



ENSURING FOOD SAFETY: COMBATING SPIKED MILK FOR PUBLIC HEALTH PROTECTION

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Abstract - Food safety is an indispensable aspect of public health, and its significance cannot be understated. Amidst growing concerns over foodborne illnesses, spiked milk has emerged as a grave issue with potentially detrimental effects on consumers' well-being. This article delves into the multifaceted aspects of food safety, with specific focus on the alarming trend of spiked milk. It examines the common adulterants found in milk, ranging from hazardous chemicals to contaminants, and the associated health risks posed to consumers. The article underscores the impact of spiked milk on the dairy industry and consumers, stressing the importance of strict enforcement of food safety regulations. The role of consumer awareness and education is emphasized, empowering individuals to take measures in safeguarding their health through discerning milk safety. The authors aim to study "Ensuring Food Safety: Combating Spiked Milk for Public Health Protection" through a well-structured questionnaire framed by the researcher put forth among the general public with different age groups to obtain their view on food adulteration.

Keywords: Food safety, Spiked milk, Adulteration, Public health.

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INTRODUCTION

Food safety has emerged as an important global issue with international trade and public health implications (WHO, 2006). Food fraud is an area of serious concern which has come under increased scrutiny as a potential food safety and public health concern in recent years (Food and Agriculture Organization of the United Nations 2007). Spiking milk refers to the act of adding harmful substances or adulterants to milk, either to increase its volume or mask its quality. This unethical and illegal practice poses significant risks to public health and violates food safety regulations.

Food adulteration is the act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by the removal of some valuable ingredient. India as one of the largest milk-producing countries, considers milk as an essential commodity in the daily life of Indians. It is not only a source of good quality protein, but also of calcium and riboflavin besides other nutrients for the growth, and maintenance of proper functioning of human beings. It is also used for the preparation of various products like ghee, butter, cream, yoghurt and sour milk (Webb et al 1974). Food adulterants refer to the foreign and usually inferior chemical substance present in food that causes harm or is unwanted in the food (Gahukar 2013). Milk adulteration causes losses in quantity and also leads to poor quality of milk. It is the result of poor hygiene, malpractices, lack of preservation technology, cooling facilities and sanitation conditions (Hasnoot et al 2004). Milk adulteration also involves dilution with water, and the addition of nitrogen sources like ammonium salts, melamine, urea, and non-dairy proteins with mal intentions (Das et al 2016). Even though milk obtained from different species of cattle slightly varies in composition and properties but it should contain general constituents of milk. That is on average milk is made up of 87.4% water and 12.6% milk solids among milk solids 3.7% fat, 8.9% milk solids non-fat contain proteins 3.4% lactose 4.8% and minerals 0.7% (Chandan 1997).

Objective

- To investigate the prevalence of adulteration in milk samples.
- To assess the health risks associated with consuming adulterated milk, including the potential impact on vulnerable population groups
- To explore consumer awareness and knowledge regarding milk adulteration and its implications for food safety practices.
- To propose recommendations for enhancing food safety measures, preventing milk adulteration, and promoting responsible practices throughout the dairy industry.

REVIEW OF LITERATURE

Aesthetic adulteration is the contamination of food with filthy, putrid, or decomposed substances. According to Cozzolino, (2017), Mastitis was the most common disease reported; oxytocin and oxytetracycline were frequently used in veterinary formulations. Of 205 milk samples analysed, 9% of market samples and 73% of individual animal milk samples contained oxytetracycline residues. Gautam and Agarwal (2017) highlighted Operation Flood and Dairy Co-operatives emerged in India as the largest rural employment scheme, enabling the modernization of the dairy sector to a level from where it can take off to meet not only the country's demand for milk and milk products but can also exploit global market opportunities. In accordance with Manning and Soon (2018), the present article reviews the most commonly used methods, techniques and equipment for instrumental analysis of volatile (flavour) compounds in milk and dairy products.

METHODOLOGY

The researcher has done an empirical study on food adulteration laws in India. The primary information for the analysis is collected through the field, randomly selected respondents including the general public of various age brackets with a structured survey form. The SPSS software by IBM was used to calculate the descriptive statistics. The independent variable used for this research includes gender, age etc. The dependent variable used for this purpose of research is “adulterants added to food to improve the flavour, colour and appearance and to increase quantity to gain more profit” and “adding water amounts to adulteration of the milk”. The responses received are calculated using the Pearson Chi sq. Technique. The secondary sources employed for the study is by touching on books, analytical articles, e-sources, articles, journals, and newspapers. The study conjointly found 1778 respondents.

ANALYSIS

FREQUENCY TABLE

Table 1: GENDER

	Frequency	Percent	Valid percent	Cumulative

					Percent
Valid	Male	727	40.9	40.9	40.9
	Female	1017	57.2	57.2	98.1
	Transgender	34	1.9	1.9	100.0
	Total	1778	100.0	100.0	

Table 2: AGE

		Frequency	Percent	Valid percent	Cumulative percent
Valid	Below 18	455	25.6	25.6	25.6
	19-25	462	26.0	26.0	51.6
	26-35	507	28.5	28.5	80.0
	36-45	271	15.2	15.2	95.3
	above 45	83	4.7	4.7	100.0
	total	1778	100.0	100.0	

Table of interpretation

Inferences:

Totally 1778 responses were collected from the general public to find out the awareness of people on the food administration loss in India. From the above, it is

clear that 727 male respondents and 1017 female respondents are recorded out of 1778 responses.

Table 3: Crosstab analysis between gender and respondents' opinions about adulterants being added to food to gain more profits.

Ha: Adding adulterants in food is to increase the profit

H0: Adding adulterants in food is to increase the quantity and not for profit

Crosstab

Adulterants added to food to improve the flavour, colour and appearance and to increase quantity to gain more profit?							
Count		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Gender	Male	43	181	217	189	97	727
	Female	77	241	326	215	158	1017
	Transgender	6	11	7	8	2	34
Total		126	433	550	412	257	1778

Chi-square test

	Value	df	asyp.sig.(2-sided)
Pearson chi-square	17.615 ^a	8	.024

likelihood ratio	16.643	8	.034
linear-by-linear association	1.688	1	.194

Table of Interpretation

Totally 412 respondents strongly disagreed and 257 respondents disagreed,550 respondents are neutral and 433respondents agreed and 126 strongly agreed.

Inference:

From the above table and responses received the following is inferred:

Crosstab-According to the responses received is evident that totally 412 out of 2693 said strongly disagree and 257 said disagree. 285 are male respondents and 373 are female respondents.

Chi-square value-The value is greater than 0.05 so it is highly significant.Therefore,the alternative hypothesis is rejected and the null hypothesis is proved.Hence, it is proved that adding adulterants to food is to increase the quantity and not for profit.

Table 4: Crosstab analysis between gender and respondents' opinions about adding water amounts to adulteration of the milk.

Ha: Adding water amounts to adulteration of the milk.

H0: Adding water not amounts to adulteration of the milk

Crosstab

adding water amounts to adulteration of the milk?
COUNT

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Gender	Male	65	267	234	99	62	727
	Female	126	209	347	229	106	1017
	Transgender	11	8	7	7	1	34
Total		202	484	588	335	169	1778

Chi-square tests

	value	df	asyp.sig.(2-sided)
Pearson chi-square	81.967 ^a	8	.000
likelihood ratio	78.485	8	.000
linear-by-linear association	7.613	1	.006

Table of Interpretation

Totally 484 respondents strongly agreed and 202 respondents agreed, 588 respondents are neutral and 335 respondents disagreed and 169 strongly disagreed.

Inference:

From the above table and responses received the following is inferred:

Crosstab-According to the responses received is evident that a total of 202 out of 1778 said strongly agreed and 484 out of 1778 said agreed. In which 727 are male respondents and 1017 are female respondents.

Chi-square value-The value is less than 0.05 so it is highly significant. so the null hypothesis is rejected and the alternative hypothesis is proved. so it is proved that adding water amounts to adulteration of the milk.

TABLE 5

Crosstab analysis between age and respondent's opinions about adulterants added to food to improve the flavour, colour and appearance and to increase quantity to gain more profit

Ha: There is a significant relationship between the age of the respondents and their awareness of food adulteration.

H0: There is no significant relationship between the age of the respondents and their awareness of food adulteration.

CROSS TAB

Adulterants added to food to improve the flavour, colour and appearance and to increase quantity to gain more profit							
		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Age	Below 18	34	56	182	101	82	455
	19-25	23	123	123	128	65	462
	26-35	41	166	140	98	62	507
	36-45	17	78	72	62	42	271
	above 45	11	10	33	23	6	83
total		126	433	550	412	257	1778

Chi-square tests

	Value	df	asymp.sig.(2-sided)
Pearson chi-square	96.182 ^a	16	.000

Likelihood ratio	100.727	16	.000
Linear-by-linear association	13.215	1	.000

Table of Interpretation

Totally 126 respondents strongly agreed and 433 respondents agreed, 550 respondents are neutral and 412 respondents disagreed and 257 strongly disagreed.

Inference:

From the above table and responses received the following is inferred:

Crosstab-According to the responses received is evident that a total of 126 out of 1778 said strongly agreed and 433 out of 1778 said agreed. 455 are below the age of 18 respondents and 462 respondents are between the age of 19-25 and 507 respondents are between the age of 26-35 respondents and 271 respondents are between the age of 36-45 and 83 respondents are above the age of 45.

Chi-square value-The value is less than 0.05 so it is highly significant. so the null hypothesis is rejected and the alternative hypothesis is proved that there is a significant relationship between the age of the respondents and their awareness of food adulteration.

From Table 1 it is clear that 727 male respondents and 1017 female respondents are recorded out of 1778 responses. The high responses are from the age group below the age of 18, 19-25 and 26-35. From Table 4 the chi-square value is greater than 0.05 so it is highly significant. Hence null hypothesis is proved. So, it is proved that adding adulterants to food is to increase the quantity and not for profit. From Table 6 it is clear that the chi-square value is less than 0.05 so it is highly significant. Hence alternative hypothesis is proved. so it is proved that adding adulterants to food is to increase profit. Table 10 the chi-square value is less than 0.05 so it is highly significant. Hence alternative hypothesis is proved. so it is proved that there is a significant relationship between the age of the respondents and their awareness of food adulteration.

There are several reasons why adulteration of milk occurs. The motives behind adulterations include:

- Adulterants such as water, starch, or other cheaper substances are added to increase the volume of milk, allowing sellers to sell more products and maximize profits.
- Adulteration may be used to mask the spoilage or deterioration of milk. Adding preservatives or other substances can extend the shelf life of milk, making it appear fresh for a longer time.
- During times of high demand or shortages, milk adulteration might occur to meet consumer needs.
- To make maximum profit from food items by fewer investments.

Legal Research Content

The legislation that dealt with food safety in India was the Prevention of Food Adulteration Act, of 1954. The Prevention of Food Adulteration Act had been in place for over five decades and there was a need for change due to varied reasons which include the changing requirements of our food industry. Food Safety and Standards Act 2006 overrides all other related laws in India and the Food Safety and Standards Authority of India was established to integrate the food safety laws in India, to systematically and scientifically re-orient the food processing and manufacturing industry from regulation to self-compliance.

Those adulterating food products could face life imprisonment and a penalty of up to Rs. 10 lakhs as per the amendments proposed by the regulator FSSAI in its 2006 Food Safety and Standards Act. 28 regulations were passed under the food safety and standards act till 2023 to curb various adulterations and management of food safety issues. Punishment for unsafe food varies from 1 lakh rupees to 10 lakh rupees according to Section 59 of the act. Section 65 covers the compensation in case of injury or death of a consumer, is liable to 5 lakh rupees in case of death; 3 lakhs in case of grievous hurt and 1 lakh in case of all other injuries, the food authority can also cancel the food license of such person etc.

Suggestions and Recommendations

Measures can be taken to prevent the sale of adulterated milk from reaching the public through systematic testing at the border check posts when milk arrives from one state to another state. Vehicles bringing milk should be allowed entry to states only after ensuring that the contents contain no harmful substances. Check whether the seal is valid or not, before buying the food products like milk, oil, and other food pouches. Milk in plastic covers has no information about the branded firm, the date and time of packaging etc., should not be purchased. Always make sure to check and buy products having an FSSAI-validated label, along with the license number, list of ingredients, manufactured date, and expiration. Regular inspections and penalties for those found guilty of adulteration should be enforced to deter potential offenders. Invest in research and development to improve and expand detection methods for milk adulteration. Industry associations should play an active role in promoting ethical practices and discouraging adulteration. Establish easily accessible reporting systems for consumers to report suspected cases of milk adulteration. Prompt investigation and action on reported incidents can deter future adulteration attempts.

CONCLUSION

From the opinions of the respondents, it is clear that most of them are aware of food adulteration and they find the Food Safety and Standard Act 2006 to be an effective act in India. Detection of adulteration in food is an essential requirement for ensuring the safety of the foods we consume. Although sophisticated lab techniques are accurate, precise, and reliable, they are costly and time-consuming. It is essential to develop reliable “quick screening tests” that a common person can perform at the level of the household to have a broad picture of the status of adulteration in her food in case of doubt.

Conflict of Interest

The authors declare no conflict of Interest.

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