



FOOD ADULTERATION

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Food is adulterated to increase the quantity and make more profit. The food is sucked of its nutrients and the place where the food is grown is often contaminated. For example: Milk is mixed with water. Vanaspati is used as an adulterant for ghee. Ergot is used as an adulterant for cereals. Chalk-powder is used as an adulterant for flour. Chicory is used as an adulterant for coffee. Papaya seeds is used as an adulterant for pepper. Brick-powder is used as an adulterant for chilly-powder. tamarind seed powder is used as adulterant for coffee. wood powder is adulterated for turmeric and dhaniya powder.

What is adulteration?

An adulterant is a chemical substance which should not be contained within other substances (e.g. food, beverages, and fuels) for legal or other reasons. The addition of adulterants is called adulteration.

The word is appropriate only when the additions are unwanted by the recipient. Otherwise the expression would be food additive. Adulterants when used in illicit drugs are called cutting agents, while deliberate addition of toxic adulterants to food or other products for human consumption is known as poisoning.

Some Adulterated Foods in market and linked especially by children:

Turmeric, dals and pulses such as moong or channa: Here adulterant is Metanil Yellow and Kesari Dal (Added to enhance the yellow colour of a food substance). Its harmful effect is that it is highly carcinogenic and if consumed over a continuous period of time it can also cause stomach disorders.

Green chillies, green peas and other vegetables: Here adulterant is Malachite Green (To accentuate the bright, glowing green colour of the vegetable). Argemone seeds (used to add bulk and weight) that it is a coloured dye that has proven to be carcinogenic for humans if consumed over a long period of time.

Mustard seeds and mustard oil: Here adulterant is Argemone seeds (used to add bulk and weight). Papaya seeds (used to add bulk) that the consumption of these could cause epidemic dropsy and severe glaucoma. Young children and senior citizens with poor immunity are more susceptible to this.

Paneer, khoya, condensed milk and milk: Here adulterant is starch (used to give it thick, rich texture). Its harmful effect is that it is unhygienic, unprocessed water and starch can cause stomach disorders. Starch greatly reduces the nutritional value of the ingredient.

Ice cream: Here adulterant is pepperoni, ethyl acetate, butraldehyde, emil acetate, nitrate, washing powder etc are not less than poison. Pepperoni is used as a pesticide and ethyl acetate causes terrible diseases affecting lungs, kidneys and heart.

Ice cream is manufactured in extremely cold chamber where fat is hardened and several harmful substances are added. Also a kind of gum is added which is sticky and slow melting. This gum is obtained by boiling animal parts like tail, the nose, the udder etc.

Black pepper: Here adulterant is Papaya seeds (used to add bulk). Its harmful effect is that Papaya seeds can cause serious liver problems and stomach disorders.

Coffee powder: Here adulterant is Tamarind seeds, chicory powder (used to add bulk and colour). Its harmful effect is that it can cause diarrhea, stomach disorders, giddiness and severe joint pains.



Figure 1

Some other adulterants: The starch in rice powder or wheat flour, often added to thicken cream, could be identified by the blue colour produced by a dilute solution of iodine in aqueous potassium iodide. Red wine adulterated with the juice of bilberries or elderberries produced a deep blue precipitate with lead acetate. Of all forms of adulteration the most reprehensible was the use of poisonous colouring matters in the manufacture of jellies and sweets. The bright colours used to attract children often contained lead, copper or mercury salts.

Food-preservatives have a very extensive use, which often constitutes adulteration. Salt is the classic preservative, but is seldom classified as an adulterant. Salicylic, benzoic, and boric acids, and their sodium salts,

formaldehyde, ammonium fluoride, sulphurous acid and its salts are among the principal preservatives. Many of these appear to be innocuous, but there is danger that the continued use of food preserved by these agents may be injurious. Some preservatives have been conclusively shown to be injurious when used for long period.



Figure 2

- ❖ Coal-tar colours are employed a great deal, pickles and canned vegetables are sometimes coloured green with copper salts.
- ❖ Butter is made more yellow by anatta.
- ❖ Turmeric is used in mustard and some cereal preparations.
- ❖ Any jellies, which are coloured so as to simulate finer ones. In confectionery, dangerous colours, such as chrome yellow, prussian blue, copper and arsenic compounds are employed.
- ❖ Cream is adulterated with gelatin, and formaldehyde is employed as a preservative for it.
- ❖ Butter is adulterated to an enormous extent with oleomargarine, a product of beef fat.
- ❖ Brick dust in chilli powder, coloured chalk powder in turmeric.



Figure 3

- ❖ Injectable dyes in watermelon, peas, capsicum, brinjal, papaya seeds in black pepper etc.

Adulteration in water:

Water that has been adequately chlorinated, by using the minimum recommended water treatment standard provide protection against viral and bacterial waterborne diseases. However, chlorine treatment alone, as used in the routine disinfection of water, might not kill some enteric viruses and the parasitic organisms that cause giardiasis, amoebiasis, and cryptosporidiosis. In areas where chlorinated tap water is not available or where hygiene and sanitation are poor, one is advised that only the following might be safe to drink: Beverages, such as tea and coffee, made with boiled water

The safety of canned or bottled carbonated beverages, including carbonated bottled water and soft drinks is questionable nowadays.

Where water might be contaminated, one is advised that ice should also be considered contaminated and should not be used in beverages. If ice has been in contact with containers used for drinking, one should thoroughly clean the containers, preferably with soap and hot water, after the ice has been discarded.



Figure 4

It is safer to drink a beverage directly from the can or bottle than from a questionable container. However, water on the outside of beverage cans or bottles might also be contaminated. Therefore, one should be advised to dry

wet cans or bottles before they are opened and to wipe clean surfaces with which the mouth will have direct contact. Where water might be contaminated, one is advised to avoid brushing their teeth with tap water. The following methods may be used for treating water to make it safe for drinking and other purposes.

Water filters Proper selection, operation, care, and maintenance of water filters are essential to producing safe water. If no source of safe drinking water is available or can be obtained, tap water that is uncomfortably hot to touch might be safer than cold tap water; however, proper disinfection, filtering, or boiling is still advised.

Food Adulteration – A Threat to Consumers:

One is familiar with the famous saying of one of the past prime ministers of India describing corruption as universal and not confined to India. Same appears to be true with food adulteration also. It is surprising that the fraudsters are always one step ahead of the safety agencies when it comes to detecting adulteration and their techniques are increasingly becoming more and more sophisticated with time. Food frauds literally constitute a high tech industry because of the enormous economic gains inherent in adulteration. Interestingly costlier the food product, more incentive is available for evolving appropriate methods to mimic the original product with cheap alternatives. Here is a gist of the report that elaborates on economic frauds perpetrated in the US based on reliable data base.

"Olive oil, milk, honey, saffron, orange juice, coffee and apple juice are the seven most likely food ingredients to be targets for intentional or economically motivated adulteration of food, or food fraud, according to analysis of the first U.S. public database created to compile information on risk factors for food fraud published in the Journal of Food Science. The database was created by the U.S. Pharmacopeial Convention (USP) and provides baseline information to assist interested parties in assessing the risks of specific products. It includes a total of 1,305 records for food fraud based on a total of 667 scholarly, media and other publicly available reports. 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. According to the authors of the paper, food fraud may be more risky than traditional threats to the food supply because the adulterants used in these activities often are unconventional and designed to avoid detection through routine analyses. "The vast majority of food fraud is primarily technical and economical," said John Spink, associate director with the anti-counterfeiting and product protection program at Michigan State University. "However, there are some cases where there can be serious health consequences as illustrated when melamine was added to infant formula and pet food in order to falsify the level of protein content in these products."

When it comes to food adulteration no other country can beat India because this is a country where every one has unlimited freedom to indulge in such activities with no possibility of retribution. Though food laws that exist are

comparable to international ones, there is very little activity at the ground level to monitor or detect adulterated foods in the market or punish the guilty. Milk is mentioned as one of the top adulterated products but can any country beat the ingenuity of the Indian fraudsters in evolving a milk completely without a cow or a buffalo, using ingredients like detergents, urea, cheap oil etc that competes with genuine milk in the market with complete impunity? Of course Chinese may be providing close competition by using the deadly Melamine to increase protein values in milk for economic gains! Saffron is another commodity that attracts fraudsters like the honey beckoning the bees! Consumers are invariably advised by well meaning pundits that they should go for branded foods marketed by established food manufacturers but it is like asking people to eat cake if bread is not affordable! Besides almost all commodities that do not undergo any significant are not available in the branded format from reputed industry players. There does not appear to be any lasting solution to this vexed problem. Stringent punishment to proven fraudsters in double quick time, if made the hall mark of the food safety regime, may see a decline in adulteration cases significantly. A separate and dedicated food fraud court stream under the judiciary for fast tracking such cases may also have a deterrent effect.

Procedure for sampling and analysis:

Any food Inspector can enter and inspect any place where any article of food is manufactured or stored for sale or stored for the manufacture of any other article of food for sale or exposed or exhibited for sale or where any adulterant is manufactured or kept and take samples of such article of food or adulterant for analysis. Notice will be issued by the Inspector in writing then and there to the seller indicating his intention. Three samples are taken and the signature of the seller is affixed to them. One sample is sent for analysis to Public Analyst under intimation to the Local Health Authority.

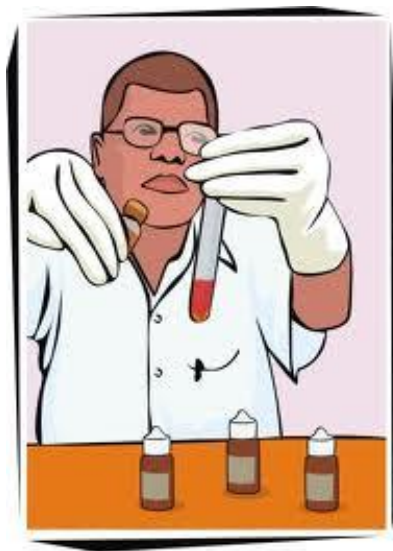


Figure 5

Notable incidents Adulteration:

- ❖ In 1987, Beech-Nut paid \$2.2 million in fines for violating the Federal Food, Drug, and Cosmetic Act by selling artificially flavored sugar water as apple juice.[9]
- ❖ In 1997, ConAgra Foods pled guilty to federal criminal charges that one of its units illegally sprayed water on stored grain to increase its weight and value.[10]
- ❖ In 2007, samples of wheat gluten mixed with melamine, presumably to produce artificially inflated results from common tests for protein content, were discovered in many U.S. pet food brands, as well as in human food supply. The adulterated gluten was found to have come from China, and U.S. authorities concluded that its origin was the Xuzhou Anying Biologic Technology Development Company, a Xuzhou, China-based company. (See: Chinese protein adulteration.).
- ❖ In 2008, significant portions of China's milk supply were found to have been contaminated with melamine. Infant formula produced from melamine-tainted milk killed at least six children and were believed to have harmed thousands of others. (See: 2008 Chinese milk scandal.)
- ❖ In 2012, a study in India conducted by the Food Safety Standards Authority of India (FSSAI) across 33 states found that milk in India is adulterated with detergent, fat and even urea, as well diluted with water. Of the 1791 random samples from 33 states, just 31.5% of the samples tested (565) conformed to the FSSAI standards while the rest 1226 (68.4%) failed the test. See: 2012 India milk adulterant scandal.



Figure 6

Food adulteration in India seems to be getting deadlier by the day. First we had some unscrupulous dairy farmers in western Uttar Pradesh inventing synthetic milk - a deadly cocktail of urea, caustic soda and vegetable oil. Then we had reports of fruits, particularly mangoes, being ripened with calcium carbide and now, there are reports of fish being made to appear fresh with formalin.

All adulterants such as calcium carbide and formalin are banned from use in food items - whether raw or packaged - since they are known to be toxic. Some of them have even been classified as carcinogens or cancercausing substances.

The situation is indicative of a deeper malaise in the Indian food regulatory regime. The food industry has grown by leaps and bounds in the past two decades, but food regulation has hardly kept pace.

The Prevention of Food Adulteration Act has been replaced with a broad-based food safety law and a body called the Food Safety and Standards Authority of India. But the change has made no difference at the ground level.

Instead of tackling adulteration and the issue of food safety, the authority appears preoccupied with issues connected with the packaged food industry. It is high time that the food regulator tightened its belt.

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