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Consumer preference and willingness to pay for value added fish products in Palakkad, Kerala

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ABSTRACT

The technological changes in production, processing and distribution dictate todays' food market. Changing life style and rising income have set a new trend in the demand for quality food among the consumers.In view of increasing awareness about nutritious diet and health, the necessity to bring in strict quality control, value addition and consumer appeal in food products has become important. A study was conducted in Palakkad District of Kerala to evaluate the consumer preference and willingness to pay for value added fish products. Ingredients, price, cooking method and perceived quality were the attributes studied at various levels. Applying an orthogonal design, 18 hypothetical product concepts were generated and 120 selected respondents were asked to rank the product concepts according to their preference. A conjoint analysis of the data revealed that quality is the most important attribute influencing consumer behaviour. A positive willingness to pay was also observed for quality. The results show that certified quality is important to improve market opportunities for value added fish products. It was seen that the consumers in the young and earning age group were ready to pay 10-15% more for a quality ensured fish product.

Keywords: Consumer preference, Conjoint analysis, Value addition, Willingness to pay

Introduction

According to a survey conducted by Corporate Catalyst India (CCI) is the second largest producer of food and holds the potential to be the biggest on global food and agriculture canvas. The food industry in India comprises of food production and food processing sectors. It ranks fifth in terms of production, consumption, export and expected growth. The food processing industry is one of the largest in India presently growing at an average rate of 10% per annum (Ali *et al.,* 2009)

Spending on food and food products constitutes the major share of the Indian consumer, forming more than 31% share of the wallet (FICCI, 2010). Increased income levels, cheap credit facilities and higher disposable income have resulted in greater spending on food consumption. There is an increasing trend of a shift from food security to nutritional security and convenience shopping in the recent past. The emerging fast food culture among the young and affordable has brought focus on processed food and its demand in the domestic food market in India.

Fish, being rich source of high quality protein, is also an important source of income and employment to millions of rural people, especially women. Fish based snack products have not been able to capture the snack food market due to lack of innovative products keeping in pace with current consumer trend. In this context, as part of an ongoing National Agricultural Innovation Project (NAIP) at Central Institute of Fisheries Technology (CIFT), Cochin, an attempt was made to create a value chain for bulk landing low value species through development of innovative value added fish products and promote them through fisherwomen self help groups (SHGs). The present study was carried out in Kerala, to evaluate the consumer preference and willingness to pay for these value added fish products.

Earlier studies have employed structural equation modelling (Tudoran *et al*.,2009), conjoint analysis (Harrison *et al.,* 2002; Boughanmi*et al*., 2007; Hill *et al.,* 2008), sensory analysis, scoring method, quantitative descriptive analysis (Sveinsdottir *et al.,* 2009), conditional logit model (Jaffry *et al*., 2004), ordered probit models (Brecard *et al.,* 2009) and cluster analysis (Arvanityonnis *et al*., 2004) to analyse the consumer preference and their willingness to pay for fish food products by providing information on health benefits, price, nutritive value and sensory quality of the products.

Studies on consumers' attitudes, purchasing behaviour and willingness to pay for safe and quality fishery products (Feng *et al.,* 2009; Shirai, 2010) indicated that income, cultural differences, risk exposure to food safety, economy and trade are the forces that influence consumption of food products (Jensen, 2006), while product labelling

(Jaffry *et. al.,* 2004), eco-labelling, taste and price (Brecard *et al.,* 2009; Zhou *et al.*, 2010) were the determining attributes for consumer preference.

Materials and methods

The present investigation on consumer preference and willingness to pay was conducted to ascertain the consumer purchase behaviour of snacks in Palakkad District of Kerala.

Conjoint analysis, a popular technique used in marketing research to study the features a product should possess to have a wide consumer reach, was employed to analyse the data on consumer preferences. Conjoint analysis, conceptualised by Luce and Tukey (1964) and further developed by Green and Rao (1971) for marketing research, employs a decompositional method to estimate the structure of consumer preferences and consumer utility values of different attributes of a product or service. The relative importance of a product *vis-à-vis* others can also be estimated using this method (Green and Srinivasan, 1978).

Consumer preference for the value added fish products like fish cutlet, fish roll and fish samosa developed under the project *vis-à-vis* meat and vegetable based snacks available in the snack food market was evaluated. A brochure on the quality and health benefits of these products was prepared along with photographs of these products. Ingredient, price, perceived quality and cooking method were the attributes studied at various levels, which are described in Table 1.

Table 2. Orthogonal design generated for fish value added products

Attribute 1	Attribute 2	Attribute 3	Attribute 4
2	3	1	1
3	3	2	1
3	2	3	2
3	2	1	1
1	2	2	2
2	1	2	2
1	1	1	2
3	1	1	2
2	2	2	2
2	2	1	1
1	2	2	1
1	1	3	1
2	2	3	2
1	2	3	1
3	1	2	1
3	3	3	2
2	1	3	1
1	3	1	2

To estimate utilities, a part-worth model (additive function model) was employed (Green and Srinivasan, 1978). The overall preference or total utility of the combination (U) can be expressed as:

$$U_{ijkl} = \text{constant} + UI_i + UM_{j+}UP_k + UQ_l$$

Table 1. Label and attribute levels selected for the conjoint study

Attribute	What consumer perceives through this attribute	Attribute label	Attribute level
Ingredient	Taste	Snack based on	Meat, fish, vegetable
Price	Economy	Price	₹ 8, ₹ 12, ₹ 15
Cooking method	Health benefit	Form of the product	Fried and crispy, sandwich, stuffed
Quality	Food safety	Perceived quality	Yes /No

Given the four attributes with their respective levels, a full factorial design requires 54 hypothetical combinations. In order to reduce the number of product profiles, which are manageable by the respondents, an orthogonal design was generated with 18 cards (product profiles) using SAS software (Table 2). In order to quantify the part-worth utilities, the respondents were asked to sort a set of these 18 cards which contained the description of the product and rank in terms of preferences by indicating their preference on a 9 point scale. Preferences for the described product combination in the card ranged from 'definitely would not purchase' to 'definitely would purchase'.

where UI_i is the utility of ingredient attribute at the i^{th} level, UM_j is the utility of cooking method attribute at j^{th} level, UP_k is the utility of price attribute at the k^{th} level and UQ_l is the utility of quality attribute at the l^{th} level. Accordingly the consumer preference scores for all the selected fish food products were arrived.

The data collection was carried out from a simple random sample of 120 respondents from Palakkad, using a structured questionnaire which was administered in a face to face interview. Prior to the survey, a pre testing of the questionnaire was conducted and appropriate modifications were carried out to maintain consistency and consumer understanding. Over 150 persons were contacted previously

for knowing their interest in giving the details for the survey. Out of the responses received, 120 survey questionnaires, which were full in all respects, were taken up for further analysis. Table 3 represents a summary of the sample characteristics.

Table 3. Sample description

Variable	Percentage
Gender	
Male	43
Female	57
Age	
35 or less	39
36 to 50	25
Above 50	36
Monthly income	
₹ 15,000 to 30,000	46
₹ 30,000 to 50,000	37
Above ₹ 50,000	17
Education	
Schooling	30
Graduation	47
Post-graduation	23
Household size	
2-4	78
5-6	18
Above 6	4

Results and discussion

Those persons who are in-charge of food product purchases for their household or who have a say in the purchase activity were contacted in the households for this study. More number of females were contacted, which indicated that women were mainly responsible for making food purchase at the household. Most of the respondents (46%) belonged to the income group ₹ 15,000 to ₹ 30,000 per month and only 17% of the respondents belonged to the higher income group. About 78% of the households were nuclear families as is the trend nowadays. The results of the conjoint analysis and the estimates of the part-worth utilities are presented in Table 4, which shows that the highest utility score was achieved for fish based products, as shown by the corresponding part-worth utility value of level 2 of Ingredient attribute. The consumer could compromise for 10% to 15% increase in price compared to the standard prices for snack items, as is shown for the high utility value for ₹ 12 of price attribute.

As regards to taste, fried snack items are highly preferred as indicated by the part-worth utility (2.09) corresponding to the level of method attribute. The utility values for the quality attribute gives an indication that the consumer is conscious about ensuring good quality of the product.

The internal validity of model was estimated by Kendall's υ_b statistic as suggested by Green and Srinivasan (1978). The coefficient of correlation was 0.83 ($p<0.05$), which shows that there is a strong correlation between the observed preferences and those estimated by the conjoint model. The total utilities for each product profile, which were evaluated during the study, are presented in Table 5. It can be noted from the results that card no. 10 which has the combination of fish based fried snack priced at ₹ 12 and whose quality is ensured registers the highest utility score of 5.9. The lowest score has been registered for a vegetable based stuffed snack item (card no.16) priced at ₹ 15 with quality not ensured.

The results indicate that the producers of fish based products need to pay attention on quality and food safety, as the consumers look for quality food and they are ready to pay a premium price for safe and quality food. Nominal increase in price, as compared to the standard prices of competitive traditional food items made out of meat and vegetable, will not affect consumer acceptance. Since the fish prices are highly unstable, it is essential for ensuring a margin in the business. Further, a certified quality label for the product plays a crucial role in establishing the superiority and acceptability of a product. The role of public sector as a source of technical and financial assistance for value addition and product making is vital to help small scale fish food producers to have a space in processed fish food marketing. Table 6 gives the average importance of the attributes considered for this study. It can be seen that consumers attach importance to ingredient and quality among the selected attributes for the study. The estimated part-worth utilities can also be used to calculate the relative importance of the attributes of a particular product. The relative importance (Halbrendt *et al.*, 1995) can be calculated as the ratio of utility range of the attribute and the sum of utility ranges of all attributes multiplied by 100. The analysis showed that consumers attach high importance to the ingredient of the snack (31.82%) followed by the quality (23.48%) and attach a relatively lower importance to price (22.36%) and the form of the snack (22.33%).

Table 4 . Utilities estimated by the Conjoint model

Ingredient				Price			Method			Quality	
Constant	Meat	Fish	Vegetable	₹ 8	₹ 12	₹ 15	Fried and crisp	Sandwich	Stuffed	Yes	No
5.28	0.13	1.18	-1.93	0.48	1.35	-1.48	2.09	-0.64	-1.09	0.65	-0.45

Table 5. Total utilities of the evaluated cards (product profiles)

Card	Ingredient	Price (₹)	Cooking method	Perceived quality	Utility value
1	Fish	15	Fried ans crispy	Yes	3.06
2	Vegetable	15	Sandwich	Yes	-4.54
3	Vegetable	12	Stuffed	No	-2.14
4	Vegetable	12	Fried and crispy	Yes	2.17
5	Meat	12	Sandwich	No	0.37
6	Fish	8	Sandwich	No	1.15
7	Meat	8	Fried and crispy	No	2.25
8	Vegetable	8	Fried and crispy	No	0.17
9	Fish	12	Sandwich	No	1.15
10	Fish	12	Fried and crispy	Yes	5.9
11	Meat	12	Sandwich	Yes	1.5
12	Meat	8	Stuffed	Yes	-0.94
13	Fish	12	Stuffed	No	1.58
14	Meat	12	Stuffed	Yes	1.05
15	Vegetable	8	Sandwich	Yes	-1.44
16	Vegetable	15	Stuffed	No	-4.98
17	Fish	8	Stuffed	Yes	1.84
18	Meat	15	Fried and crispy	No	0.27

Table 6. Average* importance values of the attributes

Attribute	Mean	SE	Minimum	Maximum
Ingredient	32.11	11.38	10.34	71.00
Method	22.18	11.84	1.18	57.14
Price	21.04	6.96	7.42	49.76
Quality	25.63	8.04	18.23	35.82

*Based on 120 values

Growing income levels, changing lifestyles and promotional campaigns of the companies aiming to capture India's middle and upper middle class consumers would lead to dramatic explosion of processed food market in the coming years. The preference structure of Kerala consumers for certain fish based snack products indicated that consumers attributed more preference to fish based snack item when the quality was ensured. Further, willingness to pay 10- 15% more for a good qualtiy snack item was also observed. The results show that value added fish products when hygienically prepared, and promoted with quality label can fetch higher prices compared to the conventional meat or vegetable based products in the domestic food market, given the obvious health benefits of fish.

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