

## **MILK ADULTERATION AND IT'S DETECTION METHODS** **Srinivasan C<sup>1\*</sup>, Sathya P<sup>2</sup>, Vijayaragavendiran S<sup>1</sup>, Muralikrishnan<sup>3</sup>, Kamalahasan<sup>4</sup>, Bharathi S.V<sup>5</sup> and Prakash<sup>6</sup>**

<sup>1</sup>M.V.Sc Scholars, Department of Animal Nutrition, <sup>2</sup>M.V.Sc Scholar, Department of Dairy Science, <sup>3</sup>M.V.Sc Scholar, Department of Veterinary Public Health, <sup>4</sup>M.V.Sc Scholar, Department of Livestock Production Management, <sup>5</sup>M.V.Sc Scholar, Department of Veterinary Anatomy, <sup>6</sup>M.V.Sc Scholar, Department of Animal Genetics and Breeding College of Veterinary and Animal sciences, Mannuthy, Thrissur-680651  
E-mail: dr.srinivasan1992@gmail.com (\*Corresponding Author)

**Abstract:** In India, adulteration and contamination are encountered in food consumed at the household level, in the food service establishments and business firms, and also when sold as street foods. Food is essential for sustenance of life. Adulteration of food cheats the consumer and can pose serious risk to health in some cases. Major food adulteration and contamination events seem to occur with some regularity, such as the widely publicized adulteration of milk and milk products. Contamination of mycotoxins, metals and pesticides in daily foods and milk has been found highly toxic and carcinogenic, and about 70% of deaths are supposed to be of food-borne origin. If food inspectors are vigilant and active, the risk of food toxicity can be minimized at all levels of food supply and consumption. The social life in the communities is strengthened resulting in less expense on health related problems. Citizens aware of food adulteration and contamination can arrange camps/campaigns through local bodies and safe food can be the goal for all concerned.

**Keywords:** Food Adulterants, Milk, Detection Methods.

### **Introduction**

Consumer is the largest economic group and central point of all marketing activities. With the rise in the income of people, the quality, the quantity and the sophistication of the consumer goods has also increased. The market is literally overflowing with the new products based on intricate technology. It is very difficult for the consumer to select one food item because of misleading advertisements, improper media emphasis and food adulteration. As a result of these malpractices, the ultimate victim is a consumer, who innocently takes adulterated foods and suffers. Milk is an important source of nutrient required for growth in infants and children and for maintenance of health in adults. Milk is a perfect food, readily digested and absorbed. It is a sole natural food for infants and children. It is chiefly a valuable source of good quality protein, fat, carbohydrates, vitamins and minerals. Protein in diet supply the amino acids required for growth of infants and children. It is also required for maintenance of

tissues in adults. Milk is one of the products which can be adulterated in many ways affecting the quality of further dairy products. Extension of milk with a low value ingredient (watering of milk, milk of different species, addition of whey, etc.) also known as “economic adulteration” has been often practiced.

### **Food Adulteration**

Food adulteration is an act of intentionally debasing the quality of offered for sale either by the admixture or substitution of inferior substances or by the removal of some valuable ingredient. Food adulteration takes into account not only the intentional addition or substitution or abstraction of substances which adversely affect nature, substances and quality of foods, but also their incidental contamination during the period of growth, harvesting, storage, processing, transport and distribution.

“Adulterant” means any material which is or could be employed for making the food unsafe or sub standard or misbranded or containing extraneous matter.

### **Common Adulterants in Milk & Detection Methods**

#### **Tests which can be done at Home**

<b>Adulterant</b>	<b>Method of detection</b>
Water	The presence of water can be detected by putting a drop of milk on a polished slanting surface. The drop of pure milk flows slowly leaving a white trail behind it, whereas milk adulterated with water will flow immediately without leaving a mark.
Starch	Add a few drops of tincture of iodine or Iodine solution. Formation of blue colour indicates the presence of starch.
Urea	Take a teaspoon of milk in a test tube. Add ½ teaspoon of soybean. Mix up the contents thoroughly by shaking the test tube. After 5 mints, dip a red litmus paper in it. Remove the paper after 30 seconds. A change in colour from red to blue indicates the presence of urea in the milk.
Detergent	Shake 5-10 ml of sample with an equal amount of water. Lather indicates the presence of detergent.
Synthetic milk	Synthetic milk has a bitter after taste, given a soapy feeling on rubbing between the fingers and turns yellowish on heating.
Glucose/ Invert Sugar	Take a strip of Diacetic strip and dip it in the milk for 30 sec to 1 min. If the strip changes colour, then it shows that the sample of milk contains glucose.

**Tests which have to be done in laboratory**

<b>Adulterant</b>	<b>Method of Detection</b>
Vanapati	Take 3ml of milk in a test tube, add 10 drops of HCL. Mix one teaspoonful of sugar. After 5 mint, examine the mixture. The red colouration indicates the presence of vanapati in milk
Formalin	Take 10ml of milk in a test tube and add 5ml of con H <sub>2</sub> SO <sub>4</sub> from the sides of the wall without shaking. If a violet or blue ring appears at the intersection of two layers then it shows presence of formalin.
Ammonium sulphate	Take 5ml of hot milk in attest tube. Add Citric acid. The whey obtained is separated and filtered. Take the whey in another test tube and add 0.5 ml of 5% barium chloride. Precipitate formation indicates presence of Ammonium sulphate
Salt	Take 5ml of Silver Nitrate reagent in a test tube. Add 2-3 drops of Potassium dichromate reagent. Add 1ml of milk in the test tube and mix thoroughly. If contents of the test tube turn yellow, then milk contains salt.
Sugar	Take 3ml of milk in the test, and add 2ml of the HCL. Heat the test tube after adding Resorcinol. The red colour indicates presence of sugar in the milk.
Sodium bicarbonate	Take 3 ml of milk in a test tube and add 5 ml of rectified sprit to it. Then add 4 drops of Rosalic acid solution. Rosy/red colouration indicates the presence of Sodium bicarbonate in milk
Removal of fat	The Lactometer reading will go above 26

**Remedial measures**

The PFA Act and Rules must be strictly enforced and offenders punished adequately. The manpower limitation, lack of adequate training to the food inspectors and apathy of consumers encourages the menace of adulteration. There is need for rationalization of the standards prescribed under PFA Act. The adulterated substandard and injurious food stuffs (including dairy products) should be discouraged from trade. Certain discrepancies exist in the standards prescribed under PFA Act and ISI and Agmark standards. These anomalies should be rectified and a uniform standard should be prescribed. Rapid, reliable and inexpensive tests to detect various harmless and harmful adulterants should be worked out so that cases of adulterations are detected readily. The milk producers should be given incentives for clean milk production and should be encouraged to supply the milk to the registered village societies, milk unions and dairies. The various intermediaries should be eliminated. Special provision should be made for packaging and distribution/sale of dairy products. Most of the market samples of dairy products are stored under unhygienic conditions and sold loose without any specification with regard to the nature and content of

the product. Special provisions should be framed for rigorous control over the production, distribution and sale of milk and milk products including registration of premises where they are manufactured, maintenance of premises in a sanitary condition and maintenance of healthy states of human beings associated with the production, distribution and sale of such foods.

### **Conclusions**

Low income people mostly least educated, had low awareness, about their rights and responsibilities and food adulteration. They had limited income, so they could not reach the standard items of their choice. Conduct awareness programme, campaigns and monitoring agencies of the government can alter these kinds of peoples. Greater consumer vigilance and action alone can help improve the situation. But such efforts are not fruitful unless consumers themselves are aware of their rights and responsibilities. With rapid growth in urbanization, the consumerism, food processing and marketing systems have been changed significantly. More attention is thus needed for further extension of improved practices in agriculture and animal husbandry.

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