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Food Adulteration: Impact on Public Health

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Abstract:

Working principle of an engine is based on the combustion of fuels; similarly human body requires regular food intake to generate calories via metabolism process. Carbohydrates, rote proteins and fats are the main type of macronutrients in food. But now days the food is being contaminated with several adulterants like chalk and brick powder, sand, molasses, starch, sand, stone chips and various toxic chemicals to gain more profit and to sustain in the competitive commercial market. The adulteration causes various fatal & incurable diseases and also affects different human organs like liver, stoma stomach, kidney, heart & brain. Food adulteration is unethical illegal and called as "Social- Evil" & "Slow Poison". This review article highlights different types of food adulteration & impact on human body and society.

Key Words: Engine, macronutrients, contaminated, incurable, evil.

What is food adulteration?

Adulteration of food is commonly defined as the addition or subtraction of any substance to or from food, so that the natural composition and quality of food is affected. Food adulteration includes mixing, substitution, concealing the quality, decomposed food for sale. Food adulteration is an art of adding or mixing poor quality, inferior, harmful, substandard, useless or unnecessary substances to food.

Reason for adulteration:-

1. To earn more profit.
2. To put down the product costs to meet market competition.
3. Shortage of authentic ingredients at affordable price.
4. Increases food demand of population.
5. Illiteracy of general public; lack of consciousness of proper food consumption.
6. Lack of government initiative.

Types of food adulteration: Food adulteration involves the infusion of useless, ordinary, unnecessary harmful chemicals to food which reduces the nutrients values of food and may cause a bad impact on public health. There are different types of food adulteration occurs and can be classified into following categories.

Intentional adulteration is the inclusion of inferior substances having properties similar to the food in which they are added. They are thus difficult to detect. The adulterant could be physical or biological in nature. It is done to promote the level of their essential nutrients after reduction of a given amount in order to increase their profit margin by several chemicals like urea, lead, caustic soda and increases volume by adding sand, chalk & brick powder, starch, water, stone chips, vegetable oil, mud, talc, molasses, sugar cane, & looks more attractive to use various textile dyes which are carcinogenic in nature.

Incidental adulteration happens due to carelessness and lack in proper hygienic conditions of processing, storage and transportation and marketing e.g., pesticides residues on grains, dropping of rodents, larva growth in food.

Metallic adulteration is the intentional or unintentional inclusion of different types of metals and metallic components in food e.g., Arsenic from different pesticides, tin from different cans, leads from water, cadmium from processing units.

Harmful Effects on public health due to food adulteration: Food adulteration has a massive negative impact on public health. Irrespective of the type of adulteration, prolonged consumption of adulterated food is very harmful to the human body. Consuming adulterated food increase the no of toxic elements in the body .Almost every food items from milk to fruits, from vegetables to grain is adulterated at some level .It contributes the society with many diseases ranging from mild to life threatening conditions like vision problem, kidney & liver problems, stomach disorders, damage digestive system ,skin irritation and cancer.

Some of their common food contamination and their dangerous impacts are given below:

Milk: Milk is an ideal food for infants, adults as well as elder person use to its large quantity of nutrients. It is one of the valuable sources of protein, fats, vitamins, various types of minerals as well as carbohydrates for growth and development body. According to FSSAI states the test of milk & milk products which can be carried out through 'Milk-O-Screen' system installed in "Food Safety on Wheel"(FSW) are fat, solid not fat(SNF), proteins ,adulterants added urea, sucrose, maltodextrine, ammonium sulphate. The World Health Organization(WHO) has recently issued an advisory to the Government of India stating that if adulteration f milk & milk products is not checked immediately,87% of citizens would be suffering from serious deceases like cancer by the year 2025.

Water: According to Food Safety Standard Authority of India (FSSAI)' water' is a common adulterant found in milk. It is used to increase volume and it decreases the nutrients values. Water borne diseases like diarrhea, amoebiasis, shigellosis, cholera, giardia, cancer etc.

Urea: Urea is a natural constituent of milk and it forms a major part of the non-protein nitrogen of milk. It content in natural milk varies from 20 mg/100 ml to 70mg/100ml.However, urea content above 700ppm (according to FSSAI) in milk indicates milk is adulterated by urea. This type of adulterant is used in milk to increase more white

and increases the consistency of milk and also improves the solid not fat protein percentage (SNF)

It causes like acidity, indigestion, ulcer, liver complications. It especially effect on kidney and renal system because kidney has to more work to throw out urea contents from the body.

Detergent: It is used to increase foaming in milk & whiteness & also thickness of milk. It causes gastrointestinal and renal complications.

Formalin: It increases the shelf life of milk.-Damages kidney and liver.

Starch: It uses to increase quantity of milk and maintain the SNF values for synthetic milk. It causes diarrhea and also fatal for diabetic patients.

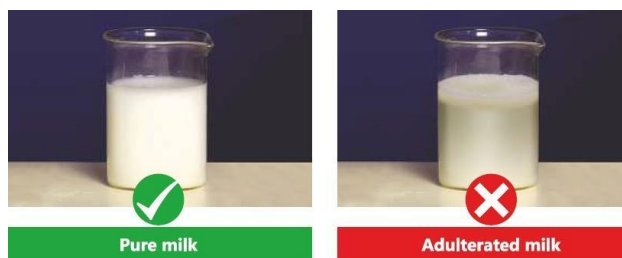


Fig: 1 Milk in pure state (left panel) and contaminated (right panel) (Source:-<https://fssai.gov.in>)

Ghee: Ghee is often mixed with hydrogenated oil and animal fats. Synthetic colours and flavors are added to other fats to make them appear like ghee. Smashed and sweet potato, starch is added to ghee for increases its thickness. The adulterant argemone oil is highly toxic in nature which causes a rare disease known as dropsy and may also paralyze the limbs. This type of adulteration is responsible for cancer and renal failure.



Fig: 2 Clarified butter in pure state (left panel) and contaminated (right panel) (Source:-<https://fssai.gov.in>)

Mustard Seeds & Oil: Mustard seeds are an integral part of the Indian spice box which is loaded with vitamins and minerals. But now days these seeds are being poisoned with toxic argemone seeds. As per the study by the National Library of Medicine, the seeds contain 30–35% of oil which itself contains 0.13% alkaloids. The seed oil of the plant Argemone Mexicana contains the toxic quaternary benzophenanthridine alkaloids sanguinarine and dehydrosanguinarine with lesser quantities of cheletyrrhine and coptisine, and small

quantities of berberine and protopine, which are isoquinol with argemone oil lead to epidemic dropsy. The same study states that consumption of argemone seeds or oil results in increased permeability of capillaries, leading to edema of the lower body and limbs, with oxidative stress and death of red blood cells causing anemia and, ultimately congestive heart failure.



Fig: 3 Mustard seed (left panel) and argemone seed (Source: - <https://fssai.gov.in>)



Fig: 4 Argemone flower (left panel) and dropsy diseased legs (right panel) (Source: <http://femanalytika.blogspot.com>)

Chili powder: Brick and chalk powder, sand, saw dust, dirt are contaminated with chili powder and non-permitted colour like Sudan red to show more unique colour.- Saw dust, brick and chalk powder affect the function of stomach and also lungs. Sudan red is carcinogenic in nature

Turmeric Powder: Turmeric is not used as flavoring agents it is also revered as Ayurvedic medicine to grow up immunity and act as an anti-inflammatory. It is contaminated by chalk powder, tapioca starch to increase its quantity and also poisoned by dangerous chemicals like lead chromate powder, metanil yellow, yellow aniline etc. Non permitted colours are carcinogenic in nature. Starch affects stomach disorder. Lead chromate powder can cause anemia, paralysis, brain damage and abortions.

Rather than Sweets, fish & poultry, honey, coffee & tea powder, wheat, vegetables, all, also contaminated by dangerous chemicals and substances and they have a long time impact on public health.

Conclusion:-The result of “Food Adulteration” severely affects the imbalance of ecological system. Here Government has a major role to stop these inhuman activities. Government has taken an initiative movement to aware the society about this type of contamination of food .The Food Safety and Standard Authority Of India (FSSAI) has guided the common people how to detect the food adulteration .To reduce food adulteration regular surveillance, monitoring, inspection and random sampling of food products are being carried out by Food Safety Officers and take an immediate action against as per the provisions of Food Safety and Standard (FSS) act, 2006.

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