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An analysis of consumers' preferences for orange juice in India during COVID-19

Boosting the immune system's response through better nutrition has been suggested as a coping strategy to help fight COVID-19. Among other food products, orange juice, a rich source of Vitamin C, has been in huge demand in India since the outbreak of COVID-19. Panic buying has further added to this increased demand for orange juice. Using data collected through online surveys, this paper applies both conjoint and market simulation analysis to study consumers' preferences when purchasing orange juice. Nine important product attributes (flavour, preservatives, sweetener, brand, taste, pulp concentration, container, production method of orange and price) as well as different levels for each attribute are considered for the analysis. Among the selected attributes, relatively respondents gave more importance to the 'method of production' of orange, followed by 'brand', 'pulp concentration', 'sweeteners', and 'preservatives.' The market simulation analysis showed that a new product with the desired levels (high mean utility values) across the selected attributes would stand to enjoy a market share of around 32 percent. These findings support product differentiation as a strategy by firms in the food processing sector under conditions of intense competition.

Keywords: COVID-19, nutrition, orange juice, consumer preference, conjoint analysis, market simulation

JEL classifications: M21, M31, M37

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Introduction

Currently, the COVID-19 pandemic is a critical challenge across the globe. Prior to vaccines becoming available, the world has been in crisis due to the lack of a definitive medicine or a method to cure the disease. In this situation, one contentious recommended method has been to maintain a good nutritional status to fight against the virus. "Immune boosting" is also a trending topic correlated with the COVID-19 pandemic, appearing alongside numerous speculative cures, treatments, and preventative strategies. Also, there is no current evidence that any product or practice will provide enhanced "immune-boosting" protection against COVID-19. However, the public health experts continue to advise that the individual's immune system will need to adapt unaided to COVID-19 as it is the body's multi-level defence network against potentially harmful bacteria, viruses, and other organisms (Coelho-Ravagnani *et al.*, 2021). Hence, this COVID-19 pandemic has indirectly turned the world's attention towards boosting the immune system as a defensive force against disease-causing bacteria, viruses, and other organisms (Ferrarezi *et al.*, 2013).

The nutritional status of individuals has been suggested as a possible bulwark, capable of destabilising the COVID-19 pandemic. As many doctors have pointed out, vitamin C possesses antioxidants and other properties that protect the cells from substances that damage the body (Aman and Masood, 2020). A deficiency of vitamin C can lead to delayed wound healing, an inability to properly fight infections and an impaired immune response. Fortunately, orange juice and citrus juice contains more than enough of the recommended daily intake of vitamin C. Orange juice is the most consumed fruit juice world-wide and in India is no exception to this trend. It is obtained from the endocarp of the Mandarin orange (*Citrus reticulata*) fruit.

The mandarin orange is most common among citrus fruits grown in India. It occupies nearly 43 percent of the total area under citrus cultivation in India (2017-18). The area under orange cultivation in India has increased drastically from 0.12 million hectares in 1991-92 to 1 million hectares in 2017-18 and the production rose from 0.11 to 1.26 million tonnes (MA, 2018). Oranges are predominantly produced in the States of Andhra Pradesh, Maharashtra, Madhya Pradesh, Telangana, Tamil Nadu, and Punjab. Andhra Pradesh leads other states, accounting for 45 of India's orange cultivation and 61 percent of orange juice production (MA, 2018). Several varieties of oranges are cultivated in India to make orange juice. The orange juice contains substantial amounts of several micronutrients such as vitamin C, folate and polyphenols (e.g. hesperidin, which is a flavanone) and may contribute significantly to boosting the immune system.

With an increasing number of COVID-19 positive cases both in India in general and in Andhra Pradesh in particular, the demand for consumption of orange juice is on the rise. Currently, the unforeseen and significant increase in the demand for orange juice has exceeded the available supply in the Indian market. This spike in orange juice consumption can be attributed to consumers seeking out immunity-boosting food and drinks, like vitamin C-rich citrus, during the pandemic. Differences in social status, culture, environmental influences, purchasing power, motivation, and lifestyle give rise to different consumer behaviour in relation to orange juice consumption. These conditions simultaneously create opportunities for producers and processors to market a wide variety of orange juices with different attributes like flavour, brand, taste, pulp, and price, according to the needs and desires of consumers as well as the market segments targeted by traders. The consumption of orange juice has been the focus of increased public attention in times of COVID-19 due to its perceived capacity to boost the immune system.

Thus, it is vitally important to analyse consumers' preferences for different attributes and concentrations of orange juice, as well as to highlight how orange juice can be promoted in respect of the product attributes that matter most to consumers. Consequently, conjoint analysis and market simulation analysis have been employed in this study with a view to sustaining the marketability of new products.

Review of literature

Many studies have been conducted on consumer preference for food products; here, an attempt has been made to present a critical review of the literature relating to orange juice. Ferrarezi *et al.* (2013) analysed the impact of label information on the consumer intent to purchase ready-to-drink orange juice and nectar by applying conjoint analysis to data from Brazil. A convenience sample of 149 consumers and a factorial design featuring four characteristics, price, brand, information about the product and kind of beverage, were used. Three levels were established for brand and product information, and two for price and kind of beverage. Findings of the study revealed that low price, product information and the market leading brand had a positive impact on buying intentions. 'No preservatives/natural' was the information that most influenced consumer's purchase intent. The authors also suggested that these results could be useful for the strategic planning of consumer education and might also have important implications for Brazilian orange juice manufacturers.

Sriratana and Limsombunchai (2010) analysed the factors influencing the pure orange juice purchasing decisions of consumers in the Bangkok Metropolitan area by employing both descriptive analysis techniques and conjoint analysis. Their survey, which was conducted among 400 sample consumers, revealed that being able to see a certificate of standard and quality assurance was the most important factor influencing the pure orange juice purchasing decisions of consumers, followed afterwards by nutrition and price factors, respectively. Types of oranges and packaging were found to be relatively insignificant factors by comparison.

Luckow and Delahunty (2004) analysed the consumer acceptance of orange juice containing functional ingredients, performing a descriptive sensory analysis on four functional orange juices and seven conventional orange juices. The survey conducted on 100 consumers revealed that they generally preferred the sensory characteristics of conventional juices. The study also revealed the existence of a small consumer segment (11%) that significantly preferred the sensory attributes of functional juices. Annunziata and Vecchio (2013) applied conjoint analysis to explore consumers' evaluation of four attributes of probiotic functional foods: base product (yoghurt, orange juice and biscuits), health claim (generic, psychological and prevention), price (high, regular and low) and brand (familiar and unfamiliar). Their analysis revealed that consumers considered the base product as the most important attribute in selecting a probiotic functional food, followed afterwards by the prevention claim. Further, customer groups differ significantly in their evaluation of the perceived healthiness of functional foods and in the importance that they attach to price and brand.

Windhita *et al.* (2017) analysed the quality attributes and factors that influence consumers' preferences for local oranges and imported oranges in Indonesia. Conjoint analysis revealed that the taste of local oranges is the most important attribute, followed by colour and size; meanwhile, for imported oranges colour and size are the major attributes. In terms of flavour, local oranges were considered superior to imported oranges. However, where colour and size attributes were concerned, imported oranges were viewed as being superior to local oranges. Consequently, the researchers concluded that consumers prefer local oranges to imported oranges on account of their flavour and taste.

Methodology

Food choice and consumption are complex phenomena, influenced by various psychological and sensory-categorical factors associated with marketing. The initial product evaluation and satisfaction after use are the factors that consumers generally consider when selecting a food product. The quality of the product, which can be considered to be an important factor in this context, can be perceived in various forms such as flavour, preservatives, sweeteners, taste and so on (intrinsic cues). When it is difficult to assess a product from its intrinsic cues, consumers often rely on extrinsic cues such as price, brand name, container, or method of production to infer the quality of the product indirectly (Sethuraman and Cole, 1999; DelVecchio, 2001). The qualities or attributes can contribute to a market-oriented approach in developing new products since it is a broad concept and is well recognised in terms of marketing and consumer behaviour (Ophuis and van Trijp, 1995).

Literature research and in-depth interviews with sector experts were carried out to determine the definitions of important orange juice attributes to be included in this study. Research attributes and attribute levels were limited based on the information obtained and accordingly, nine attributes and 27 levels (3 levels/attribute) were identified to study their effects on the purchase of orange juice for conjoint measurement (Table 1). Conjoint analysis has been widely used to assess the consumer's preference for and purchase intention towards various food products (see e.g. Asioli *et al.*, 2014; Ferrarezi *et al.*, 2013; Mann *et al.*, 2012; Ares *et al.*, 2008; Haddad *et al.*, 2007; Helgesen *et al.*, 1998; Gil and Sanchez, 1997). It is a multivariate technique that models the purchase decision-making process by analysing consumer trade-offs among hypothetical multi-attribute products. Thus, in a conjoint analysis, a product can be described as a combination of a set of attribute levels, where a utility is estimated for each level to quantify the value that an individual gives it. The utility values contributed by each attribute level determine purchasers' total utility or overall judgment of a product (Green and Srinivasan, 1978). Consequently, in this study, the conjoint analysis was deemed appropriate to measure the consumers' preferences of orange juice. This research was intended to describe and analyse the consumers' socio-economic profile, consumers' preferences for the combination of desirable orange juice attributes as well as to provide a market simulation analysis for introducing a new product

with the desired levels of attributes based on the higher average utility values. A discrete conjoint model was selected for this study, and no assumptions were made regarding the relationships between attributes and product scores.

The research was conducted in East Godavari, West Godavari, Chittoor, Guntur and Ananthapuramu districts of Andhra Pradesh purposively as the number of COVID-19 cases had begun to increase alarmingly in these districts since March 2020. The sample required to collect the requisite data was drawn in accordance with the formula proposed by Yamane (1967):

$$n = \frac{Z^2 P(1 - P)}{e^2} = \frac{(1.96)^2 0.5(1 - 0.5)}{0.05^2} = 384.16 \quad (1)$$

Accordingly, 500 sample respondents (100 respondents from each district) were selected through the convenience sampling method (in view of COVID-19 pandemic) for getting the requisite data. The respondents visiting 'more' supermarkets in each district to purchase orange juice (on the dates of data collection) were interviewed with the help of a pre-tested schedule. The selected respondents were the end consumers who decided to buy orange juice. They were found in a condition of preferring to buy orange juice to boost their immunity against COVID-19.

The primary data considered in this study were collected from sample respondents through online questionnaires. The first online questionnaire was employed to identify the attributes and attribute levels desired by respondents. The next questionnaire involved choosing a combination of attributes from the popular attributes (Table 1) selected in

Table 1: Attributes and levels used in conjoint analysis.

Attributes	Levels
Flavour	<ul style="list-style-type: none"> Similar to fresh orange Stronger than fresh orange Weaker than fresh orange
Preservatives	<ul style="list-style-type: none"> Sodium Benzoate (SB) or Potassium Sorbate (PS), or Citric Acid (CA) in 500 PPM SB or PS or CA in 750 PPM SB or PS or CA in 1000 PPM
Sweeteners	<ul style="list-style-type: none"> Low calories, Natural sweetener No calories, Artificial sweetener High calories, Sugar/Honey
Brand	<ul style="list-style-type: none"> B Natural Patanjali Tropicana
Taste	<ul style="list-style-type: none"> More sour than sweet More sweet than sour Balanced sweet and sour
Pulp	<ul style="list-style-type: none"> More pulp Medium pulp No pulp
Container	<ul style="list-style-type: none"> Plastic Bottle with screw cap Plastic Pouch with screw cap Paper Pouch with Straw
Method of Production of Orange	<ul style="list-style-type: none"> Fully Organic Conventional use of PPC Reduced use of PPC
Price (Rs/litre)	<ul style="list-style-type: none"> >100 75-100 <75

Source: Own composition

the first questionnaire. Therefore, by employing the orthogonal procedure, 20 combinations (profiles) of attributes and levels were obtained. This methodology was followed because although a full factorial design ($3^9 = 19683$ profiles) in conjoint analysis would provide all the effects that can be obtained from the parameters corresponding to the main effects, such a huge amount of information might overload the interviewee or cause them to lose interest, adversely affecting the quality of their answers.

For this reason, researchers often use fractional factorial designs that are less than full factorial designs (Wehmeyer and Lankenau, 2005). To help obtain reliable data, two basic principles of orthogonality and equilibrium have been applied. By employing the orthogonal design, participants' fatigue can be reduced to a minimum; thereby, 19683 combinations are reduced to 20. The rule of thumb is the minimum number of choice sets should be equal to $[(1 + \text{Total number of attribute levels}) - \text{Number of attributes}] = [(1 + 27) - 9] = 19$. With the orthogonal design, the number of combinations of attributes and attribute levels is simplified to 20 (Appendix 1) to make it easier for the consumers to describe their orange juice preferences. The resultant combinations were again offered back to the respondents by means of the second online questionnaire, whose purpose was to measure the likelihood of buying orange juice. The respondent's task was to assess product attributes on a twenty-point scale, where 1 is "would definitely not purchase" and 20 is "would definitely purchase". Consumer appraisal (intention to buy) represents the dependent variable and attribute levels represent independent variables in conjoint analysis.

Utility is a conceptual basis for measuring value in a conjoint analysis, which is an assessment of subjective preferences that are unique for each respondent. The conjoint analysis's main output is a series of utility values for each level of the attributes considered above. Each attribute that enjoys higher utility value will have a higher preference and a higher chance of being selected and *vice versa*. The predicted preference for each level of selected attributes of orange juice would be obtained from the merging of these utilities across the respondents. This is given by:

$$Y = X_1 + X_2 + X_3 + \dots + X_n + \text{Constant} \quad (2)$$

where the independent variables on the RHS are the attributes of orange juice. These independent variables are non-metric (ranked) data for different profiles of the orange juice, considering different levels across the selected attributes. While the dependent variable, Y is the overall or total utility preference of the respondent to different levels across different attributes. This dependent variable also includes consumer ratings of the importance of levels across the attributes of a product. Thus, in this study,

$$\begin{aligned} \text{Total utility} = & \text{Utility } X_1 \text{ (attribute level 1 to } i) + \\ & + \text{Utility } X_2 \text{ (attribute level 2 to } i) + \\ & + \text{Utility } X_3 \text{ (attribute level 3 to } i) + \\ & + \text{Utility } X_4 \text{ (attribute level 4 to } i) + \\ & + \text{Utility } X_5 \text{ (attribute level 5 to } i) + \\ & + \text{Utility } X_6 \text{ (attribute level 6 to } i) + \\ & + \text{Utility } X_7 \text{ (attribute level 7 to } i) + \end{aligned}$$

$$\begin{aligned}
 & + \text{Utility } X_8 \text{ (attribute level 8 to } i) + \\
 & + \text{Utility } X_9 \text{ (attribute level 9 to } i) + \text{Constant}
 \end{aligned}$$

where, Y = total utility, X_1 to X_9 = Predicted utility values of (nine) selected attributes and *Constant* = the constant value in the analysis. The mean utility values across all the selected profiles serve as the analysis summary. They are used to derive the importance and relative importance of an attribute. Attribute importance is the difference between the highest and lowest utility levels of the attribute. The relative importance of an attribute is essentially its share of importance. If the distance between the utility levels of an attribute is large (i.e. the difference between highest and lowest utility levels of the attribute), then that attribute will have a larger bearing on the respondents' choice of product than another attribute, where the distance is not as large. The distance, therefore, reflects the importance of the attribute in determining consumer preferences.

As this study aims at concerning the consumers' preferences for different levels across selected attributes of orange juice consumption in selected districts of Andhra Pradesh, it will provide a clear picture for designing an effective marketing strategy for this product in tune with the consumers' preferences. The knowledge about various attributes' relative importance can help analyse marketing simulation (and even advertising decisions). Thus, a market simulation analysis is also carried out to make it possible for firms to direct attention and resources for improving the product towards the attributes and desired attribute levels that are of greatest importance to target consumers.

Results

Table 2 summarises the respondents' demographic profile. Out of the total sample, 65 percent are male, and the remaining 35 percent are female. Around 38 percent of the

Table 2: Socio-economic profile of orange juice preferring selected respondents ($n = 500$).

Consumer's Features	Frequency	%
Gender:		
Male	325	65
Female	175	35
Age:		
Under 20	83	16.6
21–35	192	38.4
36–50	128	25.6
>50	97	19.4
Educational Background:		
Illiterate	21	4.2
High School	52	10.4
Graduate	352	70.4
Post-graduate	75	15
Monthly income (Rs):		
<10,000	73	14.6
10,001 to 25000	206	31.2
25001 to 50,000	142	38.4
>50,000	79	15.8
Place of living:		
Rural	128	25.6
Urban	372	74.4

Source: Own composition

participants are of ages 21 – 35 years, 26 percent are of ages 36 – 50 and about 20 percent are aged over 50 years. Most of the participants are educated to at least graduate level (85%), and only four percent of the selected respondents are illiterate. Around 54 percent of the respondents are engaged in the service industry, and they enjoy a monthly income in excess of Rs. 25000 (appr. \$330). It seems that the tendency to consume orange juice remained biased towards this higher income group. A further classification was also made in to consider the effect of residential locality on orange juice consumption. It was noticed that almost three quarters of the sample respondents (74%) were urban consumers. Thus, in contrast to consumers from rural areas, urban consumers were well represented in this study.

Table 3: Utility value of each attribute level (consumers in general).

Attributes	Levels	Mean Utilities	SE
Flavour	Similar to Fresh Orange	0.061**	0.025
	Stronger than fresh orange	0.024	0.100
	Weaker than fresh orange	-0.085*	0.101
Preservatives	SB or PS or CA in 1000 PPM	-0.147*	0.101
	SB or PS or CA in 500 PPM	0.064	0.092
	SB or PS or CA in 750 PPM	0.083**	0.094
Sweeteners	High calories, Sugar/Honey	-0.137*	0.086
	Low calories, Natural sweetener	0.125**	0.095
	No calories, Artificial sweetener	0.012	0.103
Brand	B Natural	-0.162*	0.098
	Patanjali	0.172**	0.089
	Tropicana	-0.01	0.097
Taste	Balanced sweet and sour	0.094**	0.095
	More sour than sweet	-0.097*	0.098
	More sweet than sour	0.003	0.095
Pulp	Medium pulp	0.147**	0.100
	More Pulp	0.032	0.100
	No pulp	-0.179*	0.101
Container	Plastic bottle with screw cap	-0.024*	0.105
	Plastic pouch with screw cap	-0.02	0.092
	Paper pouch with straw	0.044**	0.099
Method of Production of Orange	Conventional use of PPC	-0.007	0.091
	Fully Organic	0.184**	0.088
	Reduced use of PPC	-0.177*	0.100
Price (Rs/litre)	<75	0.017	0.105
	>100	-0.052*	0.095
	75-100	0.035**	0.108
Constant		10.508	0.025

** The highest utility values represent more value from the consumer's perspective.

* The lowest utility values represent less value from the consumer's perspective.

Source: Own composition

Where utility estimates are concerned, the greatest positive value from the consumer's preferences indicates the most preferred attribute level by the consumer, whereas the smallest negative value indicates the least favourable attribute level by the consumer. Meanwhile, the total value of utility with the largest positive value shows the most preferred combination of attributes.

From Table 3 and Figure 1 shows that in general, the most preferred attribute level is 'fully organic' (0.184) from the 'method of production of orange' attribute, and the least favoured level is 'no pulp' (-0.179) which is in the 'pulp' attribute. The 'fully organic' level concerning the 'method of production' of orange attribute recorded the highest (positive) utility value whereas by contrast, the remaining two levels 'conventional use of PPC' and 'reduced use of PPC' recorded negative utility values of -0.007 and -0.177, respectively.

For 'brand', the consumers preferred 'Patanjali' (0.172), while the least popular one is 'B Natural' with a utility value of -0.162. The consumers preferred the Patanjali brand because of the strong perception that the product is 'organic' (close to the nature); that is, 'pesticides/chemical-free' and 'without adulteration'. Further, in view of the ongoing slowdown of the Indian economy amid the COVID-19 crisis, consumers now prefer Swadeshi products as they wish to revive it. This company has limited advertising expenses (only through regional newspapers, some digital advertising, etc.) and consequently, offer a quality product at lower prices. The firm is also offering this product through its website where the customers can order it and can take advantage of free delivery if the order value exceeds Rs. 499 (around \$7). Interestingly, other companies that also sell orange juice online do not offer such discounts.

For the 'pulp' attribute, the 'medium pulp' level is preferred to 'no pulp' by the consumers with the highest utility value of 0.147. For the attribute, 'sweeteners', the consumers preferred 'low calories, natural sweetener' with the highest utility value of 0.125 against 'high calories, sugar/honey'.

Reasons for this include increasing concerns surrounding health and nutrition, enhance palatability, high stability in food and a significant expansion in sucralose availability in India since 2002 (Allison and Kristina, 2016).

For 'taste' and 'preservatives' attributes, the consumers preferred 'balanced sweet and sour (0.094)' and 'SB, PS and CA each in 750 PPM (0.083)' levels, respectively. The survey highlighted that the consumers blame carbohydrates, and specifically sugar, for weight gain. This is because (artificial) sugars continue to be the most cited cause of weight gain. Hence, they preferred natural sweeteners in the orange juice, but not at the expense of the great taste of 'balanced sugar and sour' in the orange juice, as taste is, and will remain, one of the biggest drivers of purchase intent. Nowadays, the preservation of fruit juice has become a business activity of great significance, especially in COVID-19. This is because the demand for orange juice is currently rising sharply and outstrips its supply, meaning that if producers wish to make the product available to the consumers even during the off-season without suffering from microbial spoilage during storage, the use of preservative chemicals is inevitable. However, though the consumers are largely uninformed about the selected preservatives' chemical properties, they prefer to have them in medium concentration in the orange juice.

Even among the different levels of flavour attribute, the consumers preferred 'similar to fresh orange' with the highest utility value of 0.061 compared to the other two levels, stronger than 'fresh orange' and 'weaker than fresh orange'. This implies that they prefer natural flavours and are against adding artificial (non-natural) ingredients in the orange juice. It is also interesting to observe that the consumers showed interest in paper pouch containers (with a utility value of 0.044) instead of plastic pouch containers for orange juice given environmental health and safety factors. Further, this paper pouch (aseptic package) provides excellent protection for the ready to serve fruit juices. They

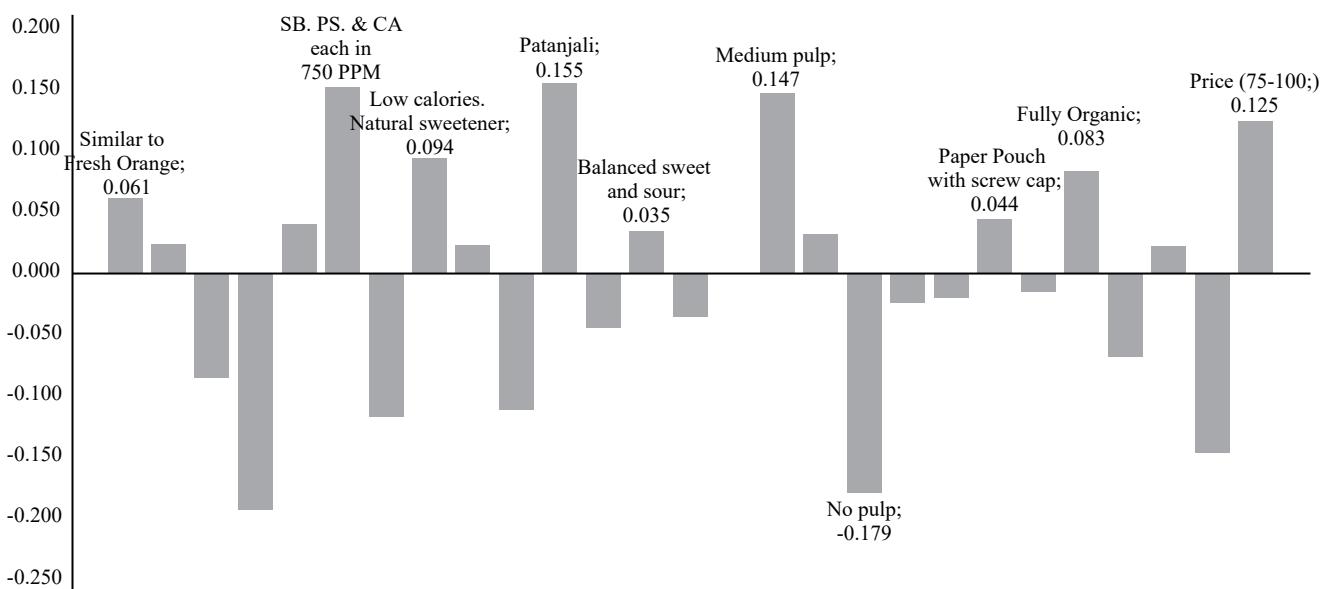


Figure 1: Mean utility values of each attribute level.

Source: Own composition

are made by combining thermoplastic with paperboard and aluminium foil. Their multi-layered construction enables the carton to protect the contents from various factors responsible for spoilage. The aluminium foil layer is a strong barrier for O₂ and light. The inner plastic layer made of polyethylene makes it possible to seal through the liquid. The outer paper layer provides stiffness making it possible for the cartons in a brick shape, thus, enabling maximum utilisation of available storage and transportation space. Excellent graphics may also lead to good display and shelf appeal and may also permit the printing of technical ingredient details on the container.

It is important to note that because of inelastic demand for the orange juice during the post-COVID regime, the levels of the 'price' attribute recorded very low utility values. Though the 'price' of the product is a crucial topic in marketing literature, it seems that this attribute has limited importance in the orange juice purchasing decision, especially during the post-COVID regime, given the persistent increase in demand for this product market. Even the reputed online stores are displaying non-availability of orange juice on their respective websites due to a sharp increase in demand. Interestingly, from a marketing perspective, the orange juice with less fresh orange flavour, very high level (1000 PPM) of preservatives, higher doses of sweeteners (honey), plastic containers, the total absence of pulp, reduced use of PPCs in the method of production of the orange and higher market price are negatively perceived by the consumers. Thus, personal health benefits and the opportunity to purchase a brand (*Swadeshi*) that manufactures orange juice from organically produced oranges are given more weight and assigned higher utility values by consumers.

The above findings are quite different to the results of earlier studies conducted by Luckow and Delahunty (2004) and Anisa *et al.* (2017), as the current study indicates consumers' preferences for orange juice in the light of COVID-19 pandemic. It has been shown that, in the Indian context during the pandemic, consumers are exhibiting increased quality consciousness focusing first on the 'method of production of the produce' (organic production) followed afterwards by the 'Brand' producing the orange juice (close to the nature), and the presence of medium fruit pulp, with low calories and natural sweeteners. Consequently, the attributes relevant to the health consciousness of the consumers outweighed other attributes like flavour, preservatives, price, taste and shape of the container. However, the present findings are in tune with the study conducted by Ferrarezi *et al.* (2013), where the consumers (selected through Convenience sampling method) preferred 'natural' product of orange juice.

It therefore becomes apparent that the choice of attribute levels has a critical bearing on perceived attribute importance, and this highlights why both the highest and the lowest prevalent levels should preferably be included in the research design to get unbiased estimates of the importance of attributes. If the range of levels within an attribute is stretched beyond the market's prevailing levels, its importance will be inflated. Since it may not always be desirable or feasible to cover a realistic range of levels within

attributes, the correct interpretation should be in terms of the relative importance of the selected attributes. The findings are shown in Table 4.

It was observed that for the average consumer, given the attribute properties tested in terms of relative importance, 'method of production' has the strongest influence with 19.91 per cent on the decision-making, followed by brand, pulp, sweeteners, taste, preservatives, flavour, container, and price. This shows that consumers are aware of the benefits of organic food that contribute to better health through reduced pesticide residues and increased nutritional quality. Accordingly, the consumers considered 'Brand' as the next important attribute for the firm that market orange juice manufactured from organically produced oranges. The other attributes like pulp, sweetener, preservatives, taste, flavour, price, and container are followed in the order of preference. Contrary to the expectations, 'price' was accorded less priority in choosing the product, as the respondents' health consciousness outweighed the expenditure incurred on it implying that there is inelastic demand for the product in the market in view of the COVID-19 pandemic. This knowledge concerning the relative importance among various attributes as perceived by the consumers can assist the firms in planning marketing and advertising decisions of the product. Consequently, other factors being equal, one would devote greater attention and resources to improving a product in respect of attributes that are of greatest importance to target consumers.

Product developers are always faced with trade-offs. For instance, using lesser sugar and honey in the orange juice would result in a decline in its price. Whether this could increase demand for the product in the market could be gauged by examining the trade-offs that consumers are willing to make.

Figure 2 illustrates trade-off analysis across the two attributes, pulp, and sweeteners. Assume the firm that currently produces orange juice with medium pulp and sweeteners comprising high calories, sugar/honey is considering switching to medium pulp with low calories, natural sweeteners, or going for more pulp with no calories, artificial sweeteners. The utility improves by + 0.262 (= 0.272 – 0.01) if the firm maintains medium pulp but switches to low calories and natural sweeteners. Likewise, the utility improves by + 0.034 (= 0.044 – 0.01) if the firm uses more pulp along

Table 4: Relative Importance among selected attributes.

Source	Importance	Relative Importance (%)
Flavour	0.15	8.05
Preservatives	0.23	12.69
Sweeteners	0.26	14.45
Brand	0.33	18.42
Taste	0.19	10.54
Pulp	0.33	17.98
Container	0.07	3.75
Method of production of orange	0.36	19.91
Price	0.09	4.80

Source: Own composition

with no calories and artificial sweeteners in the orange juice. Comparing these, the firm can deduce that an average consumer will prefer the increase in natural sweeteners in the orange juice over the increase in pulp quantity.

Similarly, assume the firm currently produces orange juice with medium pulp and sweeteners comprising high calories, sugar/honey is considering whether to retain with medium pulp, but with no calories, artificial sweeteners, or going for more pulp with low calories, natural sweeteners. The utility improves by + 0.149 (= 0.159 – 0.01) if the firm maintains medium pulp but with no calories, artificial sweeteners. Likewise, the utility improves by + 0.147 (= 0.157 – 0.01) if the firm uses more pulp with low calories, natural sweeteners in the orange juice. Comparing these, the firm can deduce that an average consumer will prefer the increase in artificial sweeteners in the medium pulp orange juice over the increase in pulp quantity and use of low calories, natural sweeteners. Thus, the firm can apply the trade-off analysis to make important product design and marketing decisions to boost the product's demand.

In analysing the issue further, the main advantage of conjoint analysis is that it allows one to simulate a market even if the consumers have not tested the product(s). In this case, the market for orange juice concerning different profiles is analysed. This helps one to compare the market shares associated with the new (desired) product (named Product 4 with all desired levels across selected attributes, as concluded in Appendix 1) with the existing products in the market. Thus, on running the market simulation model (Appendix 2), the new Product 4 enjoys the highest market share of around 32 percent compared to other products. This result seems satisfactory to launch this Product 4 in the market with the

levels preferred across the respondents' attributes. The firms are even further interested in eliciting the consumers' preferences for another new Product 5 with different intrinsic cues (taste, pulp, preservatives, sweeteners) and extrinsic cues (method of production of orange, price, and brand). Regarding Simulation 2, the market share of new Product 5 to be introduced into the market with changed intrinsic and extrinsic cues enjoy a lower share (27.50) than Product 4 (32.00) of Simulation 1. Consequently, it would be better to include the attributes and attribute levels of orange juice as desired by the consumers (i.e. Product 4).

Conclusions

With the onset of the COVID-19 pandemic, there is increasing awareness among the public to consume orange juice to boost their immune against the COVID-19 pandemic. This study investigated consumers' preferences relating to orange juice purchasing decisions (through employing conjoint analysis) and further provided a simulation of the market for a new product to be released with the attributes and attribute levels desired by them. The findings revealed that the 'method of production of orange' is the most important attribute followed by the 'brand' being available in the market, and the presence of medium fruit pulp, with low calories and natural sweeteners. It is interesting that the priority where the brand is concerned is methods of producing the orange juice that are close to the nature (using natural sweeteners in the final product). This result could be perceived as an expected one because, consumers have become more health conscious in the light of COVID-19 pandemic.

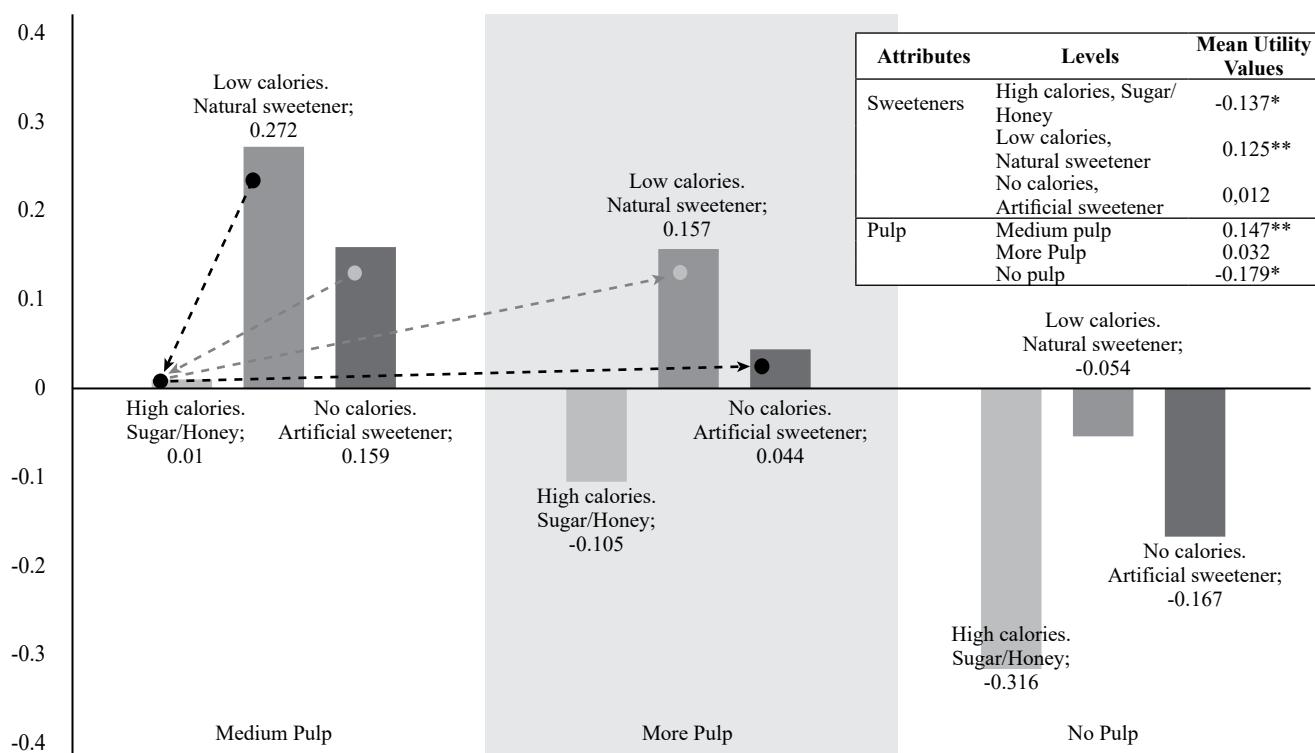


Figure 2: Trade-off analysis across the levels of Pulp and Sweeteners Attributes of orange juice.

Source: Own composition

However, and contrary to expectations, the product's 'price' was assigned lesser importance by the consumers, as there is inelastic demand for orange juice in the market. In contrast to earlier studies, attributes pertaining to health consciousness (like method of production of orange, a 'brand' producing orange juice using methods that are close to the nature, medium fruit pulp, with low calories and natural sweeteners) outweighed other attributes like flavour, preservatives, price, taste, and shape of the container in the light of COVID-19 pandemic.

Market simulation analysis revealed that the proposed new product (Product 4) with the desired attributes and attribute levels perceived by the respondents might expect to enjoy a market share of around 32 percent, and this is encouraging for the firms to launch such a product into the market. These results could also be useful for strategic planning of consumer instruction and have important implications for orange juice manufactures in the study area (Ferrarezi *et al.*, 2013). However, this research suffers from few limitations, such as the limited number of product attributes and attribute levels, while the survey respondents were selected through convenience sampling method and were also frequently contacted through emails and mobile phones (to cross-check the data supplemented by them) because of the COVID-19 pandemic. Furthermore, the effects of demographic factors were not analysed with respect to demand and orange juice attributes. Hence, there is scope for further research that takes into account more attributes and attribute levels and is applied to a wider geography.

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Appendix

Appendix 1: Profiles used to evaluate the buying preferences of orange juice.

Profile	Flavour	Preservatives	Sweeteners	Brand	Taste	Pulp	Container	Method of Production	Price (Rs/litre)
Profile 1	Weaker than fresh orange	SB or PS or CA in 1000 PPM	No calories, Artificial sweetener	B Natural	More sour than sweet	More Pulp	Paper Pouch with Straw	Reduced use of PPC	>100
Profile 2	Stronger than fresh orange	SB or PS or CA in 500 PPM	Low calories, Natural sweetener	B Natural	More sweet than sour	Medium pulp	Paper Pouch with Straw	Conventional use of PPC	75-100
Profile 3	Similar to Fresh Orange	SB or PS or CA in 500 PPM	High calories, Sugar/Honey	Patanjali	Balanced sweet and sour	Medium pulp	Paper Pouch with Straw	Conventional use of PPC	>100
Profile 4	Similar to Fresh Orange	SB or PS or CA in 500 PPM	No calories, Artificial sweetener	Patanjali	More sour than sweet	More Pulp	Plastic bottle with screw cap	Conventional use of PPC	75-100
Profile 5	Stronger than fresh orange	SB or PS or CA in 1000 PPM	Low calories, Natural sweetener	Patanjali	Balanced sweet and sour	No pulp	Plastic bottle with screw cap	Reduced use of PPC	>100
Profile 6	Weaker than fresh orange	SB or PS or CA in 500 PPM	High calories, Sugar/Honey	B Natural	More sour than sweet	Medium pulp	Plastic Pouch with screw cap	Fully Organic	<75
Profile 7	Stronger than fresh orange	SB or PS or CA in 500 PPM	No calories, Artificial sweetener	B Natural	More sweet than sour	No pulp	Plastic bottle with screw cap	Reduced use of PPC	<75
Profile 8	Stronger than fresh orange	SB or PS or CA in 750 PPM	High calories, Sugar/Honey	Tropicana	More sweet than sour	More Pulp	Plastic Pouch with screw cap	Conventional use of PPC	>100
Profile 9	Weaker than fresh orange	SB or PS or CA in 750 PPM	High calories, Sugar/Honey	Patanjali	More sweet than sour	More Pulp	Plastic bottle with screw cap	Reduced use of PPC	75-100
Profile 10	Stronger than fresh orange	SB or PS or CA in 1000 PPM	No calories, Artificial sweetener	Patanjali	More sour than sweet	Medium pulp	Plastic Pouch with screw cap	Fully Organic	75-100
Profile 11	Weaker than fresh orange	SB or PS or CA in 1000 PPM	No calories, Artificial sweetener	Tropicana	More sweet than sour	Medium pulp	Plastic bottle with screw cap	Conventional use of PPC	<75
Profile 12	Similar to Fresh Orange	SB or PS or CA in 1000 PPM	Low calories, Natural sweetener	B Natural	Balanced sweet and sour	More Pulp	Plastic Pouch with screw cap	Conventional use of PPC	<75
Profile 13	Stronger than fresh orange	SB or PS or CA in 750 PPM	High calories, Sugar/Honey	B Natural	More sour than sweet	No pulp	Plastic bottle with screw cap	Conventional use of PPC	75-100
Profile 14	Stronger than fresh orange	SB or PS or CA in 750 PPM	Low calories, Natural sweetener	Tropicana	More sour than sweet	No pulp	Paper Pouch with Straw	Reduced use of PPC	<75
Profile 15	Similar to Fresh Orange	SB or PS or CA in 1000 PPM	High calories, Sugar/Honey	Tropicana	More sweet than sour	No pulp	Paper Pouch with Straw	Fully Organic	75-100
Profile 16	Weaker than fresh orange	SB or PS or CA in 500 PPM	Low calories, Natural sweetener	Patanjali	More sour than sweet	No pulp	Plastic Pouch with screw cap	Conventional use of PPC	>100
Profile 17	Similar to Fresh Orange	SB or PS or CA in 750 PPM	No calories, Artificial sweetener	B Natural	Balanced sweet and sour	Medium pulp	Plastic Pouch with screw cap	Reduced use of PPC	75-100
Profile 18	Weaker than fresh orange	SB or PS or CA in 500 PPM	No calories, Artificial sweetener	Tropicana	Balanced sweet and sour	More Pulp	Plastic bottle with screw cap	Fully Organic	75-100
Profile 19	Weaker than fresh orange	SB or PS or CA in 750 PPM	No calories, Artificial sweetener	Patanjali	Balanced sweet and sour	No pulp	Paper Pouch with Straw	Fully Organic	<75
Profile 20	Similar to Fresh Orange	SB or PS or CA in 750 PPM	Low calories, Natural sweetener	B Natural	More sweet than sour	Medium pulp	Plastic bottle with screw cap	Fully Organic	>100

Source: Own composition.

Appendix 2: Simulation of market and shares of products.

Product ID	Flavour	Preservatives	Sweeteners	Brand	Taste	Pulp	Container	Method of Production of orange	Price (Rs/lit)	Market Share (%) (Simulation 1)	Market Share (%) (Simulation 2)
Product 1	Similar to Fresh Orange	SB, PS, & CA each in 500 PPM	Low calories, Natural sweetener	B Natural	Balanced sweet and sour	More Pulp	Plastic bottle with screw cap	Fully Organic	>100	29.00 (0.29)	26.50 (0.265)
Product 2	Stronger than fresh orange	SB, PS, & CA each in 750 PPM	No calories, Artificial sweetener	Patanjali	More sweet than sour	Medium pulp	Plastic Pouch with screw cap	Conventional use of PPC	75-100	25.00 (0.25)	24.00 (0.240)
Product 3	Weaker than fresh orange	SB, PS, & CA each in 1000 PPM	High calories, Sugar/ Honey	Tropicana	More sour than sweet	No pulp	Paper Pouch with Straw	Reduced use of PPC	<75	14.00 (0.14)	22.00 (0.220)
Product 4	Similar to Fresh Orange	SB, PS, & CA each in 500 PPM	Low calories, Natural sweetener	Patanjali	Balanced sweet and sour	Medium Pulp	Paper Pouch with Straw	Fully Organic	Rs.75-100/lit	32.00 (0.32)	--
Product 5	Similar to Fresh Orange	SB, PS, & CA each in 1000 PPM	High calories, Sugar/ Honey	Tropicana	More sweet than sour	More pulp	Paper Pouch with Straw	Reduced use of PPC	>100	--	27.50 (0.275)

Note: Figures in parentheses indicate utility values.

Source: Own composition