

# Adulteration in Food and Fules

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## Abstract -

*Food adulteration is a very old and common problem. Hazardous Chemicals such as Calcium Carbide, Sodium Cyclamate, Cyanide and formalin are widely used for ripening green tropical fruits, to keep them fresh and for preserving until sale. Low cost textile dyes are used in coloring vegetables, fruits, popular sweetmeats, soft drinks, beverages, confectioneries to draw customers attention. Detection of adulteration in food is an essential requirement for ensuring safety of foods we consume. Many of the methods for detection of food adulteration but that makes the whole process difficult to perform and time consuming. Therefore considerable interest has emerged in developing rapid methods for food adulteration detection. Thus rapid online detection of food quality in a nondestructive manner becomes more relevant.*

**Key words** - Adulteration, Petrol, Hydrochloric acid, Lime, Iodine.

## Introduction -

Food adulteration can be defined as the practice of adulterating food or contamination of food materials. An adulterant is a substance found within other substances such as food, cosmetics, pharmaceuticals, fuel or other chemicals that compromises the safety or effectiveness of said substance; it will not normally be present in any specification or declared substances due to accident or negligence rather than intent, and also for the introduction of unwanted substances after the product has been made. Adulteration therefore implies that the adulterant was introduced deliberately in the initial manufacturing process or sometimes that it was present in the raw materials. An adulterant is distinct from, for example permitted food preservatives chicory may be added to coffee to reduce the cost. Chalk was often added to bread flour, this reduces the cost and increases whiteness, but the calcium actually confers health benefits, and

in modern bread a little chalk may be included as an additive for this reason so the food adulteration refers to act of intentionally debasing the quality of food by either adding or replacing the food substances with undeclared alternative components or by the removal of some valuable components. This is usually done to lower the cost or increase the bulk of a given food product.

**Food Adulteration Types :** Food Adulteration means the process of degrading quality of food by addition or subtraction of any substance from food. Adulteration is categorized into:

- (1) Intentional Adulteration
- (2) Unintentional or Incidental Adulteration

**Intentional adulteration** - Under this adulterants are purposely or deliberately added with ulterior motives like increase in profit.

**Unintentional or incidental adulteration** - under this, adulterants are added to food product due to negligence or ignorance or by way of poor facilities and unhygienic practices.

#### Types of Adulterants

Sr. No.	Type	Substances Added
1	Intentional Adulterants	Sand, Marble chips, Stones, Mud, other- filth, Talc, Chalk Powder, Mineral Oil and harmful colour.
2	Incidental Adulterants	Pesticide residues, dropping of rodents, larvae in foods.

#### Methods for Detection of Common Adulterants in Food:

##### (A) (1) Milk and Milk Products :

(i) **Adulterant Water** - The Presence of water can be by putting a drop of milk on a polished slanting surface the drop of pure milk either of flow slowly leaving a white trail it, where as milk adulterated water will flow immediately without leaving a mark.

(ii) **Adulterant Starch** - Add a few drops of iodine, Formation of blue colour indicates the presence of Starch.

(iii) **Adulterant Urea** - Take a teaspoon of milk in a test tube add ½ teaspoon

of Soya bean or Arhar Powder, Mix up the contents. After 5 minutes, dip a red litmus paper in it, change in colour from red to blue indicates the presence of Urea in the milk.

- (iv) **Synthetic milk** - Synthetic milk has a bitter taste, gives soapy feeling on rubbing between the fingers and turns Yellowish on heating.

**(B) Rabri : Adulterant Blotting Paper.**

Take a teaspoon of rabri. Add 3ml of hydrochloric acid and distilled water. Stir with a glass rod presence of fine fibres to glass will indicate the presence of blotting paper in rabri.

**(C) Khoa: Adulterant Starch.**

Boil a small quantity of sample with some water, cool and add a few drops of iodine solution, Formation of blue colour indicates the presence of Starch.

**(D) Ghee: Adulterant Mashed Potatoes.**

Take sample add few drops of iodine, blue colour obtained mashed potato present.

**(2) Sweetening Agents :**

(a) **Sugar: Adulterant Chalk Powder** : Calcium Carbonate is insoluble in water. Add a little sugar to water and wait 10 minutes. Any chalk, if present, will settle down as an undissolved white powder.

(b) **To Detect Sugar Solution in Honey:** Take transparent glass of water. Add a drop of honey to the water. Pure honey will not disperse in water, it tells the presence of sugar.

(c) **Jaggery: Adulterant Chalk Powder.** Dissolve little amount of sample in water. Chalk Powder settles down or add a few drops of conc. Hcl solution effervescence indicates the presence of adulterant.

**(3) Spices:**

(a) **Black Pepper: Adulterant Papaya seeds.** Add some amount of black pepper to a glass of water, pure black pepper settles at the bottom, in the adulterated black pepper, papaya seeds float on the surface of water, papaya seeds can be separated out from pepper as they are brownish black in colour. These can be examined visually.

- (b) **Chillies Powder** : Take a teaspoon full of chillies powder in a glass of water. Coloured water extract will show the presence of artificial colour. Any grittiness that may be felt on rubbing the sediment at the bottom of glass confirms presence of brick powder and sand.
- (c) **Hing (Asafoetida)**: Shake little portion of the sample with water and allow to settle. Sap stone or other earthy mailer will settle down at the bottom.
- (d) **Green Peas** : Take a little amount of green peas in a beaker add water to it and mix well. Let it stand for half an hour, clear separation of colour in water indicates artificially coloured.
- (e) **Turmeric adulteration test**: Take a glass flask of warm and add teaspoon of Turmeric powder to it, let it sit for around 10-15 minutes, if the turmeric powder settles down, it is real, if it does not settle down and leaves a dark yellow color, it is adulterated.
- (4) **Sago**: adulterate sand or talcum put a little quantity of sago in month, it will have a gritty feel, if adulterated Burn the sago, if Pure, it will swell and leave hardly any ash, adulterated sago will leave behind appreciable quantity of ash.
- (5) **Tea Leaves: Adulterant Exhausted Tea (I-Test)** - Take a filter paper and spread a few tea leaves sprinkle with water to wet the filter paper, if coal tar colour is present it would immediately stain the filter paper under tap water and observe the stains against light.
- (II-Test)** - Spread a little slaked lime on white porcelain tile or glass plate, sprinkle a little tea dust on the lime. Red, orange or other shades of colour spreading on the lime will show the presence of coal tar colour. In case of genuine tea, there will be only a slight green yellow colour due to chlorophyll, which appears after some time.
- (6) **Test of Adulteration in Petrol**: Put a drop of petrol on the filter paper. The drop of petrol should evaporate in about 2 minutes without leaving a stain on the filter paper. If notice a stain, then there is possibility that the petrol is adulterated.
- Quality of Diesel**: Take 10ml of diesel introduces the oxidation catalyst to it. If the fuel is old, it will turn dark within 20 minutes.
- Test for Fuel adulteration**: though no test is specifically designed to measure the

adulteration of petrol by mixing diesel or diesel by mixing kerosene, some test namely Density test, Evaporation test, Distillation test, Chemical Marker test, Gas Chromatography may be used to determine the adulteration of fuel also.

### Conclusion -

Adulteration not only constitutes a considerable economic problem but also may lead to serious health issues for consumers in the past few decades; adulteration of food has become one of the serious problems. Consumption of adulterated food causes serious disease like, Cancer, Diarrhea, Asthma, Ulcers etc. Majority of adulterants used by the shopkeepers are cheap substituent's easily available. For example, adulterants in fats, oil and butter are paraffin wax, castor oil and hydrocarbon. Red chilli powder is mixed with brick powder and pepper is mixed with dried papaya seeds. These adulterants can be easily identified by simple chemicals test.

To prevent food adulteration regular surveillance, monitoring inspection and random sampling of food products, including edible Oil, Fuels, are being carried out by food safety officers of States/UT and action has been initiated against as per the provisions of FSS Act, 2006 against the defaulting Food Business.

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