

MATERIALS AND METHODS

Survey Method:

The local milk vendors were chosen via random sampling method. Samples of milk from various milk vendors from in and around different parts of Guwahati were collected in sterilized containers and subjected to laboratory techniques to determine the adulterants present in milk.

Study Design:

Random Sampling Design

Period of study:

Collection of milk samples and their analytical study for detecting milk adulterants were made during the period from January to April ,2018

Collection of sample:

About 50 milk samples (100 ml each) were collected to detect the various milk adulterants during the period of study. Individual raw milk samples were collected from different local vendors of Guwahati city. The samples were collected in clean, dry and sterilized screw capped glass bottles. All the possible precaution was taken to avoid external contamination at the time of collection of samples and during processing. After collection the samples were brought to the laboratory for further analysis. A standard milk adulteration kit manufactured by HIMEDIA laboratories, Mumbai, India was used. The milk samples were tested for the following adulterants – formalin, urea, starch, neutralizers (NaHCO_3 , Na_2CO_3 , NaOH and Ca(OH)_2 etc.), detergents, sodium chloride, skim milk powder, sucrose, glucose/dextrose, hydrogen peroxide and acidity and heat stability.



Students preparing milk samples for testing adulterants

Milk sampling and analysis:

Adulterants to be detected were grouped into three classes for analysis as given below:

Group I: Starch, Sucrose, Glucose and Skim Milk Powder.

Group II: Acidity/Alkalinity, Neutralizers, Sodium Chloride and Urea.

Group III: Formalin, Hydrogen Peroxide and Detergents .

The samples were analyzed for adulteration in the following procedure:

1. Alizarine: (Acidity and Heat Stability)

Procedure: One ml milk sample was taken in a test tube and 1 ml of reagent ALZ was added. The mixture was allowed to stand for 5 minutes. Then changes in colour was observed.

Results:

Status	Changes in colour	pH
Normal milk	Red	6.8
Acidic	Reddish Orange	5.8
Alkaline	Reddish Violet	7.8

2. Formalin:

Procedure: 2 ml of milk sample was taken in a test tube and 2 drops of Reagent FM-1 was added and mixed well. To it, 1 ml Reagent FM-2 was added from the side of the test tube slowly. colour change was observed for the ring formed at the junction.

Results:

Absence of formalin	Brownish yellow coloured ring
Presence of formalin	Purple/Violet coloured ring

3. Urea:

Procedure: 2 ml milk sample was taken in a test tube and 1 ml of Reagent U was added.

Change in colour was observed

Results:

Absence of Urea	Off White to Slight yellow colour
Presence of Urea	Yellow Colour

4. Starch:

Procedure: 2 ml of milk was taken in a test tube and boiled. It was then cooled. To it, 5 drop of reagent ST was added. Change in colour was observed

Results:

Absence of Starch	Off white to cream
Presence of Starch	Blue

5. Neutralizers: (Sodium bicarbonate, Sodium Carbonate and Sodium Hydroxide, Calcium hydroxides)

Procedure: 1 ml of milk samples was taken in a test tube. To it, 1 ml of reagent N-1 and 3 drops of reagent N-2 was added. Changes in colour was observed.

Results:

Absence of Neutralizers	Light Orange
Presence of Neutralizers	Reddish Pink

6. Detergents: (Shampoo, Washing powder etc):

Procedure: 2 ml of milk samples was taken in a test tube and 2 drops of Reagent DET was added. Changes in colour was observed.

Results:

Absence of Detergents	Greyish blue
Presence of Detergents	Blue
Presence of Shampoo	Slate Grey

7. Sodium Chloride:

Procedure: 2 ml of milk sample was taken in a test tube. To it, 1 ml of reagent NCL-1 and 3 drops of NCL-2 was added. Changes in colour was observed.

Results:

Absence of Sodium Chloride	Brick Red
Presence of Sodium Chloride	Yellow

Yellow colour indicate presence of common salt.

Brick red colour indicate absent of common salt.

8. Skim Milk Powder:

Procedure: 2 ml of milk sample was taken in a test tube. To it, 1 ml of reagent SKM-1 and 1 ml of reagent SKM-2 was added and mixed thoroughly. It was then heated in a water bath at boiling temperature for 15 minutes and cooled. Changes in colour was observed.

Results:

Absence of Skim Milk Powder	Greenish
Presence of Skim Milk powder	Bluish

9. Sugar (Sucrose):

Procedure: 2 ml of milk sample was taken in a test tube. To it, 1 ml of reagent SGR-1 and 1 ml of Reagent SGR-2 was added and boiled for 1 min. Changes in colour was observed.

Results:

Absence of Sugar :	Pale Yellow
Presence of Sugar	Brick Red

10. Glucose/ Dextrose:

Procedure: 1 ml of milk sample was taken in a test tube. To it, 1 ml of reagent GL-1 and 1 ml of Reagent GL-2 was added and boiled in a boiling water bath for 5 minutes and then cooled.

Changes in colour was observed.

Results:

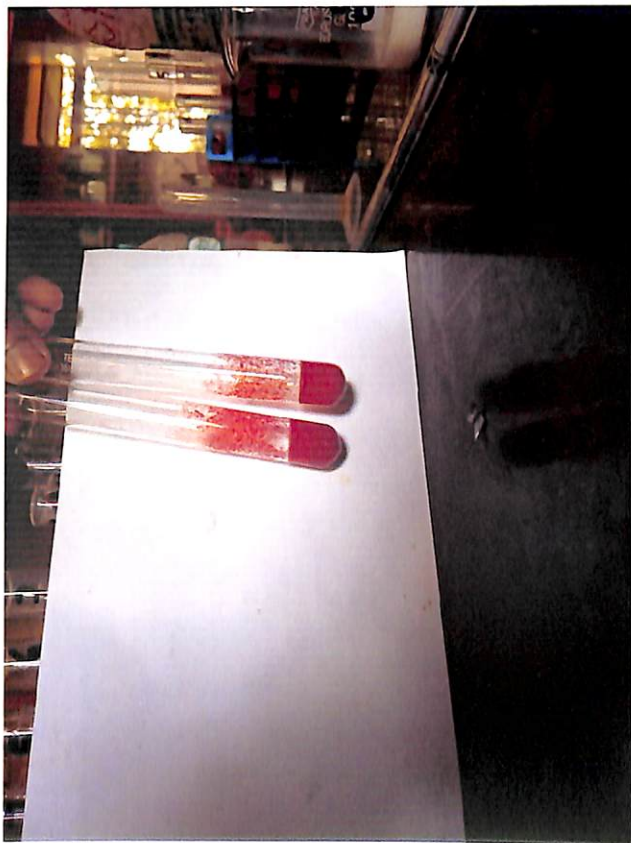
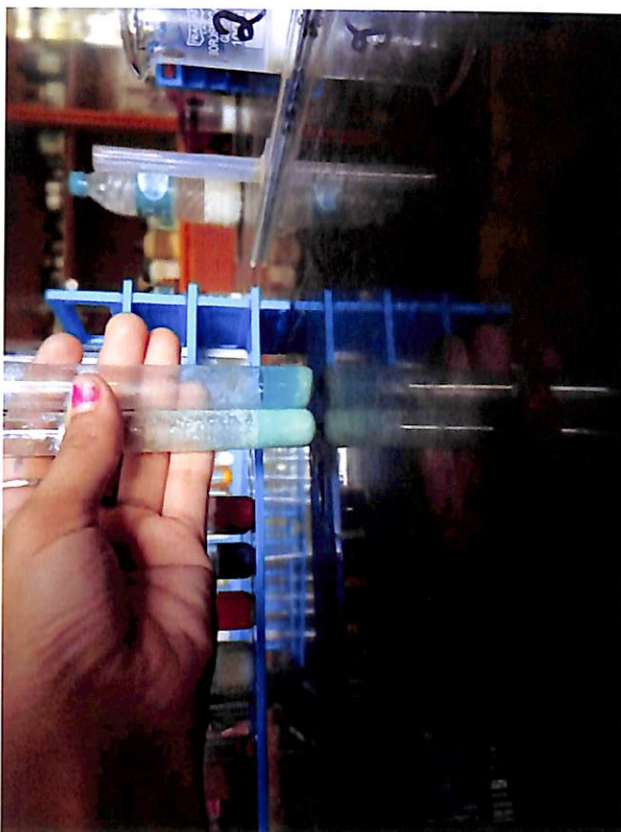
Absence of Glucose (Dextrose)	Light green
Presence of Glucose (Dextrose)	Bluish green

11. Hydrogen Peroxide:

Procedure: 5 ml of milk sample was taken in a test tube. To it , 1 small spoonful (~0.30 g) of Reagent HP was added and allowed to stand for 5 minutes. Changes in colour was observed.

Results:

Absence of Hydrogen Peroxide	White to Light Grey
Presence of Hydrogen Peroxide	Grey with Bluish/Violet tint.



Students testing adulterants of milk sample in the laboratory 2