Food Adulteration:

Adulteration of food is defined as the addition or subtraction of any substance to or from food, so that the natural composition and quality of the original food substance is affected. It is difficult for the consumer to detect the extent of adulteration. Adulteration of foods can either be intentional, unintentional or natural.

Intentional adulteration:

Intentional adulteration is the act of adding, removing substances to food or altering the existing natural properties of food knowingly. Some examples of intentional adulteration (Milk adulterated with water and by removal of cream, Butter adulterated with lard and margarine, Cheese made from skim milk or cottonseed oil, Salt and acid food preservatives, Food colors, Food Flavors).

Unintentional adulteration:

Unintentional adulteration is usually attributed to ignorance, carelessness or lack of facilities for maintaining food quality. This kind of adulteration results from pesticide and insect residues or microorganisms entering the food right from the farm through other stages leading to the customer.

Natural adulteration:

This 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. Some of the examples are toxic (mushrooms, green and other vegetables, fish and sea foods). About 5000 species of marine fish are known to be poisonous and many of these are among edible varieties.

Following are the points which government uses to declare an adulterated food.

1- A substance is added which depreciates or injuriously affects it.
2- Cheaper or inferior substances are substituted wholly or in part.
3- It is an imitation.
4- It is colored or otherwise treated, to improve its appearance or if it contains any added substance injurious to health.
5- For whatever reasons its quality is below the standard.

Prevention of food adulteration

1- To protect the public from poisonous and harmful foods.
2- To prevent the sale of substandard foods.
3- To protect the interests of the consumers by eliminating fraudulent practices.

Health hazards of adulteration:

Adulteration of food causes several health problems for human. Some of the health hazards include stomach ache, body ache, anemia, abortion, paralysis, and increase in the incidence of tumors, abnormalities of skin and eyes. Hence food adulteration should be given great importance due to its effect in the health significance of the public.

Adulteration in food stuff and its harmful effects

FOOD ARTICLE	ADULTERANT	HARMFUL EFFECTS
Tea	Used tea leaves processed and colored	Liver disorder
Coffee Powder	Tamarind seed	Diarrhea
Milk	Unhygienic water & Starch	Stomach disorder
Sugar	Chalk powder	Stomach disorder
Black pepper	Papaya Seeds	Stomach, liver problems
Edible oils	Mineral oil	Damage to liver, Carcinogenic effects
Turmeric powder	Yellow aniline dyes	Carcinogenic
Chili powder	Artificial Colors	Cancer
Sweets, Juices, Jam	Non-permitted coal tar dye, (Metanil Yellow)	Metanil yellow is toxic and carcinogenic
Honey	Molasses sugar (sugar plus water)	Stomach disorder
Meat products	Nitrates and Nitrites	Cancer and tumors in the liver, kidney and lungs

Procedure

Simple Method for Detecting the Adulterant

1	**Food**	**Coffee powder**
	Adulterant	**Cereal starch**
	Detection	Take a small quantity (one-fourth of a tea-spoon) of the sample in a test tube and add 3 ml of distilled water in it. Light a spirit lamp and heat the contents to colorize. Add 33 ml of a solution of potassium permanganate and muriatic acid (1:1) to decolorize the mixture. The formation of blue color in mixture by addition of a drop of 1% aqueous solution of iodine indicated adulteration with starch.
2	**Food**	**Honey**
	Adulterant	**Water**
	Detection	A cotton wick dipped in pure honey burns when ignited with a match stick. If adulterated presence of water will not allow the honey to burn, if it does will produce a cracking sound.
3	**Food**	**Coffee powder**
	Adulterant	**Powder of scorched persimmon stones**
	Detection	Take a small quantity (1 tea-spoon) of the sample and spread it on a moistened blotting paper. Pour on it, with much care, 3 ml of 2% aqueous solution of sodium carbonate. A red coloration indicates the presence of powder of scorched persimmon stones in coffee powder.
4	**Food**	**Milk**
	Adulterant	**Starch**
	Detection	If milk is adulterated with starch, it turns blue when few drops of tincture of iodine is added.
5	**Food**	**Black Pepper**

	Adulterant	**Papaya Seeds**
	Detection	Float the sample in alcohol. The mature black pepper berries sink while papaya seeds and light black pepper float.
6	**Food**	**Milk**
	Adulterant	**Formalin**
	Detection	When 5ml of conc. Sulphuric acid is added to 10ml of milk if a ring forms in violet or blue color at the intersection of two layers then formalin is present which is also used as a preservative in milk.
7	**Food**	**Milk**
	Adulterant	**Sugar**
	Detection	Take 10 ml of milk in a test tube and add 5ml of hydrochloric acid a long with 0.1g of resorcinol. Then shake the test tube well and place the test tube in a boiling water bath for 5 min Appearance of red color indicates the presence of added sugar in milk.
8	**Food**	**Milk**
	Adulterant	**Annatto**
	Detection	Add sodium carbonate to a sample of the milk until it shows a slight alkaline reaction. Immerse a piece of filter-paper and leave it in for 12 or 15 hours. If annatto is present, there will be a reddish- yellow stain on the paper.
9	**Food**	**Chili powder**
	Adulterant	**Artificial colors**
	Detection	Take a tea spoon full of chili powder in a glass of water. Colored water extract will show the presence of artificial color.
10	**Food**	**Milk**
	Adulterant	**Urea**
	Detection	Take a teaspoonful of milk in a test tube. Add a ½ teaspoon of soya bean. Mix up the contents thoroughly by shaking the test tube. After 5 minutes, dip a red litmus paper in it. Remove the paper after half a minute. A change in color from red to blue indicates the presence of urea in the milk.