

## MANAGEMENT OF FOOD ADULTERATION BY FOOD BUSINESS OPERATORS

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### Abstract

Food is a basic need for all. Good quality food is essential for the maintenance of health, both physical and mental. Due to overgrowing population, environmental hazards, human greediness, depleting natural resource etc., one of the man-made hazards is the adulteration of food. Food adulteration has serious affects on our health. Despite various measures taken by the government, NGOs etc., in the form of creating awareness about the hazards of food adulteration, the outcome is not up to the expectation. This paper throws light on types of food adulteration, reasons, common adulterations detected, effects of adulterants and control measures to be taken by the business operators and the other concerned to mitigate the issue. The paper is based on both secondary sources and primary sources. The data collected is analyzed and presented in descriptive form. The observation method is also used wherever necessary.

It is identified that excess demand, increase in population, profiteering, shortage of authentic ingredients at affordable prices, shortage of qualified personnel to address the quality issues, no updation on processing techniques, lack of control measures etc., are the common reasons for adulteration. Regular collection of samples, publishing the results of lab tests made and the action taken against the culprits, organization of more and more awareness programs on prevention of adulteration, strict adherence to law by the government, popularizing the simple visual and physical tests to detect the adulterants, increasing the number of testing laboratories, developing the ethical practices among the business operators strengthening the consumer organizations to fight the adulteration, regular interactions with the food industry to understand their difficulties, concerns, problems and expectations are the suggestions offered by the paper.

**Key Words:** NGOs: Non-Governmental Organizations , **PFA Act:** Prevention of Food Adulteration Act

### Introduction

Food is a basic need for all. It should be available in sufficient quantity at right time and should also be nutritious, safe and wholesome. Good quality food is essential for the maintenance of health, both physical and mental. It is essential for growth and various life processes. An array of food in our daily diet includes vegetables, fruits, pulses, grains etc. These are consumed either in raw form or through certain processes. Due to overgrowing population, environmental hazards, human greediness, depleting natural resource etc., one of the man-made hazards is the adulteration of food. Food adulteration has serious affects on our health. Despite various measures taken by the government, NGOs etc., in the form of creating awareness about the hazards of food adulteration, the outcome is not up to the expectation.

### Focus and Structure of the Paper

This paper throws light on types of food adulteration, reasons, common adulterations detected, effects of adulterants and control measures to be taken by the business operators and the other concerned to mitigate the issue. The paper is based on both secondary sources and primary sources. Secondary information is collected from the published sources through web search. Primary information, particularly on the types of adulteration experienced / seen as a retailer and consumer is collected from 10 each business operators and primary customers in Sagar taluk of Shivamogga district. The business operators include milk vendors, rice merchants, grocery dealers and, provision stores. The data collected is analyzed and presented in descriptive form. The observation method is also used wherever necessary.

### Food Adulteration and Adulterants – Meaning

When the food fails to meet the legal standards set by the government and ethical expectations of the buyers, the food is said to be adulterated. It takes place, when substances that degrade the quality of food are added to it. Prevention of Food Adulteration Act takes in to account not only the intentional addition or substitution or abstraction of substances which adversely affects the nature, substance and quality of foods, but also their incidental contamination during the period of growth, harvesting, storage, processing, transportation and distribution. In simple terms it can be defined as the contamination or adulteration of food or food materials by adding harmful substances to it. Adulterants means the substances that lower the quality of food, when added to it. The substances hamper the natural quality of the food. The adulterant may be present in any form and in any quantity. They are harmful and pose the ability to lower the potency of the product. Sometimes the adulterant is though not harmful, it reduces the nutritional value of the food to a greater extent. Different types of adulterants are used to adulterate the food.

### Reasons

The food adulteration practice is practiced since the beginning of buying and selling of food items. The simple answer to the question that 'why do people practice adulteration of food even when they know that it adversely affects the health of human beings' is that- 'the unethical hunger for more profits'. The country has a long history of adding water to the milk to increase its quantity and gain more profit from less volume of milk. Similarly the food adulteration is practiced as a part of business strategy by food manufacturers and industries for the following reasons.

- 1) When demand exceeds the supply.
- 2) The increasing population also plays a major role in food adulteration.
- 3) To earn more profit by cheaper means ( called profiteering)
- 4) To make the food presentable and as an imitation of some other food which is more in demand.
- 5) Non- availability of (at time) or shortage of authentic ingredients at affordable prices.
- 6) To reduce the selling price of product and thereby facing the competition or creating competition with genuine business operators.
- 7) The practice of Value Engineering.
- 8) Shortage of qualified personnel to address the quality issues. In other words, due to lack of awareness and proper knowledge, it is still practiced.
- 9) No updation or lack of processing techniques.
- 10) Lack of control measures or inefficiency of government initiatives to control it.
- 11) Adulteration increases the weight of the food and helps in earning more profit in cheaper way.

### Notable Incidents of Food Adulteration

The usage of adulterants has been common in countries with limited legal controls on food quality and weak monitoring by authorities. Sometimes this usage has even extended to adding dangerous chemicals and poisons. Adulterant usage was first investigated in 1820 by the German Chemist Frederick Accum, who identified many toxic metal coloring in foods and drinks. Some of the notable examples of food adulteration are;

- 1) Mixing of water to milk.
- 2) Mixing of sand, particles and pebbles to pulses.
- 3) Mixing of wood powder to tea powder.
- 4) Mixing kerosene to petrol ( Now controlled)
- 5) Mixing oil with cheaper oils or chemical derivatives.
- 6) Packing low quality food products with high quality ones.
- 7) Selling of artificially flavored sugar water as apple juice.
- 8) Mixing of melamine in milk and infant formula products.
- 9) Milk adulteration with detergent, fat and urea.
- 10) Spraying the water on grains to increase the weight and value.

Thus, food grains, edible oils, spices, milk, coffee, sweetening agents (sugar and honey), non-alcoholic beverages, confectionery etc., are the items attracting the adulteration in large scale.

It is important to note that adulteration of a food can take place at any of the stages in the supply chain i.e., production/ processing/ manufacturing, distribution, retailing and at catering stages. The adulteration of food has progressed from being a simple means of fraud to a highly sophisticated and lucrative business. Although simple forms of adulteration like addition of water to milk and colored starch to turmeric or red chilli powder are still prevalent, newer forms and types of adulteration are emerging. Pesticide residues in vegetables, fruits, food grains, boiled water and antibiotic residues in milk and meat are now more in evidence. Use of new adulterants like ultramarine blue in dry ginger to hide holes and other damage done by insects, urea in puffed rice to improve its texture and aluminium foil in *betelnut* or *supari* instead of silver foil has been observed. The factors led to adulteration at each stage of supply chain are detailed here.

### 1) Production/ Processing/ Manufacturing Stage

The factors during production stage are poor agricultural practices, improper processing, storage and packaging, intentional addition of adulterant or substitution with cheaper materials.

### 2) Distribution Stage

The factors during this stage are; poor storage conditions, improper conditions of transportation etc.

### 3) Retailing and Catering Stage

The factors during this stage are; poor hygiene and sanitation, and improper storage, intentional addition of adulterant or substitution with cheaper materials.

The adulteration takes place in the form of replacement, addition and removal. Complete or partial replacement of a food ingredient with less expensive substitute, addition of small amounts of non-authenticated substances and removal of authentic and valuable constituent are made in these stages.

### Harmful effects of Adulteration

The paper is listing out the adulterants added to some of the food items and analyze the harmful effects of adulteration. Based on these, few initiatives are suggested to control the adulteration. Table 1 presents the adulterants added to some of the food items and their harmful effects.

**Table 1**  
**Adulterants and Ill-effects**

Sl.No.	Food Items	Chemical / Adulterant Used	Negative or Harmful Effects
1.	Milk and Curd	-Sodium carbonate or washing soda -Sodium hydroxide or caustic soda -Formaldehyde -Hydrogen Peroxide -Urea	Irritates the intestinal lining Corrosive, destroys organic tissues Intense pain with inflammation, ulceration and necrosis of mucous membranes Irritating burns on the skin and mucous membranes Gastrointestinal irritation, loss of appetite, nausea and vomiting.
2.	Ghee, Cheese and Butter	-Mashed Potatoes, Vanaspati and Starch Powder	Gastro- intestinal disturbances and other stomach disorders.
3.	Grains	Dust, pebbles, stones, straw, weed seeds, damaged grain etc.	Liver disorders, Toxicity in the body, etc.
4.	Pulses	Dyes, Chemical and Lead Chromate	Stomach disorders
5.	Coffee Powder	Chicory, Tamarind Seeds Powder	Diarrhoea
6.	Tea	Artificial colouring	Liver disorders
7.	Sugar	Chalk powder, Washing soda, Urea etc	Stomach disorders and Kidney Failures.

8.	<b>Pepper</b>	Dried papaya seeds and blackberries	Severe allergic reactions, stomach and skin irritations.
9.	<b>Oil</b>	-Argemone oil  -Pentachlorophenol and Anilides -Tricresyl phosphate -Mineral oil (liquid paraffin)  -Castor Oil	Epidemic dropsy, characterized by oedema over ankles, gastrointestinal disturbances, blood vessel changes, changes in the eyes and cardiac insufficiency  Toxic Oil Syndrome (TOS) and death  Paralysis of hands and feet  Anal seepage and irritation, interfere with the absorption of fat soluble vitamins (A, D, E, K)  Nausea, vomiting, colic pain and a severe laxative effect, inhibits the absorption of fat soluble vitamins, notably vitamins A and L
10.	<b>Edible Oils</b>	Mineral Oil, Karanja oil, castor oil and artificial colors	Gallbladder cancer, allergies, paralysis, cardiac arrest and increased LDL cholesterol
11.	<b>Mustard Seeds</b>	Argemone Seeds	Abdominal Contractions, sluggishness and increased excretion
12.	<b>Turmeric Powder</b>	Pesticide residues, saw dust, chalk dust, industrial dyes, metanil yellow dye arsenic, lead metal etc.	Cancer and stomach disorders
13.	<b>Honey</b>	Molasses, dextrose, sugar and corn syrups	Stomach disorders
14.	<b>Jaggery</b>	Washing soda, chalk powder	Vomiting and other stomach disorders
15.	<b>Ice cream</b>	Pepper oil, ethyl acetate, butyraldehyde, nitrate, washing powder.	Dreadful diseases that affect organs including lungs, kidneys and heart.
16.	<b>Fruits and Vegetables</b>	Chemical dyes, malachite green, calcium carbide, copper sulphate and oxytocin saccharin wax.	Stomach disorders, Vomiting and dyes used are highly carcinogenic
17.	<b>Jam, Juice and candies</b>	Non-permitted dyes including metanil yellow and other artificial food dyes.	These dyes are highly carcinogenic that have the potential to cause different types of cancer.
18.	<b>Tomato sauces</b>	Pumpkin pulp, non-edible artificial colours and flavours	Gastritis and inflammation of vital organs.

**Suggestions**

The paper suggests the following measures to prevent/ control the food adulteration.

- 1) The food inspectors should regularly collect the samples of food and analyze in Food Laboratories under the PFA Act.
- 2) Most of the times, the findings of the tests conducted are not made public. Hence common men lost the faith on regulatory bodies. Therefore, it is advisable to publish the results of lab tests made and the action taken against the culprits.
- 3) Organization of more and more awareness programs on prevention of adulteration.

- 4) Strict adherence to law by the government/ regulatory bodies in controlling the adulteration.
- 5) Popularizing the simple visual and physical tests to detect the adulterants.
- 6) The government should popularize the simple tests for detection of adulteration which can be made at home with minimum chemicals.
- 7) Increasing the number of testing laboratories.
- 8) Strict implementation of the provisions of Prevention of Food Adulteration (PFA) Act, 1954 and other related laws.
- 9) Developing the ethical practices among the business operators.
- 10) Strengthening the consumer organizations to fight the adulteration.
- 11) Popularizing the methods detecting the adulterants.
- 12) Regular interactions with the food industry to understand their difficulties, concerns, problems and expectations.
- 13) The food business operators should regularly update on the process and allergen related outbreaks in the country, assessing the risk for all the ingredients, additives and processing aids and techniques.
- 14) Third party auditing of the process to identify existing and probable lacunae in the system.
- 15) The scientific community should share the knowledge with the statutory bodies and industry.

### Conclusion

To prevent the food adulteration, regular surveillance, monitoring, inspection and random sampling of food products are being carried out by Food Safety Officers and actions are initiated against the defaulting Food Business Operators. In order to ensure the availability of good quality food items, the authorities are taking measures from time to time. But, wide spread corruption, imbibed unethical practices among business operators, negligence by the deprived customers, poor execution of laws, lack of strong consumer organizations etc., are the created barriers which thrown challenges in fighting the adulteration. An integrated approach throughout the food chain involving the stakeholders, such as statutory and regulatory authorities, food industry, scientific community and end-users are the dare need of the hour.

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