



A study on consumer awareness of food safety standards for processed food products and the impact on buying behavior

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Abstract

The present study assessed the consumer awareness of food safety standards required for processed food products and its impact on buying behavior. A sample size of 144 consumers from Chennai, India was included in the study. The findings of the study revealed that consumers were aware of the logo representing the food safety standards but not its functioning and existence. Consumers who were aware of the safety standards were more conscious and responsible on checking the food labelling components than others. Analyzing the buying frequency of different types of food products, consumers had a habit of buying packaged and labelled foods with proper certification every time. Additionally they also purchase loose foods and packaged foods without labelling, sometime or rarely, irrespective of their awareness level. Thus, consumer awareness of food safety standards had a partial influence on buying behavior of processed food products.

Keywords: consumer awareness, food safety standards, processed food products, buying behaviour

Introduction

Science and technology acts as a boon in feeding the world using innovative processing and preservation technologies. The global food industry is growing rapidly and contributes to nearly 10% of the world's GDP. In India, the food processing industry contributes to nearly 14% of the total GDP. Even though there is a rise in the growth of food industries with arrival of different processed food products, food safety becomes the biggest concern across the world, over the years. Food safety assurance is of huge importance where government regulatory bodies play a tremendous role by laying down food safety standards and regulations. Food Safety and Standards Authority of India (FSSAI) is the food regulatory body of India, which governs all food related matters such as food safety, standards, regulation and enforcement. There are other standards such as Agricultural Marketing (AGMARK), a grading and marketing act for agricultural produce and Bureau of Indian Standards (BIS), which provides Indian Standards Institution (ISI) certification mark for certain food products. Fruit Product Order (FPO) is a certification mark formulated for processed fruit products such as jams, jellies, pickles etc., effective since 1955 in India, but became mandatory in 2006. India, a signatory to World Trade Organization (WTO) on food trade, has to abide by the guidelines, definitely. In recent years, consumers seek food safety as most important and gaining more concern in India (Vasanthi A, 2018). Thus, it is important to study about the consumer awareness on food safety standards for processed food products and its impact on their buying behavior.

Objectives of The Study

The primary objectives of the study are:

- To find the consumer awareness and knowledge on

food safety and quality marks required for processed food products.

- To find the consumer awareness on food labelling and packaging standards
- To elicit information on the consumer buying behaviour of processed food products.
- To analyse the impact of consumer awareness of food safety standards on their buying behaviour.

Materials and Methods

Descriptive research design was used to carry out the research, where online- web based survey method was employed as a research strategy.

Data Collection: A structured, disguised questionnaire, which consists of a total of 35 questions, was used to collect the data. The questionnaire consists of close ended questions such as dichotomous questions, multiple choice and rating scale questions. The study was carried out in the month January - March, 2021.

Sampling design: Convenience sampling method was used to select the samples. Chennai, the capital of Tamil Nadu, India was chosen as the study location, where 144 respondents were included in the study.

Data Analysis

Frequency distribution and percentages were used to represent the demographic characteristics of the respondents. It is also used to find the level of consumer awareness of food safety standards for processed food products, the frequency of reading food labelling components and the frequency of buying different types of foods. Microsoft Excel was used to design the graphical

diagrams and charts, representing different variables used in the study. Data collected was processed in SPSS (version 26) for statistical analysis. Cross tabulation method was used to find out the association of demographic characteristics and the consumer awareness of food safety standards for processed food products. Analysis of variance (one way ANOVA) was performed to find the impact of consumer awareness of food safety standards on their buying behavior. These statistical tests was performed with

significance level of $p < 0.05$.

Results and Discussion

Demographic characteristics of the respondents

The demographic profile of the respondents were analyzed and tabulated in the Table 1. In this study, larger proportion of the respondents were in the age of 18-24 years, with an undergraduate educational background and being employed.

Table 1: Demographic characteristics of respondents

Demographic variable	Category	Number of respondents	Percentage %
Gender	Male	60	41.7
	Female	84	58.3
Age	18-24 years	59	41
	25-35 years	37	25.7
	36-50 years	30	20.8
	Above 50 years	18	12.5
Educational Background	Higher Secondary School	21	14.6
	Undergraduate	68	47.2
	Postgraduate	54	37.5
	Doctorate	1	0.7
Occupation	Employed	78	54.2
	Unemployed	8	5.6
	Student	30	20.8
	Housewife/husband	20	13.8
	Retired	8	5.6

Consumer awareness of food safety and quality marks:

The study revealed that maximum percentages of consumers were aware of the logo representing FSSAI (88.2%), AGMARK (83.3%), ISI (93.1%). On checking the consumer awareness on FPO mark, only 56.9% of the respondents were aware of it. But upon analyzing the consumer knowledge on these standards, only 52.8% of the respondents were aware that FSSAI is the food safety regulatory body of India and 54.2% of them knew the expansion of FSSAI. Only 18.1% of them were aware that FPO represents the Fruit Product Order and the majority of them felt that FPO represents Food Product Order, which is irrelevant. Though 93.1% of them knew ISI mark, only 39.1% of respondents knew that ISI operates under the Bureau of Indian Standards (BIS). Most of the consumers misunderstood ISI as an international standard. Thus, consumers were only aware of the logo, but had poor knowledge on its functioning and existence of food standards.

Consumer awareness on certified processed food products

Consumer awareness on common food products, which require food safety certification such as AGMARK, FPO and ISI mark, were analyzed in this study. As mentioned in the Figure 2, consumers were highly aware of AGMARK certified ghee and gingelly (sesame) oil. Awareness level on other AGMARK certified products such as honey, blended vegetable oil, spice masala powders, cereal grains were low. This is similar to the study conducted by Saha et al (2013) in Kolkata, India. The reason may be due to the voluntary nature of AGMARK certification in food products. As shown in the Figure 3, consumer awareness on FPO certified food products revealed that only 40.3% of the respondents were aware that fruit based products require FPO mark on its label. Consumers had a assumption that foods other than fruit based products also require FPO certification. As depicted in the Figure 4, 47.2% of the respondents were aware of ISI certified packaged drinking water and 25% of the people were aware of packaged mineral water. The awareness level on other ISI certified products such as milk powder, condensed milk, weaning foods were very low.

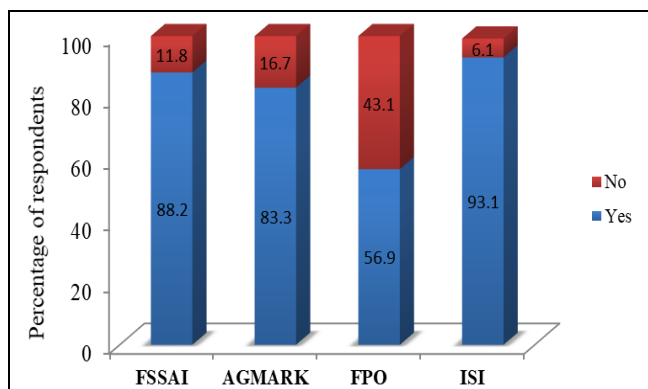


Fig 1: Respondent's awareness on logo representing food safety and quality marks

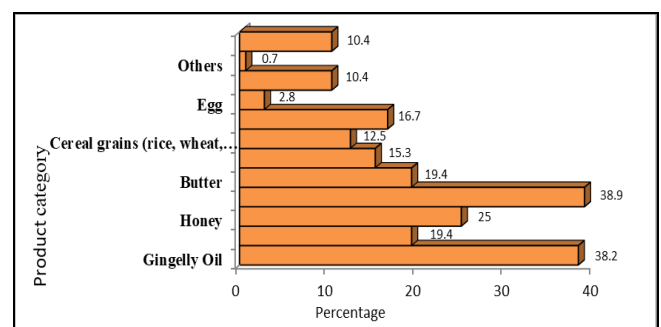


Fig 2: Respondent's awareness on AGMARK certified food products

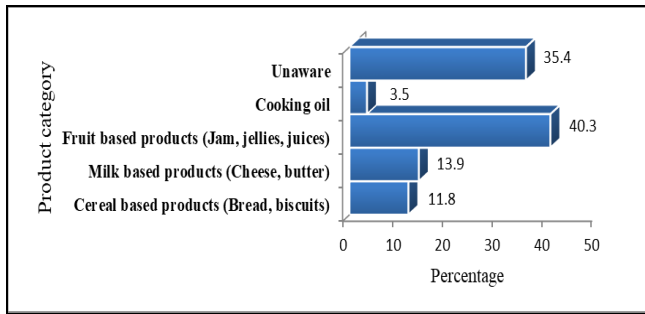


Fig 3: Respondent's awareness on FPO certified food products

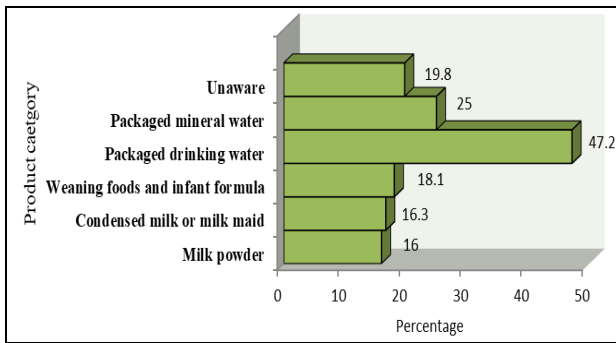


Fig 4: Respondent's awareness on ISI certified food products

Consumer awareness on food labelling standards:

Analyzing the consumer awareness on the term 'use by date', 67.4% of people responded that 'use by date' represents the time period within which the product should be consumed. And the consumer awareness on the term 'best before date' revealed that, only 47.2% of them were aware that 'best before date' represents the time period when the product retains its best quality. It was evident that respondents have a misunderstanding between the date labels representing 'Use by date' and 'Best before date' This is similar to the study of Neff et al (2019), where consumers had a misunderstanding of the date labels such as best before and use by date, which lead to food discards, more frequently. Consumer awareness on 'E- numbers', the code used to declare the food additives, which is mentioned in the ingredient list, was analysed. Though many respondents have seen the E- numbers, mentioned in the food label but only 37.5% of them were aware that E-numbers represents the food additives used in food processing. This is similar to the survey conducted by Nousheen and Nora, (2015), where more than one half of respondents were unaware of E-numbers and the people, who have heard or seen E-numbers, were unaware of what E-number is.

Consumer awareness on food packaging standards

Consumer awareness on the Indian standard which governs the safety of food packaging material was analysed. Only 13.2% of the respondents were aware that the Bureau of Indian Standards (BIS) regulates the safety measures for food packaging materials. Majority of consumers had poor knowledge on it and had wrong assumptions that FPO - Fruit Product Order (36.8%) and ISO - International Organization for Standardization (32.6%) regulates the safety of food packaging. On analyzing the consumer knowledge on Food packaging material migration into the food product, only 45.8 % of people were aware of the fact that packaging material possesses the chances of migrating into the food product. And only 36.1% of people were

aware that Indian safety standards regulates the safety of Food packaging material migration and prescribes acceptable safety limits for packaging migration. This shows that consumer awareness on migration of food packaging material, its standards and regulations are inadequate.

Table 2: Consumer awareness on food labelling and packaging standards

Labelling and packaging standard	Aware	Unaware
Use by date	67.4%	32.6%
Best before date	47.2%	52.8
E – numbers	37.5%	62.5%
BIS	13.2%	86.8%
Packaging material standard		
Packaging material migration	36.1%	63.9%

Relationship between demographic characteristics and consumer awareness on food safety standards:

In this study, by using cross tabulation, the association between the demographic characteristics of the respondents such as gender, age, education and occupation, and consumer awareness on food safety standards was analyzed. Female respondents had higher awareness level on food safety standards than males. Respondents in the age group of 18-24 years were more aware of the food safety standards while people above 50 years of age had the least awareness, especially about FPO, E – Number, BIS – the packaging material standard. Consumers with a post graduate educational background were more aware of the standards whereas people who had only higher secondary school education had the least awareness level. On observing the association of consumer's occupation and their awareness level, students pursuing their college education had higher awareness and employed people had moderate awareness of food standards. Homemakers and retired people were least aware of food safety standards than others. Thus, there is a relationship between demographic characteristics of the consumer and their awareness of food safety standards.

Impact of consumer awareness of food safety standards of processed food products on their buying behaviour:

Cross tabulation method and one-way ANOVA was used to find the impact of consumer awareness of food safety standards on their buying behavior. The findings of the study revealed that most of the consumers prefer supermarkets (38.9%) and small retail stores (22.2%) to buy the processed food products, followed by small retail stores. Others prefer nearby local shops (16.7%), wholesale markets (12.5%) and organic stores (9%) as the place of purchasing processed food products. There are many factors which influence the consumer decision-making or buying behavior. As shown in Figure 5, 'quality' is considered as most important by 34.7% of consumers, followed by brand, safety standards, price, labelling information. Other factors such as type of food packaging, ease of availability, convenience, discounts and offers were considered least important in buying processed food products. On observing consumer's buying behaviour, people who perceive quality, brand, labelling information and safety standards as most important were found to buy the majority of the processed food products from supermarkets and consumers who perceived price as most important prefer to buy from small retail stores.

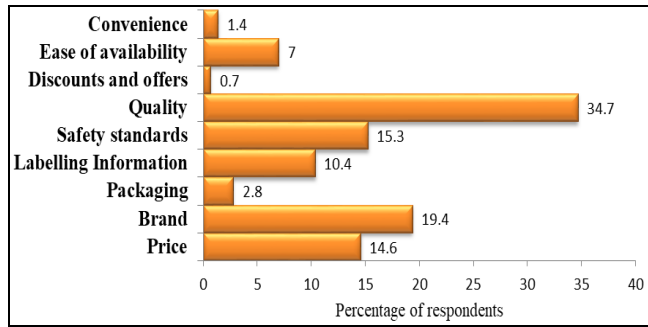


Fig 5: Important factors considered while buying processed foods

Frequency of reading food labelling components:

The results of the study indicated that majority of consumers (87.5%) had the habit of reading the food labelling while purchasing processed food products. As depicted in the Figure 6, 70% of the respondents always look for the date labels such as manufacturing date, expiry date, best before date and use by date, every time when they purchase food products. Similar results were reported in studies conducted by Akku et al., (2016) and Sejal et al (2021). Less than 50% of consumers have a habit of reading net quantity, food safety standards, vegetarian / non-vegetarian category, storage instructions and health claims, every time when they purchase a food product. But labelling components such as ingredients list (41.7%) and allergic information (33.3%) were read only when people purchase a new food product. Reeta et al., (2014) revealed that higher proportion of consumers read manufacturing/ expiry date most of the time whereas less than 50% of consumers only read safety standards every time they purchase. This is quite similar to the present study. On observing the impact of consumer awareness of E-numbers on the frequency of checking ingredients list in a food label, respondents who were aware of E-numbers present in the food label, checks the ingredient list every time when they purchase, whereas people who were unaware of E-numbers checks the ingredient list in food label, only when they purchase a new food product. There is a higher significant difference between consumer awareness of E- Numbers and the frequency of reading ingredients list of food products (p value = <0.001).

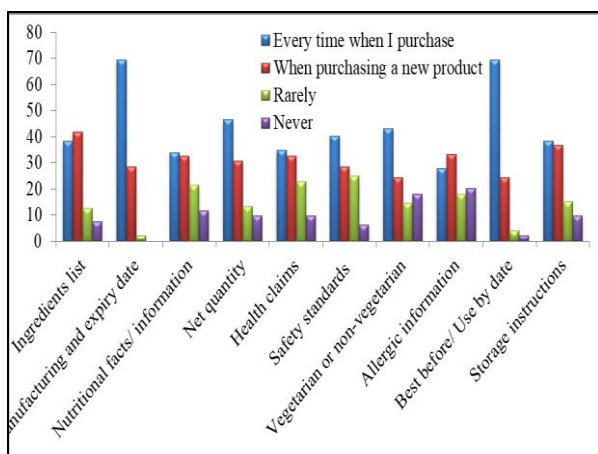


Fig 6: Frequency of reading food labelling components while buying

Table 3: Consumer awareness of E-numbers and the frequency of reading ingredients list in the food labelling

Awareness on E-Numbers	Frequency of reading ingredients list			
	Every time	When purchasing a new product	Rarely	Never
Aware	48.4%	41.7%	8.8%	1.1%
Unaware	20.7%	41.5%	18.9%	18.9%
p value	<0.001			

Impact of consumer awareness of food safety standards on the frequency of checking the safety standards in a food product label

Majorly, consumers who were aware of FSSAI, tend to check the safety standard marks every time whereas who were unaware of FSSAI, checks it rarely. This is similar in case of consumer’s awareness on AGMARK and FPO mark. Even though most of the respondents were aware of the ISI mark, only 43.3% of them checks for safety standards in the food label every time they purchase s food product. There is a significant difference between the consumer awareness of AGMARK and the frequency of reading safety standards (p value=0.006). There is a higher significant difference between the consumer awareness of FSSAI, FPO, ISI and the frequency of reading the safety standards (p value <0.001).

Table 4: Consumer awareness on safety/ quality standards and the frequency of reading safety standards in the food labelling

Awareness of food safety standards	Frequency of reading the food safety standards			
	Every time	When purchasing a new product	Rarely	Never
Awareness of FSSAI				
Aware	44.1%	30%	21.2%	4.7%
Unaware	11.8%	17.6%	53%	17.6%
p value	<0.001			
Awareness of AGMARK				
Aware	42.1%	32.2%	22.3%	3.3%
Unaware	30.4%	8.7%	39.1%	21.8%
p value	0.006			
Awareness of FPO				
Aware	50%	40.3%	8.53%	1.21%
Unaware	27.3%	13%	46.7%	13%
P value	<0.001			
Awareness of ISI				
Aware	43.3%	29.1%	22.4%	5.2%
Unaware	0%	20%	60%	20%
p value	<0.001			

Consumer’s buying frequency of different types of packaged food products

As shown in the Figure 7, the majority of consumers, buy packaged foods which have a proper labelling with certification, every time when they purchase. At the same time, consumers also tend to buy loosely packed foods and packaged food without proper labelling, sometime, which may be attributed to the convenience factor.

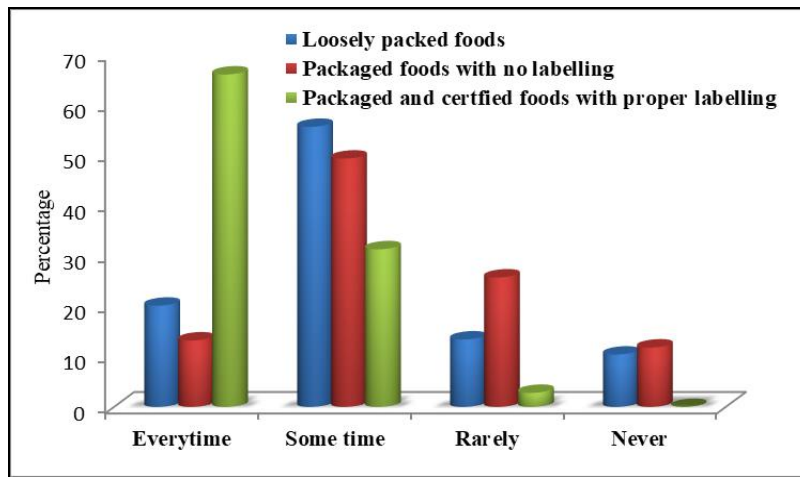


Fig 7: Frequency of buying different types of packaged foods

Impact of consumer awareness of packaging material standard on the buying frequency of different types of packaged foods:

The majority of consumers both who were aware and unaware of BIS, the packaging material standard, tend to buy loose foods only some time, and there is a significant association between consumer awareness of packaging material standard (BIS) and the frequency of buying loose foods (p value = 0.007). Maximum of the consumers who were unaware of the packaging material standard, purchases the packaged foods without labelling some time, whereas those who were aware (47.4%) of the packaging material standard, rarely purchases the packaged foods without labelling and there is a higher significant difference between these variables (p value = <0.001). Larger proportion of consumers purchases packaged foods with proper labelling and certification, every time, irrespective of the awareness on packaging material standard and there is no significant association between the two variables.

Table 5: Consumer awareness on packaging material standard and buying frequency of different types of packaged foods

Awareness of packaging material standard -BIS	Every time	Some time	Rarely	Never
	Loose Foods			
Aware	15.9%	42.1%	21%	21%
Unaware	20.8%	57.6%	12.8%	8.8%
p value	0.007			
Packaged foods without labelling				
Aware	0%	36.8%	47.4%	15.8%
Unaware	15.2%	49.6%	21.6%	13.6%
p value	<0.001			
Packaged foods with proper labelling and certification				
Aware	79%	21%	0%	0%
Unaware	64%	32.8%	2.4%	0.8%
p value	0.128			

Finally on analyzing the consumer willingness to buy certified processed food products, more than half the respondents in the study (56.9%) were willing to buy high quality certified food products only at an affordable cost. Only 32.6% of people were willing to buy high standard certified food products even at high cost. Few respondents (10.4%) were never willing to buy certified food products at high cost. Also, consumers were willing to learn or upgrade their knowledge about food safety standards in larger proportion (88.4%) and only 11.6% of people were not

willing to learn. Among them, most of them were willing to learn from government sources such as training programs, campaigns or information on official websites and social media.

Conclusion

Food safety should be ensured in every stage of the food supply chain, to provide safe and harmless food to the consumers. Each and every person involved in the food supply chain activities have in huge role in maintaining food safety. Though food regulatory bodies provide tremendous measures to prevent food safety hazards / frauds, by laying down safety standards and certifications, it is the consumer’s responsibility to be aware of those standards and lead a safe buying behavior of processed food products, a kind of self- protection. The present study found that consumers were aware of the logo representing the food safety standards but were unaware of the functioning of these standards / quality marks. Consumers were unaware of the food products that require mandatory certification. This indicates poor knowledge of consumers on these standards. Upon analyzing the consumer awareness on labelling and packaging standards, awareness on date labels and E-numbers was inadequate. In India, the Bureau of Indian Standards (BIS) governs the packaging material safety. Majority of consumers were unaware of BIS and only few consumers were aware of packaging material migration but unaware of the existence of safety standards for it. Analyzing the demographic characteristics of respondents, proper awareness is required for people with poor educational background and especially retired people and homemakers. Analyzing the consumer buying behavior of processed food products, consumers who prefer quality as important, buy food products from supermarkets whereas consumers who consider price as important, buy their food groceries from small retail stores. Consumers mostly read manufacturing date and expiry date every time when they purchase than other components. Consumers, who were aware of safety standards such as FSSAI, AGMARK, ISI and FPO, check for the safety standards of a food product, every time when they purchase. Though consumers buy packaged foods with proper labelling and certification every time, they also buy loose foods and packaged foods without labelling, sometime or rarely, irrespective of their awareness level. Thus, awareness of food safety standards has a partial influence of buying behavior of processed food products.

Suggestions to improve consumer awareness on food safety standards

From the study findings, education from government source was more preferred by the consumers. Though FSSAI's official website provides all the necessary details regarding food safety standards, not all consumers around the country are aware of it. Social media and celebrity endorsement is least used to portray about food safety standards. So it can be used as a platform to inform consumers about the government website. Booklets or pamphlets regarding food safety standards can be provided in respective regional languages, especially to rural consumers through public fair price shops. By partnering with the most well-known food processing industries, consumer awareness on food safety standards can be improved.

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