

**FOOD ADULTERATION AND ITS PROBLEMS (INTENTIONAL, ACCIDENTAL AND NATURAL FOOD ADULTERATION)****S.MANASHA<sup>1</sup>,**

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**Abstract**

*Our land, the earth is blessed with various good foods. But most of the businessmen are normally adulterating the food. So, this is the major health critics for our people. This whole paper contains the matters regarding food adulteration and its problems with specific reference to intentional, accidental and natural food adulteration. Foods which are more likely to get adulterated are Olive oil, milk, honey, saffron, Orange juice, coffee and apple juice. The adulterated food bears or contains any “poisonous or deleterious substance” which may render it injurious to health. Food can be adulterated intentionally and accidentally. Unintentional adulteration is the result of ignorance or the lack of facilities to maintain food quality. So, the main thing is to screen before what we eat. Food colours, chemicals and additives often creep up not just in our local produce, but even in packaged products. Many legal enforcements are also taken by government to prevent food adulteration. In India, adulteration and contamination are encountered in food consumed at the household level, in the food service establishments and in business firms, and also when sold as street foods. Contamination of various mycotoxins, metals and pesticides in daily foods and milk has been found highly toxic and 70% of deaths are food-borne origin. Recently, during Deepawali festivals there was no dearth of news reports on the television and local newspapers on how the adulteration is being done by businessmen. Usage of new technologies like Genetically Modified, Nano-tech foods, functional foods are very much profitable and helpful for our food processing and food production. But, there includes various issues for our health also. So, while producing foods these should be kept in mind by the producers to enforce the health of the human beings.*

**Keywords :** Food adulteration, health problems, intentional accidental and natural food adulteration

## INTRODUCTION

Generally people are under the impression that a food item is adulterated only if they fall sick because of it. Some adulterants can be physically identified and some others can be identified only after the tests.

Food fraud is a collective term that encompasses the deliberate substitution, addition, tampering or misrepresentation of food, food ingredients or food packaging, or false or misleading statements made about a product for economic gain. A more specific type of fraud is the fraudulent addition of non – authentic substances or removal or replacement of authentic substances without the purchaser's knowledge for economic gain of the seller.

## FOOD ADULTERATION

While traditionally , Indian families used to cook food at home with healthy ingredients and knew what want it to the meal, in modern times, raising incomes and affluences, more and more people are moving away to readymade fast foods and eating regularly at restaurants. The food in many of these outlets is cooked with poor quality ingredients to attract and satisfy the palate rather than provide a wholesome nutritional meal. But, normally most people do not know these foods are adulterated by 25 to 30 percent. This causes a major impairment for their health.

### **Foods which are more likely to get adulterated are -**

Olive oil, milk, honey, saffron, Orange juice, coffee and apple juice are the seven most ingredients to be targeted for intentional or economically motivated food to get adulteration.

### **FOODS CAN BE ADULTERATED BY MANY DIFFERENT WAYS:**

- I. Intentional
- II. Accidental
- III. Natural

## INTENTIONAL FOOD ADULTERATION

Intentional food adulteration is usually done for financial gain. It includes adding some thing intentionally , with knowledge to earn profit.

### **Common forms of Intentional food adulteration are :**

1. Addition of water or Urea to liquid milk
2. Extraneous matter to ground spices

3. Addition of Argemone Seeds to Mustard seeds.
  - **Health problems** : Loss of Vision and Heart diseases
4. Addition of Washing powder to Ice creams
5. Addition of chalk to Sugar.
6. Aluminium Foil to Silver Foil.
7. Water to Honey.
8. Chicory to Coffee.
9. Coloured leaves and Iron fillings to Tea.
  - **Health problems** : Appendicitis and Small Intestine problems.
10. Rodamine culture ( a biological stain), Brick powder to Red chilli powder.
  - **Health problems** : Loss of Vision and Respiratory diseases
11. Metanil Yellow to Turmeric Powder, dal, moong and washed channa.
  - **Health problems** : Anaemia, Epilepsy, neurotoxicity.
12. Malachite green to green vegetables like chilli.
13. Vanaspathi to pure ghee or Butter
14. Papaya seeds to Black pepper.
15. White powered stone to Common salt.
  - **Health problems** : Appendicitis
16. Argemone oil to Groundnut Oil
  - **Health problems** : Loss of Vision and Heart diseases.
17. Melami was added to infant formula and pet food.
  - **Health problems** : Falsify the level of protein content.
18. Removal or substitution of milk solids from the natural products.
19. It is found that there are various chemicals and colours used in fruits and vegetables which are very poisonous for health. Calcium carbide used in mangoes, bananas, copper sulphate used to ripen fruits faster, oxytocin a hormone used for faster growth of Pumpkin, watermelon, brinjal, gourds, cucumber. Wax adds shine on apples and pears. Cheap green colours containing chemicals such as metallic lead applied to bitter gourd and leafy vegetables to give fresh colour. Pesticides and herbicides used excessively for growing fruits and vegetables.
  - **Health Problems** : Consumption of chemical – laden fruits and vegetables can prove disastrous for digestive system, eyes and liver. It can also results in vomiting and diarrhea in children, kidney failure. Oxytoxin can leads to brain damage.

## ACCIDENTAL FOOD ADULTERATION

Accidental food adulteration occurs accidentally in nature, without our knowledge.

### Common forms of Accidental food adulteration are :

When food adulteration occurs accidentally, a variety of green vegetables is grown in marshy areas of Chennai outskirts. These areas have high levels of industrial pollutants, including heavy metals, which are absorbed by the plants. The harvested leaves find their way to the market at a cheap rate.

- **Health problems :** A chunk of the green leafy vegetables sold in Chennai is found to contain toxic metals that have the potential to harm various organs of the body. It is common in almost all developing countries. And its ugly face is come out in the form of its harmful effects as stomach disorder, giddiness and joint pain, diarrhea, liver disorder, dropsy, gastrointestinal problems, respiratory diseases, cardiac arrest, glaucoma carcinogenic effects, paralysis etc. in a developing country is at the lowest rung of the development ladder, food adulteration consists of relatively simple measures.

### 1. Adulteration in Organic foods

Organic foods are the products must be grown and manufactured in a manner that adheres to standards set by the country they sold in.

Organic farms do not consume or release synthetic pesticides into the environment. But, some of which have the potential to harm soil, water and local terrestrial and aquatic wildlife. The most common organic pesticides, accepted for restricted use by most organic standards, include Bt, pyrethrum and rotenone.

### 2. Adulteration during irradiating the foods

Food irradiation is the process of exposing food to ionizing radiation to destroy and check the multiplication microorganisms, bacteria, viruses, or insects that might be present in the food. Further applications include sprout inhibition, delay of ripening, and improvement of re – hydration. Cobalt-60 is the most commonly used radionuclide for food irradiation. For irradiating the foods the quantity of dosage is very much important. They are:

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**Dose of Irradiation**

S.No	Name of foods	Minimum	Maximum	Overall Dosage
1	Onions	0.030	0.09	0.06
2	Spices	6	14	10
3	Potatoes	0.06	0.15	0.10
4	Rice	0.25	1.0	0.62
5	Semolina (Sooji or Rawa), Wheat	0.25	1.0	0.62
6	Mango	0.25	0.75	0.50
7	Raisins, Figs and dried dates	0.25	0.75	0.50
8	Ginger, Garlic and Shallots (Small Onion)	0.03	0.15	0.09
9	Meat and meat products including chicken	2.5	4.0	3.25
10	Fresh Sea Foods	1.0	3.0	2.00
11	Frozen Sea Foods	4.0	6.0	5.00
12	Dried Sea Foods	0.25	1.0	0.62
13	Pulses	0.25	1.0	0.62

**The over dosage causes severe health hazards.**

They are :

**a. Effects of Ionizing Radiation**

- Causes disruption of internal metabolism of cells
- DNA cleavage
- Formation of free radicals
- Disrupts chemical bonds
- High capital costs
- Possible development of resistant MO
- Inadequate analytical procedures to detect irradiation in food
- Public resistance

**How does irradiation affect the food itself?**

Ionizing radiation also breaks some of the chemical bonds within the food itself. The effects of chemical changes in foods are varied. Some are desirable, others are not. Examples of some food changes are:

- Changes in structure of certain foods too fragile to withstand the irradiation, like lettuce and other leafy vegetables turn mushy.
- Slowed ripening and maturation in certain fruits and vegetables lengthens shelf-life.

- Reduction or destruction of some nutrients, such as vitamins, reduces the nutritional value (the effect is comparable to losses in heat pasteurization)
- Adulteration of some flavor compounds.
- Formation of compounds that were not originally present requires the strict control of radiation levels.
- Generation of free radicals, some of which recombine with other ions.

### 3. Adulteration during production of Genetically modified foods

Genetically modified organisms can be defined as organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally. The technology is often called “modern technology” or “gene technology”. Combining genes from different organisms is said to be “genetically modified” or “transgenic”. The GM products includes medicines, vaccines, food and food ingredients, feeds and fibres.

#### Why are GM foods produced?

GM foods are developed and marketed because there is some perceived advantage either to the producer or consumer of these foods. This is meant to translate into a product with a lower price, greater benefit (in terms of durability or nutritional value) or both. As population is growing fast, ensuring an adequate food supply is going to be a major challenge in years to come. GM foods promise to meet this in a number of ways, with properties like pest resistance, herbicide tolerance, disease resistance, cold tolerance, drought tolerance / salinity tolerance, and tailored for better nutrition and therapeutic purposes which helps to increase the yields of crops and animals with good taste and improved resistance to diseases and helpful to environment (conservation of soil, water and energy, waste management), society by increasing food security for growing population.

#### a. Controversies

- **Safety**
  - Potential human health impacts including allergens, transfer of antibiotic resistance markers, unknown effects.
  - Potential environmental impacts including unintended transfer of transgenes through crosspollination, unknown effects on other organisms (eg. Soil microbes), loss of flora and fauna biodiversity.
- **Access and Intellectual property**
  - Domination of world food production by a few companies

- Increasing dependence on industrialized nations by developing countries
- Biopiracy, or foreign exploitation of natural resources
- **Ethics**
  - Violation of natural organisms' intrinsic values
  - Tampering with nature by mixing genes among species.
  - Objections to consuming animal genes in plants and vice versa
  - Stress for animal
- **Society**
  - New advances may be skewed to interests of rich countries

#### **4. Nano – Technology in Food processing**

It is a powerful new technology for taking apart and reconstructing nature at the atomic and molecular level. It involves atomic level manipulation to transform and construct a wide range of new materials, devices, and technological systems that exist at the nanoscale, <100 nanometres (nm) in size.

##### **Four key focus areas for nanotechnology food research:**

- Nano – modification of seed and fertilizers / pesticides
- Food 'fortification' and modification
- Interactive 'smart' food
- 'Smart' packaging and food tracking

Companies such as Kraft and nestle are designing 'smart foods' that interact with consumers to 'personalise' food, changing colour, flavor or nutrients on demand. 'Smart' foods would sense when an individual was allergic to a food's ingredients, and block the offending ingredients. 'Smart' packaging could release a dose of calcium molecules to people suffering from osteoporosis.

##### **a. It also consists of various problems which includes:**

- Immense damage to other parts of the body.
- Examines the people willingness to buy and not the actual buying behavior.
- Main disadvantage is uncertainty of experts about the effects of nano – tech on human health and environment.

- Nanoencapsulation is the coating of various substances within another material at sizes on the nano scale. This technique is already in common place within a range of industries but it is accepted that only around 10% of potential applications are being exploitations.
- Current problems for nanomedicine involve understanding the issues related to toxicity and environmental impact of nanoscale materials.

### NATURAL FOOD ADULTERATION

Natural adulteration occurs due to the presence of certain chemicals, organic compounds or radicals naturally occurring in foods which are injurious to health and are not added to the foods intentionally or unintentionally.

#### Common forms of Natural food adulteration are :

Toxic varieties of pulses, mushrooms, green and other vegetables, fish and sea foods.

#### In what ways the adulterated foods are mostly consumed by people?

##### i. By having food on the streets

Public health foundation of India attributed 80 percent of all premature death is due to contaminated food and water. “ Food adulteration in India starts from the field itself where fertilizers and pesticides are overused. Therefore one kind of contaminant that is present across all range of food is very high level of pesticide residues.”

But pesticide residues are not only the problem. Many products used in everyday cooking, such as cottage cheese and clarified butter, are adulterated. Colouring agents in spices are also posing problems.

The youth who enjoy the street food are mostly at risk. Experts say, there is very little awareness among the Indian public. People are tempted to buy **cheaper** food and they are likely then to purchase adulterated food. Dr. Samir Dasgupta from the Kolkata Medical College says that processed food is unsafe in India : “ starting from potato chips to pre – cooked ready to eat food ”. Because the monitoring mechanism in our country is not very strong.

**ii. Harms due to health adulterated food coming in festive season**

Normally, people buy foods in festive seasons. Their adulterated food sweets maximum; people are also buying harms, they have hidden in sweets with Adulteration.

**Health Problems****1. Food poisoning**

Adulterated food can cost poisoning. Adulterated sweets during festive seasons consists of health damaging chemicals. If we are already suffering from some illness; out of our desire to eat readymade sweets, then it can cause grave consequences along with food poisoning.

**2. Stomach ache, indigestion, loose stools**

The adulterated food is loaded with harsh chemicals; whom human body cannot digest. Eating such food causes stomach ache; it can cause indigestion and in some loose stools for two or three days.

**3. Cough, fever**

Food adulteration during festive seasons cause respiratory problems like cough, coryza or allergic fever.

**4. Vomiting or nausea**

Readymade food or sweets that we buy in festive seasons, is so much adulterated; that before it get digested, human body immune system sense them and throws them out of body in the form of vomiting or nausea.

**5. Aphthae in mouth, out of infection from adulterated food**

In some humans, adulterated food can cause aphthae in mouth out of infection; which they bring along with them by human immune system.

**6. Allergic or inflammatory**

Lots of chemicals are used in food adulteration process and if we have allergy from any of them, then it can start allergic reaction inside our body and starts inflammatory reaction, for which we need to take medicinal help from hospital.

### iii. Food adulteration by merchants

General form of food adulteration was done in dals such as toor dal, urad dal and others. Some merchants in order to sell spoilt material, wax the dal and add colour to lend a quality look.

- **Health Problems** : Dals will be infested with different types of microorganisms, which infest uric acid into the dal in the form of excretions and this uric acid adulteration was not very prevalent in coastal parts of the state and that some cases were identified in and around Hyderabad eight months ago.

### CONCLUSION

Adulteration often considered as a one of the major problem of routine life and its ill effects on health from their daily meal item, either, in cereals, pulses, fruits and vegetables or in milk and milk products and spices. The legal enforcement is only one measure of prevention of food adulteration and it will not have any appreciable impact unless and until there is adequate supply of food at a reasonable price which the average consumer can afford, awareness of the small traders about the food standards which they are expected to maintain, awareness of the common consumer regarding the dangers of adulteration and how to take advantage of the legal machinery to force the traders to get proper food and to use the latest technologies in food production and processing at a considerable level which is capable for human being to accept and lastly a sense of honesty among the food traders, in the maintenance of the safety and quality food.

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