

Chemical Analysis of Additives and Adulterants In Dairy Milk Samples from Different Area of Aurangabad

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ABSTRACT

The aim of this study is to evaluate the presence of additives and adulterants in different milk samples. This study also shows that the milk supplied to various small tea house, dairies and public places were safe or unsafe and hygienic or unhygienic for the common man. The six milk samples such as fresh milk samples, loose dairy milk samples were collected from the different local area of Aurangabad (M.S) for its qualitative analysis of additives and adulterants. All the samples were tested with the standard method of FSSAI (Food safety and Standard Authority of India) manual 2012. The study indicates that the dairy milk samples contain some contamination such as foreign matter and dirt particles in it. In some milk samples it contains additives and adulterants like starch, boric acid and formalin. This research intends to contribute towards the common knowledge base regarding possible milk adulterants and their detection techniques.

Keywords : Milk, Additives, Preservatives, Nutrient, Processing, Adulterants.

I. INTRODUCTION

Health Benefit of milk: Milk is one of the most nutritious drinks in the world. Milk contains several important nutrients like calcium, protein, iodine, potassium, phosphorus and vitamins B2 and B12¹. Milk was promoted by public education campaigns and doctors as a rich source of these minerals.



Fig : Milk samples

Adulterants In Milk And Their Health Effect: Food additives are used for the purpose of maintaining or improving the keeping quality, texture, consistency, appearance and other technological requirements¹⁻².

Milk is a product that is always in demand and when supplies cannot be met then adulterators indulge in dangerous techniques by using cheap alternatives to increase the volume of milk. Adulteration of milk reduces the quality of milk and can even make it hazardous. Most of the chemicals used as adulterants are poisonous and cause health hazards³. Some of the major adulterants in milk having serious adverse health effect are urea, formalin, detergents, ammonium sulphate, boric acid, caustic soda, benzoic acid, salicylic acid, hydrogen peroxide, sugars and starch.⁴ As all these adulterants cause serious health issues hence we have attempted to investigate these adulterants in the present paper. Some of the adulterants have severe health issues if they are consumed for a long time. Both peroxides and detergents in milk can cause gastro-intestinal complications, which can lead to gastritis and inflammation of the intestine. Starch in the milk can cause diarrhea due to the effects of undigested starch in the intestine. Urea in milk affects the kidneys as

they have to filter out more urea content from the body. Carbonate and bicarbonates from the detergents and soaps cause disruption in hormone signaling that regulate development and reproduction⁵⁻⁶.

II. METHODS AND MATERIAL

The chemicals used for analysis were of A.R. Grade and were from S.D. fine chemicals. They were used without further purification. All the experimental vessels and storage containers were Pyrex glass. The dairy milk samples were purchased from local market. They were then frozen in plastic bags in household freezer (-200C) and kept until analysis. The samples were taken for analysis such as dairy milk samples from different area of Aurangabad for its analysis for formalin, detergents, boric acid, soap, benzoic acid, salicylic acid, hydrogen peroxide, sugars and starch. All the test was carried out qualitatively by standard Manual Methods Of Analysis of Milk and Milk product (Directorate General Of Health Services Ministry Of Health And Family Welfare) Government Of India New Delhi 2012 and solution were freshly prepared before taking the test. The procedure use to detect sugar, 5 ml milk sample was taken in a test tube. 1 ml conc. HCl and 0.1 g resorcinol solution was added. The test tube was placed in water bath for 5 min. Appearance of red color indicates the presence of added sugar. For the starch 3 ml milk sample was taken in a test tube. After boiling it thoroughly, it was cooled at room temperature then 1 drop of 1% iodine solution was added in it. Appearance of blue colour indicates presence of starch. For Common salt 5 ml of milk sample was taken in the test tube. 1 ml of 0.1 N silver nitrate solution and 0.5 ml of 10% potassium chromate solution was added in it. Appearance of yellow colour indicates the presence of added salts, whereas, brick red color shows the milk free from added salt. Test for detergent 5 ml milk sample was taken in a test tube .0.1 ml 0.5% Bromocresol Purple (BCP) solution was added in it. Appearance of violet colour indicates the presence of detergent.

Unadulterated milk shows faint violet colour. Test for soaps, 10 ml milk sample was taken in a test tube. An equal quantity of hot water and 1-2 drops of phenolphthalein indicator was added. Appearance of pink color indicates presence of soap. Test for Hydrogen peroxide: 1 ml milk sample was taken in a test tube. 1 ml of potassium iodide-starch reagent solution was added in it. Appearance of blue colour shows the presence of hydrogen peroxide as adulterant. Test for formalin 10 ml of milk was taken in a test tube and put 2-3 drops of sulphuric acid into it. If a blue ring appears at the top, milk is adulterated. Test for Urea: mix half test tube of milk and soybean together and shake well. After 5 minutes, dip litmus paper for 30 seconds and if there is a colour change from red to blue it means the milk has urea in it. Test for Benzoic acid: Milk sample and Sulphuric acid was shaken in the test tube. 0.5% ferric chloride solution was added drop wise into the test tube. Development of buff color is indication of the presence of *benzoic acid* and if violet color is observed shows the presence of *salicylic acid*. Test for Boric Acid: Take 5 ml milk sample in a test tube. 1 ml conc. HCl was added in it. A turmeric paper is dipped and it is dried. If the turmeric paper turns red, it indicates the presence of boric acid present in the milk.

III. RESULTS AND DISCUSSION

Table 1- Qualitative detection of common adulterants in milk

SAMPLE No.	ADULTERANTS	RESULT
1	FOREIGN MATTER AND DIRT PARTICLES	Absent
2		Present
3		Absent
4		Present
5		Present
6		Present
1	SUGAR	Absent
2		Absent
3		Absent
4		Absent

5		Absent
6		Absent
1	STARCH	Absent
2		Absent
3		Present
4		Absent
5		Present
6		Present
1	COMMON SALT	Absent
2		Absent
3		Absent
4		Absent
5		Absent
6		Absent
1	DETERGENT	Absent
2		Absent
3		Absent
4		Absent
5		Absent
6		Absent
1	SOAP	Absent
2		Absent
3		Absent
4		Absent
5		Absent
6		Absent

Table 2- Qualitative detection of different hazardous chemicals and Additives in milk

SAMPLES NO'S	ADDITIVES AND ADULTERANTS	RESULT
1	UREA	Absent
2		Absent
3		Absent
4		Absent
5		Absent
6		Absent

SAMPLES NO'S	ADDITIVES AND ADULTERANTS	RESULT
1	FORMALIN	Absent
2		Absent
3		Absent
4		Absent
5		Absent
6		Present
1	HYDROGEN PEROXIDE	Absent
2		Absent
3		Absent
4		Absent
5		Absent
6		Absent
1	BENZOIC ACID AND SALICYLIC ACID	Absent
2		Absent
3		Absent
4		Absent
5		Absent
1	BORIC ACID	Absent
2		Present
3		Absent
4		Present
5		Absent
6		Present

DISCUSSION : The following are the discussion of the present study: Parameters such as sugar common salt, detergent, soaps, urea, hydrogen peroxide and benzoic acid were found absent in all the milk samples and parameters such as starch were found in sample no 3, 4 & 6., formalin were found in sample no.6 and boric acid were found in sample no.2,4and 6.

IV. CONCLUSION

These test can be used to investigate the hazardous adulterants present in milk sample. As all the adulterants are not present in the samples in the present study but there is presence of certain type of adulterants in some of the samples. Hence these test gives as very useful information regarding the presence of the adulterants. Access to this

information can play a vital role in this region to overcome the adulteration of milk. Some part of the society are unaware of the ill effects of adulterants and preservatives on their health, awareness should be brought among the people about the milk adulteration.

V. REFERENCES

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