

NUTRITION LABELING IN PROCESSED FOOD INDUSTRY: A STUDY OF CONSUMER PERCEPTION

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ABSTRACT

Nutrition labeling enables informed consumer choice, raises the demand for healthier food products, encourage competition on nutritional quality, and stimulate development and production of goods with improved nutritional properties. The paper examined the use and understanding of food and nutritional labels among Indian consumers. A questionnaire-based survey was used for the purpose of the study. A total of 200 respondents were considered for the study. Data was collected from consumers in Chandigarh and peripheries. The study revealed that most of the consumers read nutrition labels. Expiry date, brand name, M.R.P, and vegetarian and non-vegetarian mark were the labeling information usually considered by the consumer. Lack of trust, understandability, time and interest were the reasons for not considering nutritional information. Further it was suggested that easy terminology, appropriate font size and simplified nutritional labels will help consumers in healthier food product choices

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INTRODUCTION:

Consumers have become increasingly interested in nutritional issues over recent years. This interest in nutrition is fuelled by a number of factors including lifestyle, ageing population, dietary and safety concerns. The consumer is influenced by various sources of information such as the family/household, social network, popular media, government dietary guidelines. Recognition that dietary habits can reduce the risk of chronic diseases and improve health has generated considerable interest in nutrition labeling of food products that is information appearing on food package labels and relating to the nutritional composition of the products (e.g. EC Directive 90 / 496). India's Ministry of Health and Family Welfare made nutrition labeling (labeling of the amount of carbohydrates, protein, energy and fat) on packaged food mandatory from 19 March 2009. Nutrition labeling is intended to enable informed consumer choice, raise the demand for healthier food products, encourage competition on nutritional quality, and stimulate development and production of goods with improved nutritional properties. Previously, food manufacturers emphasized product features and attributes, for example taste, price, package, appearance, and technology, to market their food products. Inevitably, no special effort had been put into nutrition or nutrition information. Recently, general public have become aware of the important relationship between nutrition information and pre-packaged food which has further raised the importance of processed food industry.

The food processing industry is one of the largest in India – it is ranked fifth in terms of production, consumption, export and expected growth. Food processing industry is of enormous significance for India's development because it has linked up economy, industry and agriculture in India. There is a large untapped opportunity to cater to 1000 million domestic consumers. It is estimated that 300 million upper and middle class consume processed food. With the convenience needs of dual income families, 200 million more consumers are expected to move to processed food by 2010. The market size for the processed foods is thus bound to increase from US \$102 billion currently to US \$330 billion by 2014-15 assuming a growth of 10%. The share of the value added products in processed foods would almost double from US \$44 billion currently to US \$88 billion during the same period, growing at the rate of 15%.

Considering the importance of nutrition labels in processed food industry, food marketers use information labels to provide customers with additional information, for example ingredients. Also, in response to the advocacy of the social marketing scholars and the specific needs of the

health-conscious consumers, food manufacturers and processors provide much more information, including food nutrition information, to the general public.

2. REVIEW OF RELATED LITERATURE

Freedman R. Marjorie and Connors (2010) examined the effect of point of purchase information on buying patterns of multi-ethnic college students in US. A quasi-experimental pilot project examining the effect of “Eat Smart” Point of purchase program was conducted. Sale of four product categories viz. cereal, soup, cracker, and bread over a period of four weeks after being shelf tagged as “Fuel Your Life” were analyzed. In each of the four food categories, non tagged foods were available at the identical price as tagged items. The collected data was examined for normality by examining skewness and kurtosis and Mann-Whitney U test were used for non-normally distributed data. The study revealed an increased sale of tagged food items leading to the conclusion that point -of purchasenutrition information promotehealthful food choices.

Vyth L Ellis, Steenhuis HM Ingrid, Vlot A Jessica, WulpAnouk, Hogenes G Meefa, Looije H Danielle, Brug Johannes and Seidell C Jacob (2010) examined the familiarity and motives of 404 consumers towards choices logo from nine supermarkets of various sizes belonging to C1000 supermarket chain of The Netherlands. A structured questionnaire (Dutch version of the Food Choice Questionnaire (FCQ) instrument for measuring motives related to food choice developed by Steptoe was used for the study. Data was analyzed using chi-square test, t test and ANOVA. The study revealed that of the respondents, 62% reported familiarity with the logo. The major motivations for food choices were attention to ‘weight control’ and ‘product information’.

Lynn Van Wezemaal, WimVerbeke, Marcia D de Barcellos, Joachim Scholderer and Federico Perez-Cueto (2010) determined the association between healthiness of beef and consumer perception. Eight focus group discussions were conducted in four European countries (France, UK, Germany, Spain), each consisting of seven to nine participants. A content analysis was performed on the transcripts of these discussions. Labeled, branded, fresh and lean beef were perceived as healthful beef, in contrast with further processed and packaged beef. Consumers felt that their individual choices made differences with respect to the healthiness of beef consumed.

Jacobs A Sunelle, Beer de Hanli and LarneyMent (2010) identified the information that adult consumers use on food labels, the difficulties experienced when using food labels and reasons for not always using food labels. A telephone directory was used to select three supermarket stores in Potchefstroom and Klerksdorp in the North West Province, South Africa. Data was collected from 174 consumers of African descent and Caucasians, above 18 years of age, who were involved in purchasing household food products. Data was analyzed with the help of the Statistical Consultation Services of North-West University, Potchefstroom Campus. T-test, w-test mean- averages and content analysis were used for the analysis. The information most often used on food labels was expiry date, the list of ingredients and nutritional information, such as fat and cholesterol content. The difficulties associated with food labels were the font size of the print, whereas the reasons for not reading food labels were related to product attributes.

Grunert G. Klaus a, Wills b M. Josephine, Ferna´ndez-Celemi´n aura (2010) analyzed the usage and understanding of nutrition information by UK consumers. In-store observations, in-store interviews of 2019 participants were conducted and 921 questionnaires were filled out at home for six product categories. (breakfast cereals, carbonated soft drinks, confectionary, ready meals, salty snacks, yoghurts). Data was analyzed with logistic regression. The analysis of the study revealed that, of the respondents 27% of them looked at nutrition information on the label, with guideline daily amount (GDA) labels and the nutrition grid/tables. 87.5% of the respondents were able to identify the healthiest product.

Drewnowski Adam, Moskowitz Howard, Reisner Michele and Krieger Bert (2010) identified the relative contribution of different nutrient content claims on consumer perceptions of the overall healthfulness of food products. Data was collected using an online marketing technique i-Novation paneling. Three thousand invitations were sent to potential participants by email. A panel of 320 participants exposed to multiple messages (n 48) rated the healthfulness of each hypothetical food product. Data was analyzed using conjoint analysis, based on multiple logistic regression and maximum likelihood estimation. The study revealed that the consumer perception of product healthfulness was largely driven by the declared presence of protein, fibre, calcium and vitamin C and by the total absence of saturated fat and sodium. Total fat, iron and vitamin A, all which are part of the FDA definition of healthy foods, had less impact on the consumer utilities. The utilities for total and added sugar were much lower than for either fat or fiber.

Campos Sarah, Doxey Juliana and Hammond David (2010) analyzed the consumer use, understanding and impact of nutrition labeling on dietary habits. Electronic databases such as MEDLINE, CSA Illumina Social Sciences, Web of Science (including Science Citation Index Expanded (SCI EXPANDED) – 1900–present); and the Cochrane Library were used for collecting 120 reviews covering seven jurisdictions USA, Europe, Canada, Australia and New Zealand, Norway, Thailand and Trinidad. The study revealed that nutrition labels on pre-packaged foods were among the most prominent sources of nutrition information. Nutrition labels have been perceived as a highly credible source of information and many consumers use nutrition labels to guide their selection of food products. Consistent link between the use of nutrition labels and healthier diets was also highlighted.

Berning a P. Joshua, Chouinard b Hayley H., Manning c Kenneth C., McCluskey b Jill J., Sprott d David E. (2010) examined shopper preferences for nutrition labels provided on grocery store shelf. The data was collected from a convenience sample of 403 shoppers at a major grocery chain over a three-day period in 2006 in the EastSan FranciscoBay area of California. Consumer preferences for the different label attributes were elicited with choice experiments. The responses were analyzed by estimating a random parameters logit (RPL) model. The results highlighted positive consumer preferences for the provision of nutrition information on grocery store shelf labels. Further, it was highlighted that stores and shoppers both can benefit from the provision of shelf-label nutrition information. Shoppers by providing nutrition information on shelf labels may increase their sales of healthy items by directing shoppers who are seeking healthy items to those products with shelf label information. Additionally, the shoppers by providing the shelf labels that identify specific product attributes, get signal of the consumers preferences for nutritional quality through their purchases; therefore stores may also be able to identify consumer preferences for different types of food products.

Bialkova Svetlana and Trijp Hans van (2010) in there paper identified the key determinants of consumer attention to nutrition labels. Data was collected from twenty-four respondents of WageningenUniversity. Visual search tasks were used to test the effective experimental tool. The study revealed that attention capture was faster and more accurate when the label was present, with doubled rather than standard display size, and with mono- rather than polychromatic coloring. Further, it was highlighted that logos should be printed in a consistent location on the package so as to get the performance benefit.

Singla Manisha, (2010) aimed to provide some guidelines to Indian government at introduction of code of conduct towards nutrition labels, so that government can come with consumer friendly labeling policies. Sample of 100 respondents was collected from two superstores located in New Delhi. The study revealed that food labels are read by the consumers for brand comparisons and not for consulting nutritional information. Difficult terminology, small font size and inability to understand nutritional labels are the major problems encountered by the consumers. Television, friends, magazines are commonly used for assessing nutritional information. Labels are considered more consumer friendly when benchmarks regarding serving size are provided. Income level, size of household, number of children and age did not play a role in the usage of nutritional labels by the consumers. Consumers with special dietary needs used nutritional labels regularly.

3. RESEARCH METHODOLOGY:

Objectives

1. To know the degree of checking nutrition labeling on processed foods among consumers in Chandigarh and peripheries.
2. To know the nutritional information most sought on food labels among consumers in Chandigarh and peripheries.
3. To know the impact of nutritional labels on the purchase decision of consumers in Chandigarh and peripheries.
4. To know the reasons for not checking the nutrition labels over processed food products among consumers in Chandigarh and peripheries.

Research Design:

The study was conducted in Chandigarh and periferies, India, from September 1 to October 30, 2011. A sample of 200 respondents was selected from Tri-city viz. Chandigarh (100 respondents), Mohali (50 respondents) and Panchkula (50 respondents). Three retail outlet one from each city were selected. Retail outlets were visited in morning, afternoon and evenings and the survey was administered seven days a week to ensure better coverage of all types of consumers. Every third person emerging from the store was approached for the interview and, if the customer refused to participate, the next person was approached. Couples who shopped together were taken as one unit. The survey tool for this study was a survey questionnaire method through face-to-face interview by the investigator. The survey contents included general

characteristics of the subjects such as gender, age, residence, education level, monthly income, and occupation status. Contents for nutrition labeling included the degree of checking nutrition labeling, degree of understanding, degree of utilizing nutrition labeling when purchasing products, and the reasons of not checking nutrition labeling.

Statistical Analysis:

The interview schedules were analysed using SPSS (Version 17). Descriptive statistics were used to assess the frequency of responses. Association between the variables was obtained by χ^2 -test. Factor analysis was used to extract nutrition information considered oftenly by consumers while making purchase decision. Level of significance used was p, 0.05.

Table 1: Profile of the respondents

Profile of the respondents	No. of the respondents	Percentage of respondents
Age	Frequency	Percent
Below 20	6	3.0
21-30	92	46.0
31-40	52	26.0
41-50	42	21.0
51and above	8	4.0
Total	200	100.0
Gender	Frequency	Percent
Male	86	43.0
Female	114	57.0
Total	200	100.0
Occupation	Frequency	Percent
Graduation	35	17.5
Post-graduation	82	41.0
Doctorate	11	5.5

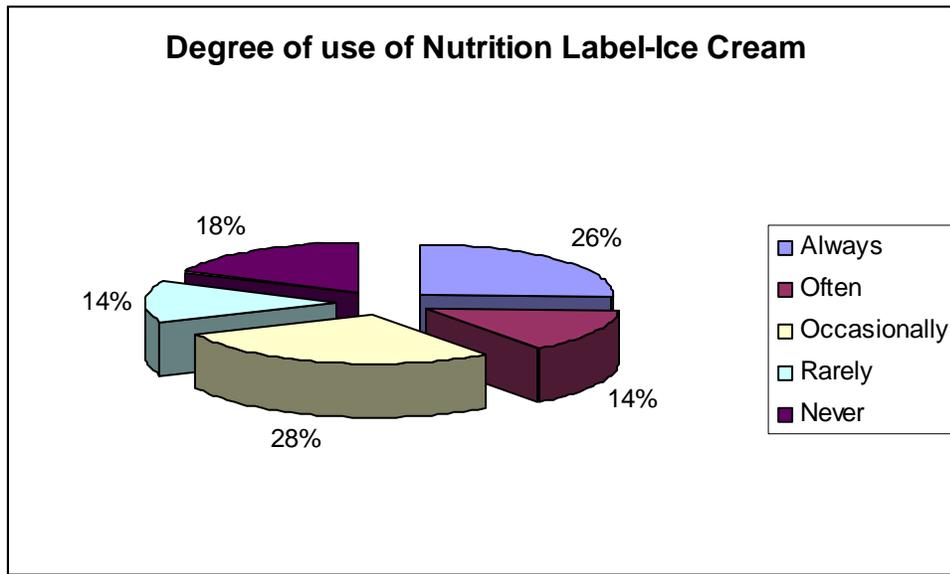
Professional	72	36.0
Total	200	100.0
Income(per month)	Frequency	Percent
Below 30,000	12	6.0
30,001-55,000	38	19.0
55,001-75,000	91	45.5
75000 and above	59	29.5
Total	200	100.0
Occupation	Frequency	Percent
Student	14	7.0
Businessman	16	8.0
Private sector employee	67	33.5
Public sector employee	52	26.0
Homemaker	51	25.5
Total	200	100.0
City	Frequency	Percent
Mohali	24	12.0
Panchkula	54	27.0
Chandigarh	122	61.0
Total	200	100.0

Table1 shows that 46 per cent of the respondents belong to age category 21-30 years followed by 31-40 years (26%), 41-50 years (21%) and above 51 years (4%). Out of the total number of respondents 57% of the respondents were females (person responsible for making decisions regarding foodproducts) and 43% were males. Most of the respondents were highly educated with post-secondary education (41%), professionals (36.0%) and graduates (17.5%). Further, out of total respondents 33.5% of the respondents were private sector employees followed by public sector employee (26.0%) andHomemakers (25.5%).Most of the respondents were of high income group. 45.5% of the respondents had income between 55001-75000 followed by respondents having income above 75001(29.5%) and 30001-55000 (19.0%). Majority of the respondents belong to Chandigarh (61%) followed by Panchkula (27%) and Mohali (12%).

Table2. Degree of use of nutrition labeling on food packages.

Responses of the respondents	No. of respondents	Percentage
Always	52	26.0
Often	28	14.0
Occasionally	57	28.5
Rarely	27	13.5
Never	36	18.0
Total	200	100%

Table2 shows that 40 per cent of the respondents ‘Always’ read nutrition labels (including respondents reading nutrition labels ‘Oftenly’ (14%) followed by respondents who ‘Never’ read nutrition labels (31.5%) (including respondents reading ‘Rarely’(13.5%). While 28.5% of the respondents read nutrition labels ‘Occasionally’ over food packages.

Figure 1: Degree of use of nutrition labeling on food Packages**Most sought nutritional information by consumers on food labels.**

A factor analysis was used to group related variables into different segments. To examine if the factor analysis model was appropriate, a Bartlett's and Kaiser-Meyer-Olkin (KMO) tests were administered. Both techniques indicated that the model was appropriate and significant, the Bartlett's test showed an approximate Chi-squared of 2731.91, and significant at the 0.01 level. The value of the KMO test was (0.567).

Six factors with eigenvalues greater than one were defined, and all combined account for 75% of the total variance. The first factor after rotation explains 19.6% of the variance, the second factor accounts for 14.9% of the variance, the third 13.1%, the fourth 10.7%, the fifth 10.1% and the sixth 6.4%, see table 3.

The extracted factors with maximum loading were factor 1 labeled 'Name of the Producer', factor 2 the 'Storage instructions', factor 3 'Serving Size', factor 4 'M.R.P.', factor 5 'Health Claims' and factor 6 'Allergen Information'.

Table 3. Variance Explained by the Factors.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %

		nce	%		e			e	
Name of the Producer	6.114	32.177	32.177	6.114	32.177	32.177	3.736	19.665	19.665
Storage instruction	2.446	12.874	45.052	2.446	12.874	45.052	2.839	14.944	34.609
Serving size	1.861	9.796	54.847	1.861	9.796	54.847	2.506	13.188	47.797
M.R.P.	1.505	7.920	62.767	1.505	7.920	62.767	2.047	10.773	58.570
Health claims	1.296	6.819	69.587	1.296	6.819	69.587	1.926	10.136	68.705
Allergen information	1.055	5.555	75.142	1.055	5.555	75.142	1.223	6.436	75.142
Ingredient information	.865	4.550	79.692						
Quantity of ingredients	.677	3.564	83.255						
Organic Modifications	.576	3.033	86.288						
Ethical Information	.543	2.859	89.147						
Nutritional Composition	.468	2.464	91.611						

Manufacturers	.429	2.260	93.871					
Customer care	.350	1.843	95.714					
Address Added flavor	.300	1.577	97.291					
Information								
Veg-non-vegetarian	.217	1.144	98.434					
ISO-AGMAR	.115	.607	99.041					
Net weight	.094	.495	99.536					
Taxes	.070	.370	99.906					
Expert Advice	.018	.094	100.000					

Extraction Method: Principal Component Analysis.

Table4. Association between nutritional labels and purchase decision of consumers.

(Education-wise Distribution)

	Educational categories				Total
	Graduation (E ₁)	Post-graduation (E ₂)	Doctorate (E ₃)	Professional (E ₄)	
Never	0 (0%)	13 (15.9%)	3 (27.3%)	14 (19.4%)	30 (15.0%)

Occasionally	4 (11.4%)	2 (2.4%)	1 (9.1%)	1 (1.4%)	8 (4.0%)
Always	31 (88.6%)	67 (81.7%)	7 (63.6%)	57 (79.2%)	162 (81.0%)
Total	35 (100.0%)	82 (100.0%)	11 (100.0%)	72 (100.0%)	200

Chi-square-15.303 d.f-6 Significant at 5% level of significance.

Table 4 shows that 81.0 per cent of the respondent's purchase decision have 'Always' been influenced by the presence of nutrition labels over food packages. Whereas purchase decision of 15 percent of the respondents have 'Never' been influenced by presence of nutrition labels over food packages. The Education -wise analysis shows that purchase decision of 88.6 per cent of the respondents from category E₁, followed by category E₂, (81.7%), category E₄ (79.2%) and category E₃ (63.6%) have been influenced by presence of nutrition labels over food packages.

Table5. Association between nutritional labels and purchase decision of consumers.

(Income-wise Distribution)

	Income categories				Total
	Below 30,000 (I ₁)	30,001- 55,000 (I ₂)	55,001- 75,000 (I ₃)	75000 and above (I ₄)	
Never	1 (8.3%)	8 (21.1%)	19 (20.9%)	2 (3.4%)	30 (15.0%)
Occasionally	1 (8.3%)	2 (5.3%)	5 (5.5%)	0 (0%)	8 (4.0%)
Always	10 (83.3%)	28 (73.7%)	67 (73.6%)	57 (96.6%)	162 (81.0%)
Total	12 (100.0%)	38 (100.0%)	91 (100.0%)	59 (100.0%)	200 (100.0%)

Chi-square-14.910 d.f-6 Significant at 5% level of significance.

The Income-wise analysis shows that purchase decision of 96.6 per cent of the respondents from category I₄, followed by category I₁, (83.3%), category I₂, (73.7%) and I₃(73.6%) have been

influenced by presence of nutrition labels over food packages. Further, the chi-square values at 5 per cent level were significant which reveal that, significant relationship exist in the purchase behavior of respondents belonging to different income and educational categories.

**Table 6.Reasons for not checking the nutrition labels over processed food products.
(Education-wise Distribution)**

	Educational categories				Total
	Graduation (E ₁)	Post- graduation (E ₂)	Doctorate (E ₃)	Professional (E ₄)	
Overlooked	0 (0%)	4 (22.2%)	1 (33.3%)	2 (25.0%)	7 (22.6%)
Do not feel the necessity to read nutrition labels	1 (50.0%)	6 (33.3%)	1 (33.3%)	4 (50.0%)	12 (38.7%)
Do not trust nutrition labels	1 (50.0%)	8 (44.4%)	1 (33.3%)	2 (25.0%)	12 (38.7%)
Total	2 (100%)	18 (100%)	3 (100%)	8 (100%)	31 (100%)

Table 6 shows that Of the total respondents 38.7 per cent ‘Do not trust nutrition labels’ and equal percent of respondents ‘Do not feel necessity to read nutrition labels’. The Education -wise analysis shows that big proportion of respondents from category E₁ (50%) followed by respondents from category E₂ (44.4%), category E₃ (33.3%) and category E₄ (25%) have no faith or do not trust nutrition labels’

Table 7. Reasons for not checking the nutrition labels over processed food products among consumers.

(Income-wise Distribution)

	Income categories				Total
	Below 30,000 (I ₁)	30,001- 55,000 (I ₂)	55,001- 75,000 (I ₃)	75000 and above (I ₄)	
Overlooked	0 (0%)	4 (36.4%)	3 (25.0%)	0 (0%)	7 (22.6%)
Do not feel the necessity to read nutrition labels	0 (0%)	4 (36.4%)	5 (41.7%)	3 (37.5%)	12 (38.7%)
Do not trust nutrition labels	0 (0%)	3 (27.8%)	4 (33.3%)	5 (62.5%)	12 (38.7%)
Total	0 (0%)	11 (100%)	12 (100%)	8 (100%)	31 (100%)

The Income-wise analysis shows that 62.5 per cent of the respondents from category I₄ and 33.3 per cent respondents from category I₃ ‘Do not trust nutrition labels’. Further, 41.7 per cent of the respondents from category I₃, category I₄ (37.5%) and category I₂ (36.4%) ‘Do not feel the necessity to read nutrition labels. Whereas, 36.4 per cent of the respondents from category I₂ ‘overlooked’ nutrition labels.

CONCLUSION AND SUGGESTIONS OF THE STUDY

With the increased importance of health and nutrition, changing life styles and higher incomes, the Indian food market offers numerous opportunities for new products and product modifications. Today’s trends for healthy eating habits and “ready-to-eat” products have

increased consumer demand for more detailed and accessible information, primarily on food packaging and labels. Although product attributes such as quality and price are extremely important to consumers and producers, packaging and labeling play a fundamental role on consumer's intention to purchase. These factors are important because they represent the first line of contact between the consumer and the product.

Results for the survey indicated that 40 per cent of the respondents 'Always' read nutrition labels. The most sought after nutritional information by consumers on food labels was 'Name of the Producer', 'Storage instructions', 'Serving Size', 'M.R.P.', 'Health Claims' and 'Allergen Information'. The income-wise and education-wise analysis indicated that majority of the respondent's purchase decision have 'Always' been influenced by the presence of nutrition labels over food packages. Further, the income-wise and education-wise analysis highlighted 'Lack of trust in nutrition labeling', 'Lack of necessity to read nutrition labels' and 'Overlooking nutrition labeling' as major reasons for which consumers do not read nutrition labels.

This study was carried out with the aim of assessing Indian consumers regarding their understanding of food labels. The study can provide guidelines to the marketers to develop marketing strategies to deal with the consumers in India and to Government to improve health of Indian population.

Some suggestions for developing guidelines by marketers and Government regarding better understanding of nutritional labels are:

- Government should develop a suitable policy for imparting education regarding nutrition;
 - consumers should be made aware of relation between diet, health and disease;
 - initiatives should be taken at school education level;
- Marketers should make nutritional labels consumer friendly.
 - deliver nutrition contents in the food products as claimed.
 - nutritional labels should be made easily readable and understandable.
 - packaging of the product as well as labels over package should be attractive.

LIMITATIONS OF THE STUDY

1. Due to lack of time and resources, the coverage of the study is limited to Chandigarh only.
2. Initially it was decided to study list of entire processed milk products but due to paucity of time, the study was limited to two products viz. Ice cream and processed cheese only.

3. The study is based on primary data which has resulted from responses of the respondents. While collecting primary data it is generally assumed that respondents have given their genuine responses, however, it is seen that differences do exist between what consumers say and what they actually do.

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