

**CONCEPT OF ADULTERANTS, PRESERVATIVES AND NEUTRALIZERS IN
MILK AND MILK PRODUCTS**

DTC-311(Chemical Quality Assurance)

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Contents

Sl. No.	Topic	Page No.
1.	Introduction	1
2.	Adulteration	1
3.	List of Common Adulterants in milk and milk products	1-2
4.	Effect of addition of Adulterants on properties and composition on milk	2
5.	Milk Preservatives	3
6.	List of common Preservatives in milk and milk products	3-4
7.	Neutralizers	4
8.	List of Common Neutralizers	4
9.	Conclusion	5
10.	References	5

1. Introduction

Milk is so highly valuable a food, some malpractice is done by adding cheaper and resembling substance substances to milk or removing valuable constituents from it in order to make an extra profit. This malpractice is called adulteration.

Adulteration means the addition of forbidden substances to foods.

Definition

“Addition of cheaper and resembling substance to milk or removal of one or more valuable constituents (like fat) from it keeping that no change is made in properties and composition of milk and in order to make extra profit is called adulteration in milk and the substances added are called adulterants”

2. Adulteration of food products

- As per the definition of the Prevention of Food Adulteration Act, 1954 (PFA) Rule 2, "adulterant" means any material, which is or could be employed for the purposes of adulteration. Further under rule 44, PFA states that no person shall either by himself or by any agent sell milk which contains any added water and also milk containing a substance not found in milk. Amongst the food items, milk is a complex mixture of nutrients and a liquid food which, can be easily adulterated by the unscrupulous persons.

- According to PFA definition —Milk is the normal mammary secretion derived from complete milking of healthy milch animal without either addition thereto or extraction therefore. It shall be free from colostrum. Milk of different classes and different designations shall conform to the standards laid down for them.

The main purpose of addition of adulterants in milk and milk products to increase the S.N.F. and Total Solid.

3. List of Common Adulterants in milk and milk products

The most of the common adulterants added to milk can be grouped in the following categories:

a) **Carbohydrates**-Addition of carbohydrate in milk to increase the S.N.F. and total solid.

Examples: Sugar, glucose, starch, malto-dextrin, etc.

b) **Salts and fertilizers**- Addition of Salts and fertilizers in milk to increase the S.N.F. and total solid.

Examples: Urea, ammonium sulphate, potassium sulphate, ammoniacal fertilizers, sodium chloride etc.

c) Neutralizers

Examples: Sodium carbonate, sodium bicarbonate, sodium hydroxide etc.

d) Detergents

Examples: Liquid detergents, washing powders etc.

e) Oils and Paints

Examples: Vegetable fats and oils, mineral oil, white paint etc.

4. Effect of addition of Adulterants on properties and composition on milk

Nature of Adulterants	Effect on		
	Fat percent	Lactometer Reading	SNF Percent
1.Addition of water	Lower	Lower	Lower
2. Removal of fat (Cream)	Lower	Higher	Higher
3.Addition of water and starch	Lower	Normal	Normal
4.Addition of Skim milk	Lower	Higher	Normal
5.Addition of cane sugar	Lower	Higher	Higher
6. Addition of Dextrose/Glucose	Lower	Higher	Higher
7.Addition of water and urea	Lower	Normal	Normal

5. Milk Preservatives

Milk is an excellent food for the micro-organism. Milk produced even under the best sanitary conditions contains a considerable number of micro-organism. Even pasteurisation does not destroy cent per cent of bacteria present in milk. Bacteria get entry to the milk through the various sources such as a body of the animal, feed of the animal, atmosphere, milker, milking utensils, adulterants and post-pasteurisation contamination etc. Yeast and moulds may also get entry to milk. These micro-organisms bring about certain abnormal changes in the physico-chemical properties of milk when stored. Thus, it becomes essential to preserve milk in its original form particularly for analytical purpose.

Definition

“Milk preservatives are the chemical substances which, when added to milk in small quantity, either check the growth of micro-organisms present in milk or destroy them and thereby increase the keeping quality of milk”

The process by which milk is preserved in its original form is called milk preservation.

Milk may be preserved by following methods:

A. Physical Methods

1. Chilling
2. Heating (Pasteurization and Sterilization)
3. Irradiation methods

B. Chemical Methods

Chemical Preservatives

For the purpose of Chemical analysis, a number of preservatives are used. The choice of a preservatives depends on the purpose of the analysis.

6. List of common milk Preservatives-

1. Formalin
2. Mercuric Chloride
3. Hydrogen peroxide
4. Boric Acid

5. Benzoic Acid
6. Salicylic acid
7. Bronopol
8. Potassium dichromate

7. Desirable properties of a good Preservatives

A good preservative should possess the following properties:

1. It should be cheap and easily available.
2. It should be non-toxic.
3. It should be easily miscible.
4. It should be colourless, tasteless and odourless.
5. It should not interfere with any constituents of milk or milk products.
6. It should not interfere with physico-chemical properties of milk.
7. It should not cause itching, burn or any other harm to the body.
8. A good preservative should not create any disorder in the digestive tract if consumed.
9. It should be easily detectable.
10. It should have ability to destroy sufficient number of micro-organism in a very small quantity.

8. Neutralizers

Neutralizers are chemical substances, which are alkaline in nature. They are added to milk in order to regulate the acidity of milk. In milk, sodium hydroxide, sodium carbonate and sodium bicarbonate are added by adulterators to neutralize the developed acidity in milk.

List of common neutralizers are added in milk-

Sodium hydroxide

Sodium carbonates

Sodium bicarbonates

9. Conclusion

Milk is so highly valuable a food but some malpractice is done by adding cheaper and resembling substance to milk or removing valuable constituents from it in order to make an extra profit is called adulteration. The main purpose of addition of adulterants in milk and milk products is to increase the S.N.F. and Total Solid. Food preservatives are the chemical substances which, when added to milk in small quantity, either check the growth of micro-organisms present in milk or destroy them and thereby increase the keeping quality of milk and milk products. Neutralizers are chemical substances, which are alkaline in nature. They are added to milk in order to control the acidity of milk. As per FSSAI (2015), addition of any adulterants, preservatives and neutralizers in milk and milk products are strictly prohibited. But FSSAI permits one preservative i.e. formalin for only analysis purpose of milk.

10. References

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4. Sharma and Sharma, Dairy Chemistry manual