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Assessing consumer behaviour for value added innovative products

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Abstract
It is well documented in literature that the success or failure of an innovative food product is heavily dependent upon the consumer demands and needs which can be studied through a consumer behaviour survey. Our study therefore aimed at understanding the consumer behaviour for the prospective development and successful launch of innovative value-added, high fiber fruit preserves containing unconventional foods (basil seeds) and by-products (apple pomace) as principal ingredients. The consumer behaviour survey was conducted on 115 respondents (college students, female); 22 to 25 from North, South, East, West and Central Delhi. For this survey a brief questionnaire was developed, designed and pre tested (n=4). Data were gathered by the help of the questionnaire and unstructured interview. Data of the consumer behaviour survey indicated that the mean age of the participants was 23.5 (17.1 to 27.0) years. Nearly 77.3 per cent had liking for sweet preserves and 70.43 per cent consumed sweet preserves though with variable and usually low frequencies. The major reasons for not consuming sweet preserves (N=34) were attributed to their high energy density/other health concerns (n=20, 58.7 per cent), high intensity of sweet taste (n=9, 26.4 per cent), and high cost (n=5, 14.07 per cent). The frequency of consumption and hence the consumer demand for jams and squashes was higher than that of jellies, marmalades and murabbas. While 96 per cent of the respondents did not have knowledge about apple pomace – the key ingredient to be used in the proposed apple pomace and basil seeds preserve, only 6 per cent were not aware about the health benefits of basil seeds. Nearly all i.e. 95 per cent participants indicated interest in gaining more knowledge about apple pomace and basil seeds. The data indicated that there was scope for the development and subsequent launch of sweet preserved products which are safe, nutritious, economical and contain byproducts of the food industry/unconventional, traditional foods. The data were also a pointer to the fact that there would be a need to sensitize the public (awareness generation campaigns, audio visual media, booklets with the pack of the product, public talks, seminars, conferences etc.) about apple pomace and basil seeds before the launch of innovative products containing such ingredients in the market. Data regarding the probability of consuming (73.9 per cent) and purchasing (71 per cent) the new product were very encouraging as majority of the respondents gave positive response for both the aspects.

Keywords: Apple Pomace, Basil Seeds, Consumer Behaviour Survey, Innovation, Value- added products.

1. Introduction
Nowadays, food product development is a continuous process and a matter of great concern to all companies active in the food processing industry. New product and/or process development is vital for the survival and successful handling of competition in the market. Product and Process Development is a systematic, commercially oriented research required to develop products and processes satisfying a known or suspected consumer need. Product development is to a great extent dependent upon the demands and needs of the consumer. However, consumer demands keep changing over time. These changes range from basic considerations such as improving food safety, shelf life, and reducing wastage, to demands for increasingly sophisticated foods having special characteristics in terms of nutritional value and palatability (Winger and Wall, 2006, Anita RL *et al*, 2006 and Chip.P and Cochet M, 2009) [8, 1, 2]. The culmination of information regarding consumer demands and expectations, existing scientific data, as well as technical expertise is necessary for the successful development of innovative food products. The ingredients used in the preparation of a food product influence the acceptability of the final product. There is increasing awareness about healthy and safe food.

The demand for unconventional foods, as an ingredient/ final product is gradually increasing. The utilization of by-products and unconventional food can help in developing the innovative food products which are economical, healthier and environment friendly. Development of value added innovative products have several benefits such as they support the concept of food and nutrition security especially in compromised economics. According to the Global Hunger Index Report (GHI), 2015, India ranks 20th amongst the leading countries with a serious hunger situation. Amongst, South Asian nations, our country ranks 3rd, behind only Afghanistan and Pakistan with a GHI score of 29.0 (Klaus V Gr *et al*, 2015) [6]. Meeting the food and nutrition needs of our population is an important objective that can be supported by the development of economical value-added products. Understanding consumer needs and demands prior to undertaking the exercise of new product development helps to increase the chances of its successful post launch acceptance (Solan AE, 1994, Hoban TJ, 1998, Stewart KB and Mitchell P, 2003) [10, 3, 11].

In India, total production of apple pomace is about 1.3 million tonnes per annum of which only ~10,000 tonnes of apple pomace is being utilized (Manimehalai, 2007). Apple pomace, a by-product of juice industry, is a rich source of several nutrients. Studies (Vasil'ev YI *et al*., 1976, Sharma *et al*, 2016) [13, 9] indicate that it contains proteins (3.99 per cent), total sugars (17.35 per cent), cellulose (6.8 per cent), crude fiber (4.3-10.5 per cent), pectin (1.5-2.5 per cent), ash (0.38 per cent) and calcium (0.87 per cent). However due to high moisture content, apple pomace gets easily fermented and spoilt. Processing or waste utilization of such nutritious by-products is both, a necessity and a challenge to the food industry (Joshi and Pandey, 1999). In addition to by-products, several seeds such as basil seeds have been identified which hold potential for utilization in value added products. Basil Seeds are good source of protein (18.49), fiber (42.05), vitamin A (7441 U), vitamin E (10.7mg), Iron (89.8mg) and Calcium (2240mg). They are inherently known in India. The protein and fiber content of basil seeds is comparable to chia seeds (Suri S *et al*, 2016, Jan and Suri, 2017). This study was therefore carried out to assess consumer perception, views, need and demands pertaining to apple pomace, basil seeds and innovative value added sweet products.

2. Methodology

Sample size

Consumer behaviour survey was carried out on 115 respondents (young adults in the age group of 18-26 years); from North (n=23), South (n=25), East (n=21), West (n=24) and Central Delhi (n=22).

Sample selection: College going, female students were randomly enrolled for the study on the basis of informed written consent.

Exclusion criteria:

- Not interested in participating in the survey
- Age greater than 18 years or lesser than 30 years

Tools and techniques

The following tools and techniques were used for the conduct of the study:

Questionnaire: A questionnaire is a research tool consisting of a series of questions which include structured; both open and closed ended or multiple choice questions for the purpose of gathering information. A brief questionnaire was developed, designed and pre tested to assess the consumer behaviour especially with reference to consumption and demand for sweet preserves. The questionnaire comprised majorly of closed ended multiple choice questions. The vocabulary used was simple so that even the least intelligent group could easily grasp it. Each question had multiple choice answers and the questionnaire was not too large to prevent the respondents from getting tired.

Interview: An interview is a face to face conversation between the researcher and the respondent. An unstructured interview was conducted while administering the questionnaire to facilitate accurate data collection. It was ensured that while communicating with the respondent no words or gestures were used that could influence the responses/ answers to the question.

Data Collection: Prior to the conduct of the survey pre-testing of questionnaire was carried out on three children and a teacher as it helped to determine whether both the interviewer and the respondents understood the questions, and also to reconfirm the relevance of questions for the data to be collected. The data collected during pretesting were not utilized for the study. In this survey 115 participants were randomly selected from North (n=23, South (n=25), East (n=21), West (n=24), and Central Delhi (n=22). Participants were enrolled from various colleges situated in different zones of Delhi. The communications made with the participants were such that they did not influence the responses in any way. The data obtained through the consumer behaviour survey was coded and statistically analyzed.

3. Results and Discussion

The age of the participants was calculated from their date of birth data. The age group ranged from 17.1 to 27.2 years; the mean being 23.5 years. The mean age of the participants for each zone is given in table 1.1.

Table 1: Age Profile of the Participants

Age	North Delhi n=23	South Delhi n=25	East Delhi n=21	West Delhi n=24	Central Delhi n=22	Total Sample N=115
mean age in years	22.93 (18.2 to 24.9)	24.9(18.0 to 27.2)	22.9(18.0 to 22.0)	22.9(19 to 27.1)	23.9(17.1 to 27.0)	23.5(17.1-27.2)

Preference and Consumption Pattern: The questionnaire used for assessing the consumer behaviour had emphasis on the consumption pattern of sweet processed fruit products/preserves. Since it is expected that if the preference for sweet taste preserves is high, the demand for a new sweet product in the "preserved food" category would also be high; information was taken on the preference and consumption of sweet preserves. Data indicated that 77.3 per cent (n=89) had liking for sweet preserves. Nearly 70.4 per cent (n=81) consumed sweet preserves but with variable and usually low frequencies. The preliminary data indicated that zone wise there was no significant difference in the liking and consumption of sweet preserves (Figure 1).

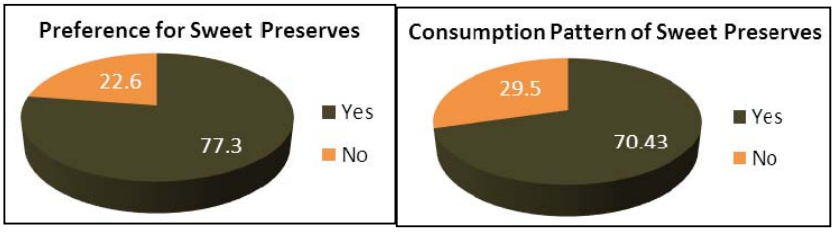

Fig 1: Preference and Consumption Pattern of Sweet Preserved Products

Reasons for not consuming sweet preserves: The major reasons given by the respondents for not consuming existing sweet preserves available in the market were associated with the potential negative influence on health (41.1 per cent) or high calorie density (17.6 per cent) of the products. This reason for avoiding sweet tasting preserves owes to their high simple carbohydrates and low fiber content. Regular and high consumption of processed products rich in simple carbohydrates but deficient in fiber have been found to be associated with increased incidence of obesity, diabetes and coronary heart diseases. Other reasons for not consuming sweet preserves were high intensity of sweet taste and high cost of such products (Table 1.2). This information helped us in identifying problem areas related to the purchase and consumption pattern of sweet preserves and the points to be kept in mind while developing the new product.

Table 2: Reason for Not Consuming Sweet Preserves

Zone/Area	Reason for not consuming sweet preserves			
	High in energy (calories)	Very sweet taste intensity	Not good for health	Cost
North Delhi n=7	3(42.8%)	3(42.8%)	1(14.2%)	0(0%)
South Delhi n=11	1(9.0%)	2(18.1%)	4(36.3%)	4(36.3%)
East Delhi n=5	0(0%)	1(20%)	3(60%)	1(20%)
West Delhi n=6	1(16.6%)	2(33.3%)	3(50%)	0(0%)
Central Delhi n=5	1(20%)	1(20%)	3(60%)	0(0%)
Total N=34	6(17.6%)	9(26.4%)	14(41.1%)	5(14.07%)

Consumption pattern of sweet preserves: One of the objective of this survey was to find out which type of preserves are consumed most often and their respective frequencies. Data indicated that nearly 45.6 per cent respondents consumed jam occasionally. About 23.3 per cent (daily alternate days) consumers included jam in their diets frequently (daily alternate days). The consumption pattern of jellies indicated a very low liking for the product in daily diets as only 7.4 per cent consumed jellies on a regular (daily/alternate) basis. Majority i.e. 62.9 per cent either never consumed jellies or the frequency was once in a month/lower. Thus, the consumer demand for jellies was low. The consumption pattern of marmalades was found similar to that of jellies. The consumption pattern of murabba a traditional Indian preserve, was similar to that reported for jellies i.e. only 3.6 per cent (n=3) respondents consumed murabbas either daily or on alternate days. Majority i.e. 77.7 per cent either had murabba occasionally or they never consumed this product. These data were a pointer to the fact that the existing market demand for murabbas was very low and the potential of their innovation and subsequent success would be grim. Data indicated that the frequency of consuming sweet fruit based beverages (squashes) was considerably higher than that of jellies, marmalades and murabbas. While 19.3 per cent respondents consumed squashes (fruit based beverages) daily or on alternate days, 23.4 per cent drank squashes once a week (Figure 1.2). Thus, the data on consumption pattern of jams, jellies, marmalades, murabbas and squashes indicated that the demand and hence the scope of innovation and subsequent success in market was higher for squashes and jams as compared to that of jellies, marmalades and murabbas.

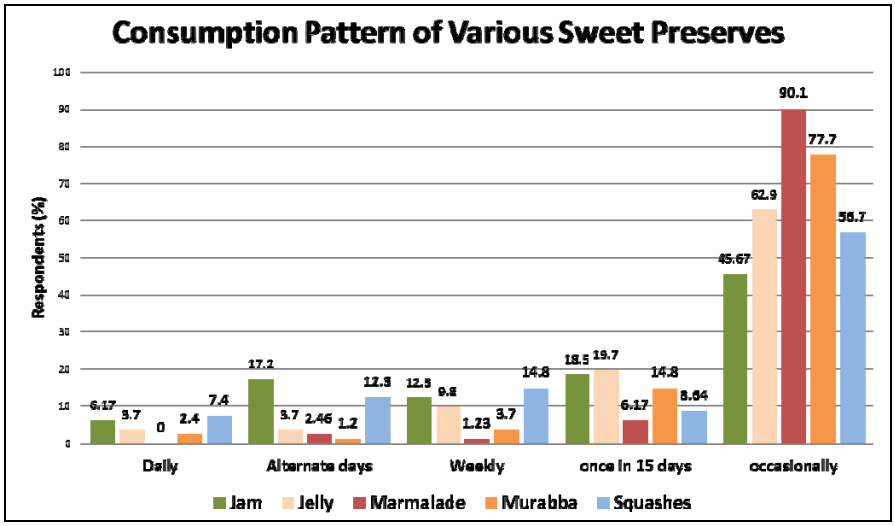

Fig 2: Consumption Pattern of Sweet Preserves

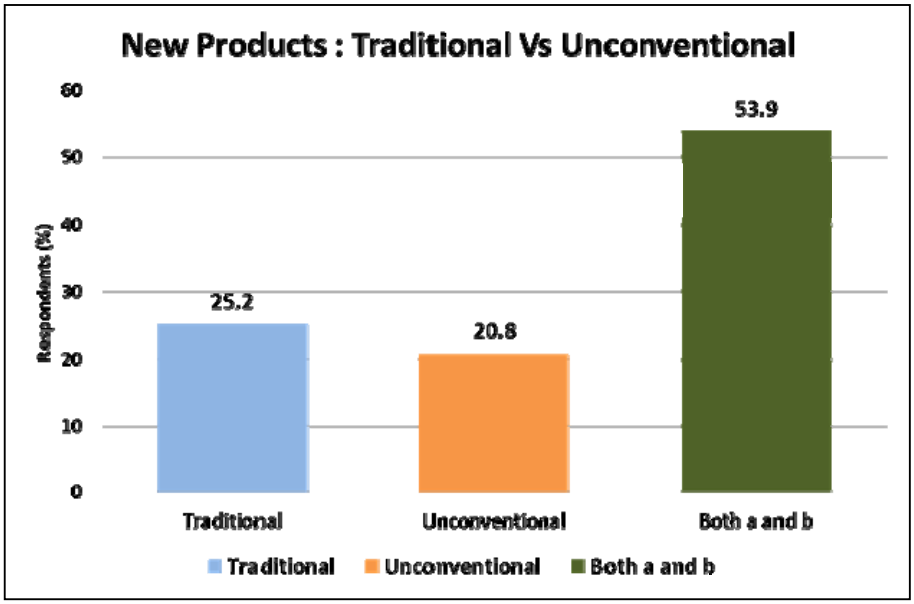

Fig 3: New Products: Traditional Vs Unconventional

Traditional or conventional new products: New food product can be made by incorporating traditional as well as unconventional/contemporary ingredients depending upon the preferences of the potential consumers. This information can be helpful in determining the choice of the ingredients. The data of survey indicated no particular preference for either traditional or unconventional food ingredients (Figure 1.3). The data reinforced that development of innovative, value-added apple pomace and basil seeds based preserves would help to provide the customers with a combination of both traditional as well as contemporary concepts or choices.

Awareness regarding Apple Pomace: The sale of a new product is to a great extent dependent upon the fact as to how familiar are the customers with the ingredients used therein. A low familiarity with the ingredients reduces the sale of the new product unless its launch is coupled with an awareness generation campaign. The data indicated that 96 per cent of the respondents did not have knowledge about apple pomace – the key ingredient being considered for subsequent use in the development of innovative value- added preserved product (Figure 1.4). Therefore there would be a need to sensitize the public about this ingredient before the launch of the product in the market. In order to sensitize the public, awareness generation campaigns can be carried out through audio visual media, booklets with the pack of the product, public talks, seminars, conferences etc.

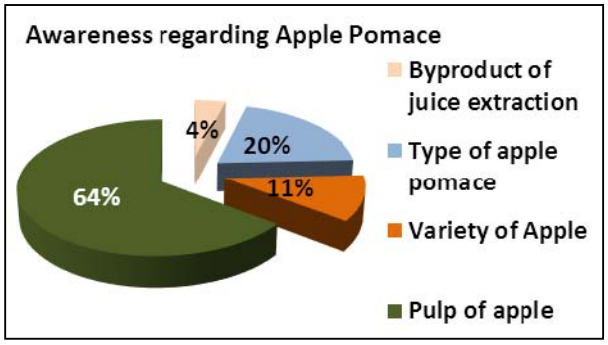

Fig 4: Awareness regarding Apple Pomace

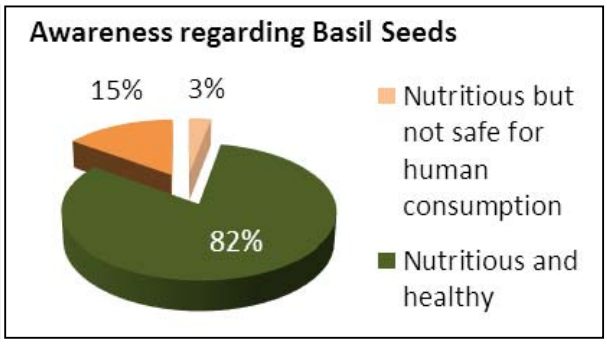

Fig 5: Awareness Regarding Basil Seeds

Awareness regarding Basil Seeds: Unlike apple pomace; majority i.e. 82 per cent of the respondents were aware about basil seeds and its potential health promotive benefits (Figure 1.5). This can be attributed to the fact that basil/tulsi has deep roots in Indian culture and is often used in daily cuisine/ as a home remedy to common cough and cold. In view of its familiarity, utilization of basil seeds in an innovative product can thus prove to be beneficial in facilitating its sale in our country.

Probability of Consumption and Purchase of Apple Pomace and Basil Seeds Preserve: Data regarding the probability of consuming and purchasing the new product was very encouraging as majority of the respondents gave positive response for both the aspects. Nearly all (95 per cent) participants also indicated interest in gaining more knowledge about apple pomace as well as basil seeds (Figure 1.6). Educational material can therefore be made on these ingredients to enhance knowledge among customers and promote the sale of, healthier, safe, economical and creative new products.

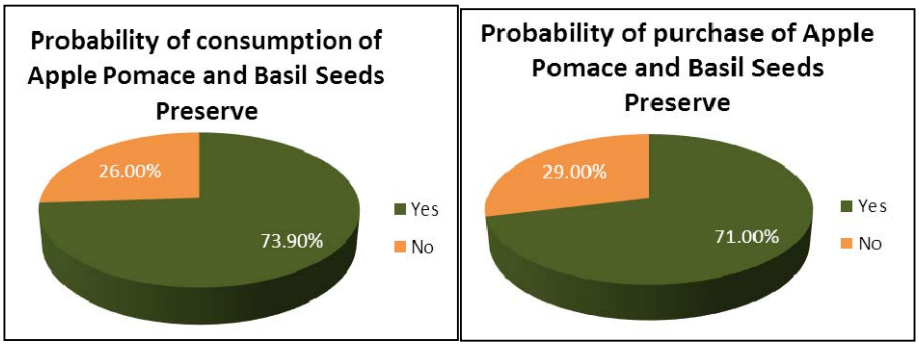

Fig 6: Apple Pomace and Basil Seeds Sweet Preserve – Probability of Consumption and Purchase

4. Conclusion

The data gathered through this consumer behaviour survey indicated that though there was liking for sweet preserves, they were consumed with rather low frequencies due to their low fiber and high simple carbohydrate content. The respondents indicated inclination towards a healthier, safe and economical innovative food products. Data regarding the probability of consuming and purchasing the new product containing by-products of food processing industry and traditional foods were very encouraging as majority of the respondents gave positive response for both the aspects. It was elicited through this survey that if unfamiliar food resources are tapped for the development of innovative value added products, there would be a need to generate awareness among the masses regarding the health benefits of such ingredients. In such cases, it would be desirable to conduct awareness generation campaigns both before and at the time of launch of the product to ensure their successful positioning in the grocery-list and hence the diets of the consumer. The results indicated that there was need and scope of introducing an economical, value added and a healthy fruit based innovative processed product in the market.

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