housewives (19.17%) and businesspersons (18.33%). In terms of annual income, many respondents (38.33%) have an income between Rs. 5.00 to 10.00 lakhs, while 33.33% earn more than Rs. 10.00 lakhs. Fewer respondents report incomes in the range of Rs. 2.50 to 5.00 lakhs (19.17%) and only 9.17% earn less than Rs. 2.50 lakhs annually.

Market availability of exotic fruits

Market availability is a critical factor in both business operations and consumer decision-making. It refers to how easily a product can be accessed within a specific market, influencing how businesses plan their distribution and how consumers make purchasing decisions. In India, the market for exotic fruits-those imported from regions like the United States, China, Japan and Southeast Asia-is rapidly growing. This surge is due to changing consumer preferences, increasing awareness of health benefits and the availability of a variety of exotic fruits year-round. These fruits, such as imported apples, kiwis, avocados and dragon fruits, are now widely accessible in both urban and rural markets. In Coimbatore city, a diverse range of exotic fruits is available through both offline and online retailers. A survey conducted using observational methods has provided insights into this evolving market. Key factors driving consumer demand include the variety of fruits offered and their pricing, with affordability playing a crucial role in shaping purchase decisions. Table 6 outlines the detailed findings from this survey, offering a snapshot of exotic fruit availability in the local market.

Table 5. Different combinations of orthogonal design output

Product profile	Orthogonal combination			
1	Vibrant colour	less than Rs.200	Tangy	500 g
2	Vibrant colour	Rs.200 – Rs.<500	Sweet	500 g
3	Vibrant colour	Rs.200 – Rs.<500	Tangy	1 kg
4	Shape	less than Rs.200	Mild sweet and Tangy	250 g
5	Shape	Rs.200 – Rs.<500	Tangy	1 kg
6	Shape	More than Rs.500	Mild sweet and Tangy	500 g
7	Spike or Fuzzy exterior	less than Rs.200	Sweet	250 g
8	Spike or Fuzzy exterior	Rs.200 – Rs.<500	Tangy	250 g
9	Spike or Fuzzy exterior	More than Rs.500	Mild sweet and Tangy	1 kg
10	Spike or Fuzzy exterior	Rs.200 – Rs.<500	Mild sweet and Tangy	500 g

Table 6. Demographic characteristics of exotic fruit consumer

Particulars		Numbers	Percentage
Gender	Male	44	36.67
	Female	76	63.33
Age	18 - 30	22	18.33
	31 - 45	50	41.67
	46 - 60	35	29.17
	>60	13	10.83
Educational Qualification	Primary	6	5.00
	Secondary	16	13.33
	Graduation	76	63.33
	Post Graduation	22	18.34
Occupation	Government Employee	33	27.5
	Business	22	18.33
	Private Employee	42	35.00
	Housewife	23	19.17
Annual Income	Less than 2.50 lakhs	11	9.17
	2.50 to 5.00 lakhs	23	19.17
	5.00 to 10.00 lakhs	46	38.33
	More than 10.00 lakhs	40	33.33

Table 7. Market availability of exotic fruits in Coimbatore city

S. No	Imported Fruits/ varieties	Imported from	Net Weight	Quantity/ piece/packet	Price	Season
1	Fuji apple	Japan	1kg	6pc	₹320	Throughout the year
2	Royal Gala Apple	New Zealand	500g	2pc	₹150	
3	Red delicious	New Zealand	750g	3pc	₹300	
4	Pink Lady	Australia	600g	4pc	₹400	
5	Honey Crisp	United states	1kg	6pc	₹600	
6	Grany smith	Australia	1kg	6pc	₹270	
7	Jazz Apple	New Zealand	1kg	6pc	₹400	
8	Navel	Spain	1kg	4pc	₹150	Throughout the year
9	Valencia	Spain	1kg	4pc	₹140	
10	Mandrine	China	370g – 400g	4pc	₹200	
11	Cara Orange	United states	2kg	6pc	₹300	
12	Tangor Orange	United states	3kg	15pc	₹700	
13	Malta Orange	Spain	1kg	4pc	₹220	
14	Kiwi green	New Zealand	90g - 100g	1pc	₹60	November to March
15			200g	2pc	₹120	
			450g -500g	3pc	₹150	
16	Golden Kiwi	New Zealand	100g	1pc	₹70	
			210g - 250g	2pc	₹200	
			310g - 350g	3pc	₹250	
17	Blueberry	Peru	125g	1pkg	₹150	Summer (June to August)
			500g	1pkg	₹1,000	
			125g	1pkg	₹150	
18	Red Flesh	Thailand	300g - 400g	1pc	₹100	Throughout the year
		Vietnam	1kg	3pc	₹250	
19	White	Thailand	450g - 500g	1pc	₹100	
20	Longan	Thailand	250g	1pkg	₹110	July to September
21	Passion Fruit	Brazil	450g – 500g	5pc	₹100	August to September
			1kg	9pc	₹200	
22	Pink Grape fruit	Turkey	1kg	6pc	₹280	December to April
23	Pink Grape fruit	Italy	300g	2pc	₹130	
24	Hass Tanzania	Tanzania	80g – 100g	1pc	₹120	Throughout the Year
			250 – 300g	2pc	₹300	
			500g– 600g	4pc	₹600	
			1kg	6pc	₹750	
25	Sapota Round	Mexico	250g	1pkg	₹50	Throughout the Year
26	Kimia	Iran	500g	1pkg	₹200	August to November
27	Khodary	Saudi Arabia	500g	1pkg	₹200	
28	Qyno	Iran	500g	1pkg	₹200	
29	Safawi	Saudi Arabia	450g – 500g	1pkg	₹360	
30	Rambutan	Vietnam	500g – 600g	1pkg	₹700	June to August
31	Mangosteen	Thailand	500g	6 -8pc	₹270	May to September
			1kg	15pc	₹500	
32	Lychee	China	500g	1pkg	₹280	(June to August)
33	Red Global	China	400g	1pkg	₹350	August to September
34	Green Grapes	South Africa	400g	1pkg	₹500	
35	Sweet Tamarind	Thailand	250g	1pkg	₹250	August to September
			1kg	1pkg	₹750	
36	Red Plum	China	250g	3pc	₹100	Summer (June to Sept)
			500g	5 -6pc	₹230	
37	Golden Plum	China	250g	3pc	₹120	
38	Cherry	Chile	250g	1pkg	₹500	May to June
			1kg	1pkg	₹1,250	
39	Strawberry imported	Belgium	250g	1box	₹750	April to June
40	Vermont Beauty	South Africa	450g - 500g	6pc	₹220	August to November
41	Pear Green	United States	250g	4pc	₹130	
42	Guava imported	Thailand	80g – 100g	1pc	₹36	August to November
			500g	1pkg	₹160	
43	Peach imported	Thailand	250g	1pkg	₹500	June to August
			500g	1pkg	₹750	
44	Fresh Apricot Afghani	Afghanistan	1kg	1pkg	₹500	May to June

Table 7 provides a detailed overview of imported fruit varieties available in Coimbatore City's exotic fruit market, showcasing a wide assortment of fruits from different countries. Imported apples, oranges and kiwi fruits are readily available in both online and offline retail markets throughout the year. Blueberries from Peru and tropical delights such as dragon fruit from Thailand and Vietnam are available during the summer season.

Imported apples offer a wide variety of apples, including Fuji, Royal Gala, Red Delicious, Pink Lady, Honey Crisp, Grany Smith and Jazz Apple. These apples are sourced from countries such as Japan, New Zealand, Australia and the United States. Prominent brands like "Agreen" and "Gold Fruits" are associated with different apple varieties.

The citrus category offers choices like Navel and Valencia oranges, as well as Mandrine, Cara Orange, Tangor Orange and Malta Orange, imported mainly from Spain, China and the United States.

Green and golden Kiwi, with Zespri being a prominent brand is widely available in all the stores. Blueberries, both regular and Inka Blue, come from Peru. Other exotic finds include longan fruit from Thailand, passion fruit from Brazil and dates from Iran and Saudi Arabia.

The growing popularity of exotic fruits in India has led to an increased variety of brands and options available to consumers. This expansion in the market is driven not only by the demand for these fruits but also by the desire for high-quality products. Various brands have seized the opportunity to offer to the discerning tastes of Indian consumers. Numerous brands offer a variety of these fruits, “Agreen" for apples and "Inka Blue" for blueberries, “Zespri” for Kiwi, etc. Additionally, private label branded exotic fruits can be found in “Curate” in Jio Mart, "Fresho" in Big Basket, further promoting these delightful and nutritious options to consumers.

Exotic fruits purchased by sample consumers

There are a wide variety of exotic fruits available in the market, each with its unique flavor, appearance and nutritional benefits. However, when it comes to consumer preferences and purchasing behavior, it's fascinating to note that not all exotic fruits are equally favored or frequently bought, despite consumers being aware of their existence. The sample consumers were asked about their preferred exotic fruits which they have purchased and consumed and the same is presented below in Fig. 3.

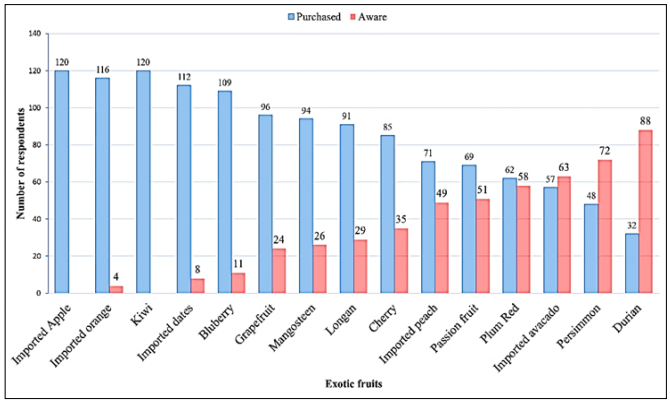

Fig. 3. Exotic fruits purchased by sample consumers.

Fig. 3 provides valuable insights into the exotic fruits that sample consumers in the study have purchased. Imported apple and kiwi are the most popular exotic fruits among the sample consumers, with 100% of the sample consumers having purchased them. This suggests a high level of familiarity and preference for these fruits, possibly due to their wide availability and established popularity in the market. Other fruits like imported oranges, imported dates and blueberries also enjoy a significant level of consumer acceptance, with purchase percentages ranging from 90.83% to 96.67%. These fruits offer unique flavors and nutritional benefits, making them attractive options for health-conscious sample consumers.

Fruits like durian, persimmon and imported avocado have relatively lower purchase percentages, indicating that they may be less commonly consumed or less preferred among the sample consumers. These fruits might have distinct taste profiles that appeal to a niche audience or are less available in the local market. The consumer preferences for exotic fruits can be influenced by factors such as taste, price, availability and cultural factors. Additionally, marketing and promotion strategies can also play a role in driving sample consumers' choices. The results revealed the diversity in consumer preferences for exotic fruits, emphasizing the importance of offering a variety of options to cater to different tastes and preferences in the market.

Preference towards extrinsic and intrinsic attributes of exotic fruits - conjoint analysis

The conjoint analysis results, as summarized in Table 8, provide insights into the importance and utility estimates of different attributes that influence consumer preferences for exotic fruits. The analysis reveals that fruit appearance is the most significant attribute, contributing 30.1% to the overall decision-making

Table 8. Preference towards extrinsic and intrinsic attributes of exotic fruits - Conjoint analysis

Attributes	Attributes Level	Utility estimate	Std. error	Mean relative importance (%)
Fruit Appearance	Vibrant color	1.065	0.068	30.099
	Shape	0.79	0.059	
	Spike or Fuzzy exterior	-0.275	0.054	
Taste	Sweet	0.157	0.069	21.056
	Tangy	0.313	0.055	
	Mild sweet and tangy	0.670	0.064	
Price	Less than Rs.200	0.443	0.074	29.866
	Rs.200 - Rs.< 500	0.886	0.148	
	More than Rs.500	-0.728	0.222	
Packaging Size	250 g	1.022	0.069	18.979
	500 g	0.772	0.139	
	1 kg	-0.150	0.206	
Constant		5.631	0.118	

process. Within this attribute, consumers showed a strong preference for vibrant color, with a positive utility estimate of 1.065, followed by shape (0.79), while fruits with a spike or fuzzy exterior were less favored, showing a negative utility estimate of -0.275. Taste was the second most important factor, with a relative importance of 21.1%. Consumers showed a preference for fruits with a mildly sweet and tangy flavor (0.670), followed by tangy (0.313) and sweet (0.157) flavors. Price also played a critical role, accounting for 29.9% of the decision-making process. Consumers preferred fruits priced between Rs. 200 and Rs. 500, with a high utility estimate of 0.886. Prices lower than Rs. 200 also had a positive influence (0.443), while prices exceeding Rs. 500 were the least preferred, with a negative utility of -0.728. Lastly, packaging size was another relevant factor, with a relative importance of 19%. Consumers showed the highest preference for the 250 g size (1.022), followed by 500 g (0.772), while the 1 kg option was the least favored (-0.150).

Total utility value of the selected combinations

Table 9 provides insights into the total utility value of selected combinations based on various product profiles and their respective importance values. These combinations reflect factors such as fruit appearance, price, taste and package size. The table shows that respondents attribute varying degrees of importance to these factors when choosing exotic fruits. For example, combinations like fruit shape with a price of less than Rs. 200, a mild sweet and tangy taste and a 250 g package size have a high total utility value of 8.556, indicating their high desirability. Similarly, a vibrant color with a price range of Rs. 200 - Rs. <500, sweet taste and a 500 g package size hold a slightly lower but still significant total utility value of 8.511. In contrast, combinations involving a spike or fuzzy exterior with a higher price (more than Rs. 500), a mild sweet and tangy taste and a 1 kg package size have a lower total utility value of 5.148, suggesting they are less appealing to consumers. The differences in utility values underline that consumers place more importance on fruit shape, vibrant color and moderate pricing when making their selections, while spike or fuzzy exteriors with higher prices tend to be less attractive.

Discussion

The demographic analysis of exotic fruit consumers in Coimbatore city, as illustrated in Table 5, reveals a diverse consumer base, with a significant proportion of female consumers (58.33%) compared to males (41.67%) (40-42). This gender disparity indicates a potential avenue for targeted marketing strategies aimed at female consumers who may be more inclined towards purchasing exotic fruits. Age-wise, the largest consumer segment falls within the 31-45 age bracket (41.67%) (43), suggesting that marketing campaigns should focus on this demographic, emphasizing the health benefits and unique flavors of exotic fruits (18-22). Educational qualifications indicate a predominantly educated consumer base, with 63.33% holding a graduate degree or higher (44), further suggesting that consumers may be more discerning and health-conscious regarding their food choices.

The market availability data presented in Table 7 highlights a wide variety of exotic fruits, indicating robust supply channels in Coimbatore. Notably, fruits like Fuji apples and Valencia oranges are available year-round, which may enhance their appeal to consumers seeking consistent access to exotic options. The price range of these fruits reflects a spectrum that caters to different income levels, with various options available below ₹200, providing accessibility to a broader audience. This aligns with findings from consumer preference studies indicating that price plays a crucial role in purchasing decisions, as reflected in Table 8, where price received a significant mean relative importance score of 29.87%.

The conjoint analysis in Table 8 further emphasizes the importance of fruit appearance, specifically vibrant color (30.10% mean relative importance), which consumers prioritize in their decision-making process (15, 45). This finding aligns with consumer behavior research, which suggests that visual attributes heavily influence fruit selection. The results also demonstrate that taste attributes, particularly mild sweet and tangy flavors, resonate well with consumers (18, 19), indicating potential flavor profiles that could be highlighted in marketing campaigns to enhance attractiveness and drive sales.

Table 9 presents the total utility values of selected combinations with fruit shape, vibrant color and competitive pricing have the highest utility values. For example, a fruit shape with a price below ₹200/ Pack and a mild sweet and tangy taste in a 250 g package (utility value 8.556) is highly preferred (46, 47). On the other hand, combinations with spike or fuzzy exteriors and higher prices, like a spike exterior with a price over ₹500 (utility value 5.148), are less desirable. This shows that consumers prioritize appearance, moderate pricing and taste, while less popular features and higher costs reduce appeal.

Overall, the insights from this study highlight the significance of aligning product offerings with consumer preferences in terms of appearance, taste and price. Marketers should leverage these findings to optimize their strategies, focusing on appealing visual presentation and competitive pricing, which are essential for enhancing consumer engagement with exotic fruits. For example, Marketing efforts have played a crucial role in familiarizing Dragon fruit. Effective marketing can highlight the positive aspects of unique fruits, including their

Table 9. Total utility value of the selected combinations

Product profile	Fruit appearance	Price	Taste	Package size	Importance value
1	Shape	less than Rs.200	Mild sweet and Tangy	250 g	8.556
2	Vibrant colour	Rs.200 - Rs. <500	Sweet	500 g	8.511
3	Vibrant colour	less than Rs.200	Tangy	500 g	8.224
4	Spike or Fuzzy exterior	Rs.200 - Rs. <500	Mild sweet and Tangy	500 g	7.684
5	Vibrant colour	Rs.200 - Rs. <500	Tangy	1 kg	7.589
6	Spike or Fuzzy exterior	Rs.200 - Rs. <500	Tangy	250 g	7.577
7	Shape	Rs.200 - Rs. <500	Tangy	1 kg	7.470
8	Shape	More than Rs.500	Mild sweet and Tangy	500 g	7.135
9	Spike or Fuzzy exterior	less than Rs.200	Sweet	250 g	6.728
10	Spike or Fuzzy exterior	More than Rs.500	Mild sweet and Tangy	1 kg	5.148

taste, health benefits and versatility in recipes. Consumers have a lower preference for larger packages of exotic fruits, indicating a preference for smaller, more manageable quantities. Future research could explore regional differences in consumer preferences for exotic fruits and the impact of health perceptions on purchasing behavior, thus providing a more nuanced understanding of this market segment.

Limitation

The study has several limitations that should be acknowledged. Firstly, it relies exclusively on data gathered through a structured, closed-ended questionnaire, which may have restricted the depth and richness of the responses, potentially overlooking nuanced insights into consumer behaviour. The accuracy of the findings depends on the respondents' honesty and reliability in answering and any biases or inaccuracies in their responses could have influenced the results. Additionally, the study captures consumer opinions at a specific point in time, which may not remain valid as market trends and consumer preferences evolve. The geographic focus on the Tiruppur and Coimbatore districts further limits the generalizability of the results to other regions with diverse demographic or retail landscapes. Moreover, some respondents were not fully engaged during the survey process, making it challenging to draw definitive and reliable conclusions. The study was also confined to organized retail stores and its findings may not extend to other retail contexts, such as traditional markets or e-commerce platforms. Lastly, external factors like economic conditions, cultural influences, or competitor activities that might impact consumer behaviour were not addressed, which could have provided additional context to the analysis. These limitations underline the scope and constraints of the study, offering a framework for interpreting the findings with caution.

Conclusion

This study provides valuable insights into the consumer preferences and market availability of exotic fruits in Coimbatore city. The demographic analysis reveals a predominantly educated and gender-diverse consumer base, with a significant segment of consumers aged 31-45 years. This demographic profile underscores the importance of tailoring marketing strategies to address the interests and needs of this group.

The extensive variety of exotic fruits available in the market, alongside their price range, highlights the potential for accessibility to a wider audience. Key attributes influencing consumer choice, particularly the visual appeal of fruits, play a crucial role in purchasing decisions. The findings from the conjoint analysis demonstrate that consumers prioritize vibrant colors and competitive pricing, while taste preferences lean towards mild sweet and tangy flavors. These insights suggest that successful marketing campaigns should emphasize the aesthetic qualities of exotic fruits, alongside promoting their flavor profiles and health benefits. Furthermore, the utility values derived from the product profiles indicate that the combination of appealing appearance, attractive pricing and desirable taste attributes significantly enhances consumer interest.

In conclusion, the exotic fruit market in Coimbatore presents promising opportunities for growth, driven by informed marketing strategies that align with consumer preferences. Future initiatives should focus on enhancing product visibility and availability while addressing the specific tastes and preferences of the target consumer base to foster increased adoption of exotic fruits in the region.

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Authors' contributions

VK performed experiments, data analysis and interpretation; wrote most of the paper and drafted the paper. MK conceived the idea and experimental design of the study, revised the scientific content of the manuscript and was head of the project. MLS provided stylish revisions to the manuscript. All authors have read and approved final manuscript.

Compliance with ethical standards

Conflict of interest: All the authors declare that they have no competing interests.

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Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used Chat GPT to improve language and readability, to reduce grammatical errors and to frame opt words and sentences ensuring that the manuscript has specific terminologies for the beneficiaries. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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