International Journal of Modern Agriculture, Volume 10, No.2, 2021
ISSN: 2305-7246

CONSUMER AWARENESS TOWARDS FOOD ADULTERATION IN INDIA

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Abstract

This paper aims to know the level of awareness among the respondents regarding food adulteration, understand the consumer's knowledge regarding the effects of food adulteration on health, various adulterants mixed in the food items and to know the methods of identifying the adulterants in the various food items. Study revealed that most of the respondents have low awareness regarding the food adulteration, its effect on the health, adulterants mixed or used for adulteration and test to be done for detecting the adulteration

Key words: Food Adulteration, Adulterants, food safety, contamination, Food testing Labs, Test for detection

Introduction

Food is the basic requirements of human beings along with water, air, and shelter for sustainment of biological life. Adulterated and contaminated food is one of the common sources of infection, can lead to malnutrition and various diseases, so the quality of food one consumes will decide the health, productivity and wellbeing of that person. "Adulteration in food has been a concern since the beginning of civilization, as it not only decreases the quality of food products but also results in a number of ill effects on health (Sangita Bansal et al 2015)" [13]. Every one work and earn money for fulfilling their basic need of hunger, i.e. food, but most of the people are not aware of what they are consuming, even though India is an agrarian society and in India food is treated as a god even then Food is adulterated and it is one of the social evil in India. Every citizen has the right to have unadulterated food i.e., for safe, clean and nutritious one.

Consumers facing difficulty in selecting the food items because of misleading advertisements, and adulteration of food, the consumer is becoming the ultimate victim; he is suffering by consuming the adulterated food. Consumption of safety and unadulterated food will ensure the protection of people health. Food adulteration can not only be a result of greedy businessman but it can be due to increased prices, shortages, lack of awareness, lethargy, negligence, indifference attitude among customers towards food adulteration and inadequate enforcement of food laws in India.

"Arthashastra recognized Adulteration as an offence and punishment were specified" [5].

Food Safety and Standards Act (FSSA) defined Adulteration of food and adulterants as "the addition or subtraction of any substance to or from food, so that the natural composition and quality of food substance is affected". "Adulterant means any material which is or could be employed for making the food unsafe or sub-standard or mis-branded or containing extraneous matter" [6].

Manjula Thakur et al (2009) "Food adulteration is a common malpractice and an age-old problem which causes serious effects on the health of people". "Adulterant defined as any cheap outside item which looks the same as the original foodstuff, which mixes very well with it and is not easy to detect" [8].

Ahmad S (2012) "Food adulteration is a socio-economic crime, because mode of adulteration is harmful for human beings and source of profits is for business men who are involved in adulteration activities" [2].

Objectives of the study:

To know the awareness level regarding the food adulteration amongst the selected respondents

To measure the relationship between level of awareness regarding food adulteration among the respondents with selected variables.

To know the awareness of consumers towards the tests, for the detection of Food Adulteration.

To know various tests for detecting adulteration in the food items

To offer suggestions for the eradication of Food Adulteration

Review of Literature:

Vasanthakalaam.H (1996) suggested that "consumers awareness plays an important role in preventing the food adulteration. so basic screening tests for food adulteration should be known to common people" [14]. Abidfaheem T.K et al (2013) their study revealed that "majority (60%) of the respondents had moderate knowledge about food adulteration. Chili powder were adulterated with artificial color, common salt was adulterated with insoluble impurities, tea powder adulterated with iron fillings and artificial color. There was significant association of knowledge about food adulteration with age and education of the respondents" [1].

Bhatt Shuchi R et al (2012) in their study found that "coriander powder was adulterated with horse dung, soil and leaf powder" [4]. Mohamed Ziyaina et al (2014) in their study found "lead and cadmium in turmeric powder" [9]. "Label declaration on packed food is very important in order to know the ingredients and its nutritional value" (Babu and Shenolikar 1995) [3]. "The process by which the quality or the nature of a given substance is reduced through the addition of a foreign or an inferior substance and the removal of vital vitamins" [10].

Khapre MP (2011) "Ignorance of consumers regarding their rights and responsibilities towards food adulteration resulting in faulty buying practices" [7].

Limitations of the study: The study restricted to Hyderabad and Warangal districts and the sample of respondents limited to 120 (60 Urban and 60 Rural respondents), results obtained from the study may not reflect entire country.

Research Methodology: Total 120 respondents were selected based on simple stratified random sampling method consisting of 60 Urban and 60 rural consumers. A questionnaire was served to collect the responses from the respondents. IBM SPSS Statistics 20.0, chi-square test is used to analyze the data for testing the relationship between the categorical variables.

Materials and Methods

Background information of the respondents

Awareness level on food adulteration

Awareness about health hazards of food adulteration

Hypothesis:

H_{O1}: There is no significant difference between urban and rural regarding awareness on food adulteration.

H_{O2}: There is no significant difference between urban and rural regarding awareness on effects of food adulteration.

H_{O3}: There is no significant difference between urban and rural regarding awareness on detection of adulterants in food items.

H_{O4}: There is no significant difference between literacy and awareness of food adulteration.

H_{O5}: There is no significant difference between literacy and awareness on effects of food adulteration.

H_{O6}: There is no significant difference between literacy and awareness on detection of adulterants in the food items.

$H_{O7,\ Ho}$8, Ho9**:** There is no significant difference between Gender and awareness level of food adulteration, effects of food adulteration, detection tests for adulterants.

Food Adulteration Types

Adulteration can be divided in to three categories based on the type of contamination, intention of the producer and processing methodology

Intentional adulteration: Intentional or willfully adulterates to increase the weight of the product whereby he can increase his profit. Items like stones, marble, mud, sand, water, chips, mineral oil, chalk powder, and coal tar dyes etc are mixed. Many adulterants effect the health and are harmful to the human body.

Unintentional or incidental adulteration:

"Most common accidental adulterants are pesticides, D.D.T. and residues present on the plant product" (Pandit *et al.,* 2002) [11]. The unintentional or incidental adulteration is mainly because of negligence, ignorance, or poor facilities. It takes place either at the time of threshing, packaging, in warehouses, or during loading and unloading. Food prepared and packed in the unhygienic conditions will lead to infestation, animal droppings etc. Contamination of foods with harmful microorganisms, Vegetables which are grown on sewage more prone to contamination with harmful microorganisms but these can be destroyed by proper processing and cooking properly. Humid may also cause fungus to various food grains, legumes and oilseeds which can cause serious illness to people.

Prevention by incidental poisoning

Regular awareness programs should be conducted to the people about the dangerous effects with the toxins in the food items. The most common incidental adulterants are pesticides, creating awareness among the farmers regarding judicious usage of pesticides, farmers should avoid spraying of Pesticides before harvest also usage of Low persistence or safer pesticides and Cooking vegetables after proper washing with salt water and then with normal water will prevent the incidental poisoning to a great extent.

Metallic contamination: Metals like Lead, arsenic, mercury, etc. and the toxic elements, in small doses such as arsenic, cadmium, Cobalt and antimony, can affect the consumer health drastically and can affect functioning of Liver, Kidney and many more.

The effects of food adulteration on the health of an individual will depend upon many factors like the type of adulterant, period of exposure, extent of adulteration etc. Even so there can be some symptoms or diseases that occur commonly due to consumption of adulterated food like Vomiting, Diarrhea, Allergy, Infections, Liver disorder, Neurological disorders, Stomach disorders, Anemia, Malnutrition, Cancer etc.

Role of Food Safety and Standards Authority of India (FSSAI) in controlling Food Adulteration

"The Food Safety and Standards Authority of India (FSSAI) or Food Authority established under the Food Safety and Standards Act, 2006 (FSS Act) primarily for laying down science based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import to ensure availability of safe and wholesome food for human consumption. Its detailed mandate is given in Section 16 of the FSS Act, 2006. The Act was operationalized with the notification of Food Safety and Standards Rules, 2011 and six Regulations w.e.f. 5th August, 2011" [6].

This Act overrides all other previous food related laws, specifically following laws were repealed

"The Prevention of Food Adulteration Act, 1954

The Fruit Products Order, 1955

The Meat Food Products Order, 1973

The Vegetable Oil Products (Control) Order, 1947

The Edible Oils Packaging (Regulation) Order, 1998

The Solvent Extracted Oil, De oiled Meal, and Edible Flour (Control) Order, 1967

The Milk and Milk Products Order, 1992

Essential Commodities Act, 1955 relating to food

List of principal Regulations in force as on 31st March 2018

Food Safety and Standards Regulations

Food Safety and Standards (Licensing and Registration of Food Businesses) Regulation, 2011

Food Safety and Standards (Food Products Standards and Food Additives) Regulation, 2011

Food Safety and Standards (Prohibition and Restriction of Sales) Regulation, 2011

Food Safety and Standards (Packaging and Labelling) Regulation, 2011

Food Safety and Standards (Contaminants, Toxins and Residues) Regulation, 2011

Food Safety and Standards (Laboratory and Sampling Analysis) Regulation, 2011

Food Safety and Standards (Health Supplements, Nutraceuticals, Food for Special Dietary Use, Food for Special Medical Purpose, Functional Food and Novel Food) Regulations, 2016

Food Safety and Standards (Food Recall Procedure) Regulation, 2017

Food Safety and Standards (Import) Regulation, 2017

Food Safety and Standards (Approval for Non-Specific Food and Food Ingredients) Regulation, 2017

Food Safety and Standards (Organic Food) Regulation, 2017

Food Safety and Standards (Alcoholic Beverages) Regulation, 2018

Food Safety and Standards (Fortification of Food) Regulation, 2018

Food Safety and Standards (Food Safety Auditing) Regulation, 2018

Food Safety and Standards (Recognition and Notification of Laboratories) Regulation, 2018

Food Safety and Standards (Advertising and Claims) Regulation, 2018

Food Safety and Standards (Packaging) Regulation, 2018

Food Safety and Standards (Recovery and Distribution of Surplus food) Regulation, 2019"

Source: Food Safety and Standards Authority of India Annual Report 2017-18

FSSAI has taken several initiatives, for protecting and empowering consumer's interests.

Exclusive Consumer Education Portal: FSSAI has created an interactive portal www. foodsmart.fssai.gov.in for making consumers educate on all the issues pertaining to food safety, consumers can express their views, ask questions and register their complaints in it.

Food Safety Display Boards: FSSAI has introduced color-coded 'Food Safety Display Boards' for creating awareness among consumer about food safety and hygiene.

Consumer feedback and Grievance Redressal: FSSAI has provided consumer feedback/complaints mechanism with a toll-free Number (1800112100) functional between 10 AM and 6 PM (on all working days), Consumers can comment, put queries and register their complaints through WhatsApp Mobile number (+9198686 86868) or send an SMS.

Consumers can interact with FSSAI on various social networking sites like Facebook, Twitter or e-mail. Customers can register their comments and complaints by going to the following address, Regulatory Compliance Division (4th floor, FSSAI, FDA Bhawan, Katia Road, New Delhi-110002). Consumers can register their complaints through integrated Grievance Redressal Mechanism (INGRAM) portal where all Stakeholders are brought onto a single platform.

Smart Consumer App

As part of the government's mission to promote Digital India and to educate and empower consumers, "Smart Consumer Mobile App was launched in December 2016. This App enables consumers to know about the product is fake or original.

Food Testing Laboratories

Increase in the population caused rapid urbanization which lead to change in the life styles made the consumer to consume the food prepared outside at small eating establishments and street vendors, this may be one of the concerned area for food adulteration. To start and carry any food business in India, all Food Business Operators (FBOs) have to obtain license or register under Section 31 of the Food Safety & Standards Act, 2006.

Mobile Food Testing Laboratories called as Food Safety on Wheels (FSW), were launched by FSSAI, it will enable to perform tests for common adulterants in food items like edible oil, milk, water, and other food items of daily consumption. The mobile food testing labs will help the outreach and conducting of surveillance activities in remote areas.

The FSSAI has also brought out some simple tests to be performed on common food items to test for their purity.

To create awareness among the consumers about food safety, Food Authority released a compilation of common tests for detecting the adulterants in the food named as Detect Adulteration with Rapid Test (DART) on 22nd August, 2017. It covers more than 50 tests and food products like Oils & Fats, Milk & Milk Products, Food grains & its products, Sugar & Confectionery, Spices & Condiments etc. can be tested by these means. DART shows pictorial representations which shows the difference between pure and adulterated food products.

Table:1 Progress on enforcement metrics for the FY 2017-18

Enforcement Metric	2016-2017	2017-2018	% increase
No. of food samples analyzed	60,671	99,353	64%
No. of samples found adulterated	14,130	24,262	72%
Count of criminal proceedings	1,248	1,506	21%

Count of civil proceedings	9,392	13,615	45%
No. of convictions	1,596	5,198	225%
No. of cases where penalty was imposed	3,978	7,627	92%
Total value of penalties imposed	Rs. 14.80 Crores	Rs. 26.35 Crores	78%

Source: Food Safety and Standards Authority of India, Annual Report 2017-18

The number of samples analyzed increased from 2016-17 to 2017-18, accordingly the samples found adulterated increased, civil and criminal proceedings increased, convictions and penalties also increased over the previous year. This shows that even after lot of efforts by the government, FSSAI and various other agencies the adulteration in food has not decreased, but increasing year after year.

Discussion

From Table-1 it is observed that the food adulteration cases are increasing, so an attempt is made to know the awareness of consumers regarding the food adulteration, its effects, adulterants used to adulterate the food and the tests to detect the adulteration in the food.

Table-2 shows the profile of the respondents, total respondents 120, out of which urban and Rural 60 each, Male-82, Female-38, literacy varying from illiterate to PhD.

Table-3 shows the Awareness regarding food adulteration is very low among the respondents with low (35.8%), Moderate (60.8%) and high (3.3%).

Few respondents expressed food adulteration is happening in the following products:

Fruits, Milk, Tea Powder, Ghee, Rice, Dhania/Coriander Powder, Spices, Paneer, Chicken, Besan, Chili Powder, Turmeric Powder, Honey, Alcohol, Ginger & Garlic Paste, Edible Oil, Vegetables, Dry Fruits, Water, Milk Powder, Beverages, Biscuits, Eggs, Juices, Chocolates, Black Pepper etc.

Table-4 shows the Awareness regarding food adulteration effects is very low among the respondents with low (35%), Moderate (61.7%) and high (3.3%).

Few respondents opined that food adulteration will lead to vomiting, diarrhea, allergy etc

Table-5 shows the Awareness regarding detection of food adulterants is very low among the respondents with low (55.8%), Moderate (43.3%) and high (8%).

Respondents opined that Mixing of inferior quality substances, mixing of sand, stones, mud etc, addition of colour and brick powder to chilli powder, synthetic milk made by mixing urea, caustic soda, starch and vegetable oil, mixing of water to milk, wax coating on apples, to look fresh fruits and vegetables are colored, methylene yellow color added in sweets, fruits and vegetables contains residuals of pesticides and insecticides, mangoes are ripened with calcium carbide, formalin is used to make fish appear fresh, mercury in sea food, usage of tin cans and aluminum foils for packaging.

Table-6 to Table-14 shows the Chi-square test results

Area of stay and awarenessHo1

As the p=.000 less than significance level 0.05, the null hypothesis is rejected, so there exists a relationship between area of stay and awareness of adulteration

Area of stay and Awareness of adulteration effects Ho2

As the p=.002 less than significance level 0.05, the null hypothesis is rejected, so there exists a relationship between area of stay and awareness of adulteration effects.

Area of stay and awareness regarding the detection of adulterants in food items Ho3

As the p=.546 is greater than significance level 0.05, the null hypothesis is accepted, so there does not exist any relationship between Area of stay and awareness regarding the detection of adulterants in food items

Literacy and awareness Ho4

As the p=.001 is less than significance level 0.05, the null hypothesis is rejected, so there exists the relationship between Literacy and awareness

Literacy and Awareness of adulteration effects Ho5

As the p=.000 is less than significance level 0.05, the null hypothesis is rejected, so there exists the relationship between Literacy and Awareness of adulteration effects

Literacy and awareness regarding the detection of adulterants in food items Ho6

As the p=.065 is greater than significance level 0.05, the null hypothesis is accepted, so there does not exists any relationship between Literacy and awareness regarding the detection of adulterants in food items.

Gender and Awareness Ho7

As the p=.745 is greater than significance level 0.05, the null hypothesis is accepted, so there does not exists any relationship between the Gender and awareness.

Gender and Awareness of adulteration effects Ho8

As the p=.328 is greater than significance level 0.05, the null hypothesis is accepted, so there does not exists any relationship between the Gender and Awareness of adulteration effects.

Gender and awareness regarding the detection of adulterants in food items Ho9

As the p=.031 is greater than significance level 0.05, the null hypothesis is accepted, so there does not exists any relationship between the Gender and awareness regarding the detection of adulterants in food items.

Measures/Suggestions:

Recommendations

Measures to eradicate food adulteration from the country:

"Consumer Awareness" is the first step to eradicate food adulteration from our country, few suggestions for the consumer to identify and prevent food adulteration:

Consumers should be aware of various acts enacted by government for the prevention of food Adulteration.

Creation of awareness among the public about the common adulterated food, their ill effects and proper testing methods of susceptible food items.

Before purchasing food items consumers should check for product labels which contains details like ingredients, manufacture date and best before use or expiry date and visual examination can ensure absence of insects, fungus and other foreign materials in the food items.

Always purchase Food items from trusted and known shops

While purchasing make sure that the package seal is intact and not tampered

Even though little bit expensive it is better that Consumers should purchase Branded items or products certified by the government which have quality certifications like BIS (Bureau of Indian Standards), and AGMARK (Agricultural Marketing).

Consumers can protect themselves from the hazards of adulteration by being conscious of what they buy and eat. Consumers should buy only those foods which have the FSSAI mark on them proving their safety and eat outside only in the establishments which have a FSSAI license or registration.

Before consumption testing of food items that are commonly adulterated for their purity is a very effective way of preventing consumption of adulterated food.

If product is found adulterated, preserving of bills will helpful for refund of cash or replacement of the product or even for filing a complaint against the seller.

Consumers can prevent food adulteration by registering complaints and filing case against those who resort to adulteration.

Formulation of proper legislation is not a solution to the problem but Stringent monitoring of the implementation is necessary.

Food Inspectors must be honest and Implement the law honestly.

Conclusion

From the above analysis we can conclude that food adulteration can affect the health of the people and most of them are not aware of it. The greediness of the traders and corrupted food inspectors who are not implementing the law honestly are the main cause for continuing of this evil in our society. To curb the Food Adulteration, and to have safe and unadulterated food to the consumers, Government of India from time to time came up with many acts. Mere acts will not curb this evil but honest implementation of law is the need of the hour. Awareness can be created among public by communicating and educating about the Food adulteration, its effects and the methods to detect the food adulteration. This social evil can be prevented by the consumers by taking precautionary measures before purchase and while purchasing. While purchasing the food items, unadulterated food items should be selected which do not affect the health. Even though visual examination cannot identify the toxic contaminants because of they are present in micro level, but it can ensure the presence or absence of insects, fungus, and any other unwanted substances. Consumer should purchase from the shops which maintain proper hygiene conditions. Government authorities should inspect stores and other places which sell food items regularly.

Further Scope of Research: The study focused on Hyderabad and Warangal area, and number of respondents and only 120 respondent's opinions were considered for the study, hence the result cannot be generalized. still further research can be done in this area by taking entire India on a wide scale.

Acknowledgement: The author wish to acknowledge all the respondents who gave responses.

Conflict of Interest: Single author so no conflict of interest

Funding: Self-Funded

Ethical Approval: Not Applicable

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