

FOOD SAFETY



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Shaping Lives...
Empowering Communities...

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INTRODUCTION

- ❑ Adulteration of food commonly defined as “the addition or subtraction of any substance to or from food, so that the natural composition and quality of food substance is affected”
- ❑ Food adulteration includes mixing, substitution, concealing the quality, putting up decomposed food for sale, misbranding or giving false labels and addition of toxicants.



Food is declared adulterated if:

- ❑ A substance is added which depreciates or injuriously affects it.
- ❑ Cheaper or inferior substances are substituted wholly or in part.
- ❑ Any valuable or necessary constituent has been wholly or in part abstracted.
- ❑ It is an imitation.
- ❑ It is colored or otherwise treated, to improve its appearance or if it contains any added substance injurious to health.
- ❑ For whatever reasons its quality is below the Standard

■ Intentional adulteration

•done for financial gain.
•Addition of Sand, marble chips, stones, mud, other filth, talc, chalk powder, water, mineral oil and harmful colour.

■ Incidental Adulteration

Happen due to carelessness and lack in proper hygienic conditions of processing, storage, transportation and marketing
eg: Pesticide residues, droppings of rodents, larvae in foods

■ Metallic Adulteration

Occurs due to Arsenic from pesticides, lead from water, effluent from chemical industries, tin from cans



- Food adulteration has become a very common practice in our country and we are consuming these foods almost everyday, which have numerous harmful effects to our health.
- The usage of adulterants has increased in societies because of few legal controls on food quality and/or poor/nonexistent monitoring by authorities.
- It frequently occurs where informal food production and marketing services are predominant and enforcement of food regulation is weak.
- Food adulteration is unethical and called as **SOCIAL EVIL** and **A SLOW POISON**.

Food Adulterations Categories

- **Replacement:** Complete or partial replacement of a food ingredient or valuable authentic constituent with less expensive substitute with the intention of circumventing on *“origin”* and *false declaration of the “process”*.
- **Addition:** Addition of small amounts of non-authenticated substances to mask inferior quality ingredient.
- **Removal:** Removal of authentic and valuable constituent without purchasers knowledge



Disadvantages for the consumer:

- ❑ He is paying more for the food stuff of lower quality
- ❑ Some form of adulteration is injurious to health, even resulting in death. eg :
 - a) Addition of argemone oil to mustard oil causes epidemic dropsy
 - b) Adulteration of edible oil with tricresyl phosphate (TCP) results in paralysis and death.

*Some common adulterants and
the diseases caused by them*

Milk

- Cow/buffalo milk can be adulterated with starch, milk powder, urea, formalin, Detergent
- **Health effect:**
Cancer or acute renal failure



List of common milk adulterants and their harmful effects

Adulterant	Added for	damage
water	Increase the milk volume	Decreases the nutritive value and poses health hazard to infants
Benzoic acid & Salicylic acid	Increases shelf life for long distance transport	Linked to asthma & increases level of hyperactivity in children
Detergents	Increases foaming in milk & increases whiteness and thickness	Causes gastro intestinal & renal problems
Urea	Provides whiteness and increases the consistency of milk, improves solid not fat percentage(SNF)	Overburdens the kidney and may cause renal failure
Formalin	Increases the shelf life	Liver & kidney damage
Starch	Increases quantity and maintains SNF in synthetic milk	Causes diarrhea, may be fatal for diabetics

TESTS FOR ADULTERANTS IN MILK

#AdulterationTest

IF MILK IS CONTAMINATED BY STARCH THEN ADD A DROP OF TINCTURE IODINE TO WARM MILK



No change in colour

Milk

Adulterated Milk

Changes in colour to blue

ADULTERANT STARCH

Add a few drops of tincture of Iodine or Iodine solution. Formation of blue colour indicates the presence of starch.



Pure milk



Adulterated milk

Detection of detergent in milk

Testing method:

- 1 Take 5 to 10ml of sample with an equal amount of water.
- 2 Shake the contents thoroughly.
- 3 If milk is adulterated with detergent, it forms dense lather.
- 4 Pure milk will form very thin foam layer due to agitation.,



Pure milk



Adulterated milk

Ghee



- Adulterants: Ghee essence is used in cheaper oils and passed off as pure ghee. This type of ghee will not solidify like normal ghee. It may also not have that grainy texture of pure ghee.
- Oleomargarine or lard (Animal fat) - added to butter
- Mashed potatoes, sweet potatoes or other starch is added to ghee

Health effect:

- Cancer or acute renal failure.
- The argemone oil used to adulterate ghee and butter is highly toxic. It causes a disease known as dropsy,(Fluid collection in some parts of the body) .It may also paralyse the limbs.

Detection of mashed potatoes, sweet potatoes and other starches in ghee/butter

Testing method:

- 1 Take ½ teaspoon of ghee/butter in a transparent glass bowl.
- 2 Add 2-3 drops of tincture of iodine.
- 3 Formation of blue colour indicates the presence of mashed potatoes, sweet potatoes and other starches.



Pure



Adulterated

Mustard seeds & oil



- Adulterant: Argemone seeds and argemone oil
- Mineral oil also added to edible oil
- **Health effect:**
 - Epidemic dropsy & Glucoma due to argemone
 - cancer due to mineral oil



TEST 23

Detection of argemone seeds in mustard seeds



Testing method:

- 1 Take small quantity of mustard seeds in a glass plate.
- 2 Examine visually for the argemone seeds.
- 3 Mustard seeds have a smooth surface and when pressed, inside it is yellow in colour.
- 4 Argemone seeds have grainy, rough surface and are black in colour. When pressed, inside it is white in colour.



Mustard seeds



Argemone seeds

Sugar and Salt

- Adulterants: chalk powder, white sand, Washing soda, Plastic crystals, Urea, White/ Yellow colour, Rawa/ Suji, Stones etc
- **Health effect:**
 - a) Chalk powder is not toxic but when inhaled for long, may cause respiratory problems
 - b) Washing soda cause diarrhea, nausea and vomiting.



Detection of white powder in iodised salt



Testing method:

- 1 Stir $\frac{1}{4}$ teaspoon of sample of salt in a glass of water.
- 2 Pure salt dissolves completely and gives a clear solution or gives slightly turbid solution due to the presence of permitted anticaking agent in the salt.
- 3 If salt is adulterated, solution turns dense white turbid in the presence of chalk powder and other insoluble impurities will settle down at the bottom.



Pure



Adulterated

Detection of chalk powder in sugar/pithi sugar/jaggery

Testing method:

- 1 Take a transparent glass of water.
- 2 Dissolve 10g of sample in water.
- 3 If sugar/pithi sugar/jaggery is mixed with chalk, the adulterant will settle down at the bottom.



Pure



Adulterated

Tea powder

- Adulterants : With used tea leaves, dye or artificial colour, iron fillings.
- Tea leaves are often adulterated with iron flakes to increase their weight. The chances of adulteration are more if we buy loose tea. Used tea from tea stalls is dried in the sun, mixed with coal tar dyes and some amount of genuine tea to give it flavour.
- **Health effects:**
Cancer, tetanus



Detection of exhausted tea in tea leaves



Testing method:

- 1 Take a filter paper and spread few tea leaves.
- 2 Sprinkle with water to wet the filter paper.
- 3 Wash the filter paper under tap water and observe the stains against light.
- 4 Pure tea leaves will not stain the filter paper.
- 5 If coal tar is present, it will immediately stain the filter paper.



Pure



Adulterated

COFFEE



- Coffee which is considered a drink of the elite is even not spared. It is mixed with chicory powder, ground tamarind and date seeds.
- Tamarind seed, date seed powder causes Diarrhoea
- Chicory powder causes Stomach disorder, Giddiness and joint pain
- Ground coffee is mixed with cheap ingredients such as maize, soybean, sugar and acai seed. While these unwanted extras aren't harmful, they can spoil the quality and taste of the product.



Chilli powder



- Adulterants: Sudan red, red brick powder, grit, sand, dirt, non-permitted colors, saw dust

Health effect:

brick powder, saw dust: Stomach disorder,
Sudan dye is carcinogenic

Sprinkle the Chilli powder in the container of water.

Saw dust will float and the added color will make the water colored.

Chilli powder



Saw dust
added color

Turmeric powder



- Adulterated with: Yellow aniline dyes, Non-permitted colourants like metanil yellow, Tapioca starch, Lead chromate powder
- **Health effects:**
 - a) Yellow aniline dyes: Carcinogenic
 - b) Non-permitted colourants like metanil yellow Highly Carcinogenic
 - c) Tapioca starch: Stomach disorder
 - d) Lead chromate added to turmeric powder and spices can cause anemia, paralysis, brain damage and abortions.

Detection of artificial colour in turmeric powder



Testing method:

- 1 Add a teaspoon of turmeric powder in a glass of water.
- 2 Natural turmeric powder leaves light yellow colour while settling down.
- 3 Adulterated turmeric powder will leave a strong yellow colour in water while settling down.



SWEETS:

- ❑ Non-permitted color or permitted food color like metal yellow, beyond the safe limit in colored food can cause allergies, hyperactivity, liver damage, infertility, anemia, cancer and birth defects.



Poultry and Fish:

- Mixed with formalin and other type of chemicals which are used to keep the food fresh are injurious to health, that causes different types of cancers, asthma and skin diseases.
- Unhygienic meat and meat products can cause food infection usually with fever and chills. These are the immediate effect of food adulteration on public health
- Mercury in mercury-contaminated fish can cause brain damage, paralysis, and death.



Reasons for food adulteration

- ❑ To earn more profits
- ❑ To increase volume of trade by showing lower prices.
- ❑ When supply is less than demand
- ❑ To cut down the product costs to meet the market competition.
- ❑ Shortage of authentic ingredients at affordable prices.
- ❑ Shortage of qualified personnel and no updation of processing techniques.
- ❑ Inadequate knowledge on the consequences and associated food safety risks.
- ❑ Lack of awareness and updation of the information on the adulteration related food safety outbreaks.



Food Adulteration Vs Food Additives

- **Food Additives are Chemical substances added to processed foods:**
 - To enhance/retain quality attributes such as texture, physical properties, taste, flavour etc.
 - To control the spoilage and enhance shelf life of the processed foods.
- **General Food Additives are:**

Anti oxidants	Bulking Agents
Emulsifiers/stabilizers	Acid regulators
Preservatives	Flavor enhancers
Artificial sweeteners	Glazing agents



- All additives are not adulterants, if present within the specific limits and once exceeded the limits they become significant adulterants and can cause serious health hazards to the consumers.
- All additives are not adulterants until reported outbreak of food safety issues occurs.



Additives:

- ❑ **Synthetic colours** used in different food items are harmful. Tartrazine is a synthetic lemon yellow azo dye primarily used as a food coloring. It is also known as E number E102. Coloring agent can cause itching, urticaria, runny nose and asthma.
- ❑ **Saccharin and cyclamate**, used as artificial sweeteners cause cancer of urinary bladder in long - run.
- ❑ **Nitrates and nitrites**, used as preservatives in packaged meat may cause stomach and gastrointestinal cancers.





- ❑ **Mono-sodium glutamate (MSG)** used as food flavour enhancer causes severe headache, nausea and occasionally chest tightness, burning sensation and asthmatic attack. Long-term use results in damage to brain.
- ❑ **Sodium meta bisulphate and Sulphur dioxide** are used in dry fruits, wines and beers to prevent discoloration and spoilage.
- ❑ **Sulphur dioxide** is also used as preservative for fruits and vegetables. It may cause breathing and heart problems.

Prevention of Food Adulteration Act, 1954

- Enacted by Indian Parliament in 1954
- Amended in 1964, 1976 and 1986.
- Objective:
 - Ensuring pure and wholesome food to the consumer*
 - Protect the consumers from fraudulent and deceptive trade practices.*

PUNISHMENT AWARDED

Case of proven Adulteration

**6 months
imprisonment
&
Fine of Rs 1000**

Adulteration causing grievous hurt or death

**Life imprisonment
& Fine of Rs 5000**

Food Standards:

- CODEX ALIMENTARIUS:
 - Principal organ of joint FAO/WHO food standard programs
 - Formulates standards for international markets
 - Food standards in India are based on this
- PFA Standards:
 - To obtain a minimum level of quality of food stuffs attainable under Indian conditions
- AGMARK STANDARDS:
 - Gives the consumer an assurance of quality of food according to standards
- BUREAU OF INDIAN STANDARDS(ISI):
 - A guarantee of good quality

C O D E X
ALIMENTARIUS
International Food Standards



World Health
Organization

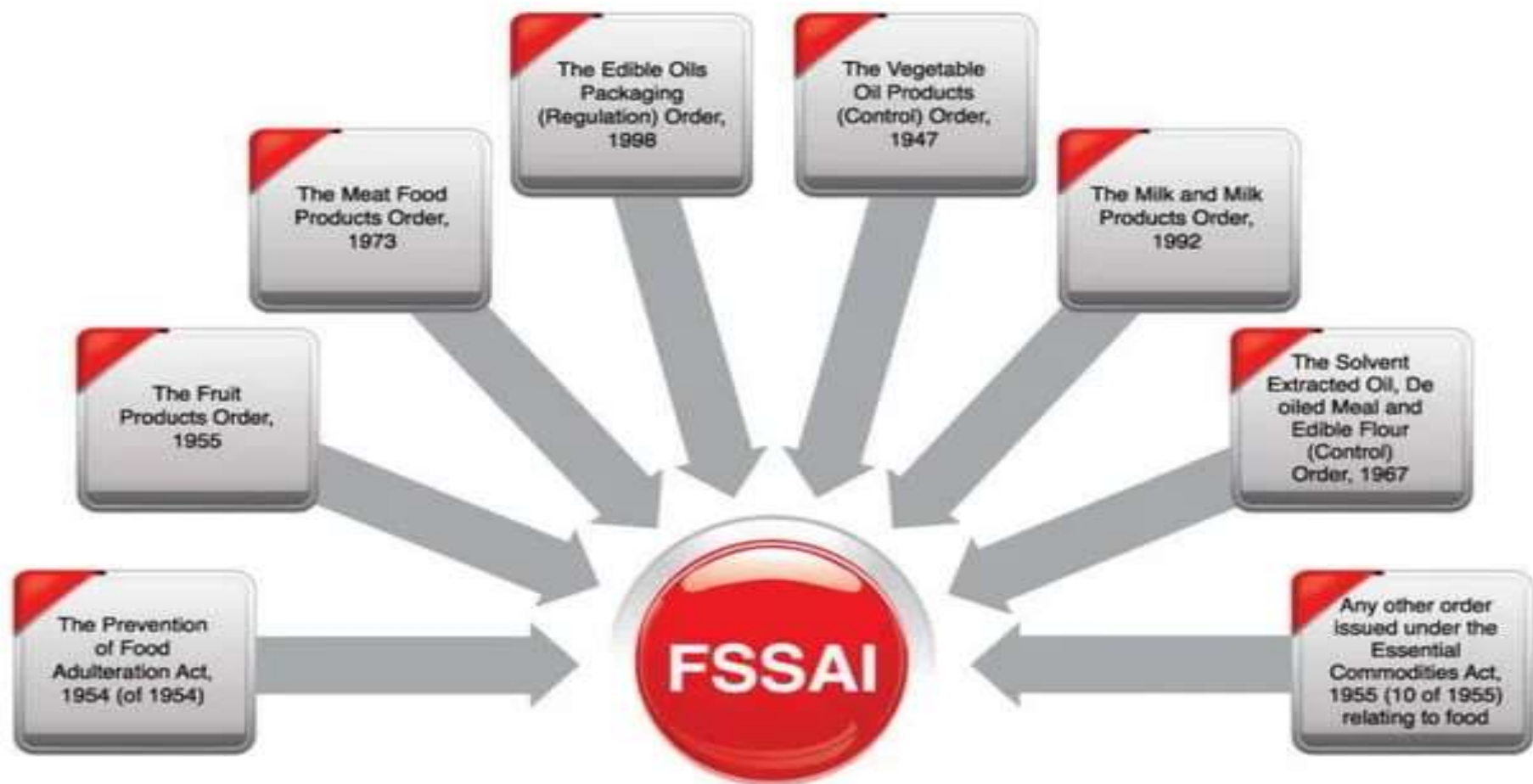


Food and Agriculture
Organization of
the United Nations



FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA (*fssai*)

- The Food Safety and Standards Authority of India (**FSSAI**) has been established under Food Safety and Standards , 2006
- Is under Ministry of Health and Family welfare, Govt. of India.
- FSSAI has been created 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.
- Aims to establish a single reference point for all matters relating to food safety and standards, by moving from multi- level, multi-departmental control to a single line of command.
- It consolidates various acts & orders that have hitherto handled food related issues in various Ministries and Departments.





Initiative by Govt. of India for Consumer Right Protection

THANK YOU