

Detection of Adulteration Present in Milk

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Abstract: Milk is very valuable food, readily digested and absorbed. It consists of nutrients, which are needed for proper growth and maintenance of body. Milk and milk products form a significant part of the diet and a substantial amount of our food expenditures goes on milk and other dairy products. In Pakistan, milk is transported from the point of production to consumers and processing plants by middlemen called "Gawalas". They don't maintain proper hygienic conditions during this transport, which leads to increase the total viable bacterial count. They also adulterate milk to increase their profit margin by several chemicals like urea, starch, flour, cane sugar, vegetable oils, detergents etc. Various preservatives like formalin and some antibiotics are also added in milk to increase its shelf life. This addition decreases the nutritive value of milk. These adulterants, preservatives and drugs in milk cause very serious health related problems. This paper detects various types of adulteration present in the milk.

Keywords: Types of adulterations and adulterants etc.

I. INTRODUCTION

Milk is a pale liquid produced by the mammary glands of mammals. It is the primary source of nutrition for young mammals before they are able to digest other types of food. Early-lactation milk contains colostrums, which carries the mother's antibodies to its young and can reduce the risk of many diseases. Milk contains many other nutrients and the carbohydrate lactose. An emulsion is a suspension of droplets of one liquid into another liquid. Milk is an emulsion of fat in water. Butter is an emulsion of water in fat. The solute is known as the dispersed phase and the solvent is known as the continuous phase. Other examples of emulsions include margarine, mayonnaise, cream, and salad dressing. A colloidal solution is when matter exists in a state of division in between a true solution, which is sugar in water, and a suspension, which is chalk in water. The characteristics of a colloid are small particle size, electrical charge, and affinity of the particles for water molecules. In milk, the whey proteins are in colloidal solution.

II. WHAT IS ADULTERATION?

Food is the basic necessity of life. One works hard and earns to satisfy our hunger and relax later. But at the end of the day, many of us are not sure of what we eat. We may be eating a dangerous dye, sawdust, soap stone, industrial starch, and aluminum foil and so on! Contaminated foods and drinks are

common sources of infection. Often, we invite diseases rather than good health.

Food adulteration is an act of intentionally debasing the quality of food 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.

Food is declared adulterated if,

- 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] Any valuable or necessary constituent has been wholly or in part abstracted.
- 5] It is coloured or otherwise treated, to improve its appearance or if it contains any added substance injurious to health.
- 6] For whatever reasons its quality is below the standard.

Adulterated food is dangerous because it may be toxic and can affect health and it could deprive nutrients essential for proper growth and development.

III. MATERIALS AND METHODS

1] DETECTION OF NEUTRALIZERS IN MILK

Prohibited neutralizers like hydrated lime, sodium hydroxide, sodium carbonate or sodium bicarbonate are added to milk to prevent spoilage.

i) ROSOLIC ACID TEST (SODA TEST): Take 5 ml of milk in a test tube and add 5 ml alcohol followed by 2-3 drops of rosolic acid. If the colour of milk changes to pinkish red, it is inferred that the milk is adulterated with sodium carbonate / sodium bicarbonate and so unfit for human consumption. (Please note that this test will be effective only if the neutralizers are present in milk. In case the added neutralizers

get nullified by the naturally developed acidity in milk, then this test will be negative and one needs to test, the alkaline condition of the milk for the presence of soda ash.)

ii) ALKALINITY TEST: Take 20 ml of milk in silica crucible and evaporate the water. The contents are then burnt in a muffle furnace at 550°C. The ash is dispersed in 10 ml distilled water and titrated against decinormal (N/10) hydrochloric acid using phenolphthalein indicator. If the titre value exceeds 1.2 ml, it can be construed that the milk is adulterated with neutralizers.

2] TEST FOR DETECTION OF HYDROGEN PEROXIDE:

Take 5 ml milk in a test tube. Add 3 drops of paraphenylene diamine and shake well. Change in colour of the milk to blue confirms that the milk is adulterated with hydrogen peroxide.

To 10 ml of milk sample in a test tube add 10-15 drops of Vanadium Pentoxide reagent and mix. The development of pink or red colour indicates presence of hydrogen peroxide.

3] TEST FOR DETECTION OF FORMALIN:

Formalin (40%) although poisonous, can preserve milk for a long time.

Take 10 ml of milk in a test tube. Add 5 ml conc. sulphuric acid (containing traces of Ferric Chloride) through the sides of the test tube without shaking. If a violet or blue ring appears at the intersection of the two layers, it shows the presence of formalin. Note violet coloration usually does not appear when relatively large quantities of formaldehyde are present.

4] TEST FOR DETECTION OF CANE SUGAR IN MILK:

Generally cane sugar is mixed in milk to increase the percentage solids content of milk i.e., to increase the lactometer reading of milk, that was already diluted with water.

Take 10 ml of milk in a test tube. Add 5 ml of hydrochloric acid along with 0.1 g of resorcinol. Shake the test tube well and place it in a boiling water bath for 5 min. Appearance of red colour indicates the presence of added cane sugar in milk.

5] TEST FOR DETECTION OF STARCH:

Addition of starch increases the SNF content of milk. Wheat flour, arrowroot, rice flour, etc can also be added for increasing the SNF content.

Take 3 ml milk in a test tube and boil it thoroughly. Cool the milk to room temperature. Add 2 to 3 drops of 1% iodine solution. Change of colour to blue indicates that the milk is adulterated with starch.

6] TEST FOR DETECTION OF GLUCOSE:

Poor quality glucose is sometimes added to milk to increase the lactometer reading.

Take 3 ml of milk in a test tube. Add 3 ml Barford's reagent and mix it thoroughly. Keep the test tube in a boiling water bath for 3 min and then cool it for 2 min by immersing it in tap water without disturbance. Add 1 ml of phosphomolybdic acid and shake. If blue colour is visible, then glucose is present in the milk sample.

IV. CONCLUSION

This study concluded that low income group respondents were least educated, had low awareness about their rights and responsibilities and food adulteration. So this group needs to be armed with lot of information and training on the issues of food adulteration and ways to raise their voice when felt cheated. They had limited income, so they could not reach the standard items of their choice. On seeing such condition of consumer, our government has made sincere efforts to curb the fraudulent practices by enactment of various laws.

It is highly unlikely that more legislation or increasing fines and jail terms alone will help reduce adulteration, particularly given the corruption that exists in the enforcement area and the low conviction rate. 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. Under these circumstances, consumer literacy is the need of the hour with special attention to low income groups who suffer the most. Adulterated Milk and Milk Products are dangerous to health of any leaving organism. Leaving organism has must essential Knowledge of adulteration of any food.

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