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QUALITATIVE ANALYSIS AND MICROBIAL TEST OF PASTEURIZED MILK

Rajesh Ku. Meher [1], Samarpita sethy, Namita Nayak

P.G Dept of Biosciences and Biotechnology, Fakir Mohan University, Balasore-756020, Odisha, India

*Corresponding Author Email: rajeshkumarmeher99@gmail.com

ABSTRACT

The chemical and microbial test of pasteurized milk was carried out by various test like organoleptic test, correct lactometer reading (CLR), detection of fat percentage of lactic acid, methylene blue reduction test (MBRT), Bacteriology test. The milk was found to be slightly acidic thus lactic acid percentage was also detected.

KEY WORDS

Pasteurized milk, Organoleptic test, CLR, MBRT, Bacteriology test.

INTRODUCTION

Milk is the nutrient rich liquid secreted by the mammary gland of mammals. I t provide the primary sources of nutrition for newborns before they are able to digest other type of food. The early lactation of milk is known as colostrums and carries the mother antibodies to the baby. It can reduce the risk of many diseases of the offspring. Human and other mammals can consume mother milk during their infancy. Most milk is obtained from dairy cows, although milk from goats, sheep, buffalo, yak, horses and camel are also used in various part of the world. Milk is a liquid food material that provides several nutrients. The colour of milk is opaque. The exact component of raw milk is varies from species to species. However milk contains significant amount of saturated fat, protein and calcium. Aquatic mammals such as seals and wheals produce milk that is very rich in fats and other solid nutrients in comparison with terrestrial mammals. Milk provides more essential nutrient in significant amount than any other single food. It is an outstanding source of calcium and phosphorus for bones, teeth and contains riboflavin, vitamin B6, B1, A, B12 in significant amounts. Milk serve as nutritionally as an energy source.

Importance of milk:

- Milk contains vitamin D and K is essential for bone growth.
- Iodine is essential for thyroid function, is present in milk.
- B12 and riboflavin is essential vitamin necessary for cardiovascular health and energy production is present in milk.
- Milk contains Biotin important for energy production.
- It contains vitamin A helps in immune function.
- It contains potassium, magnesium essential for cardiovascular health.
- It also contains trace mineral selenium which is a anticancerous agent.

In our society the farmer does not give the milk with proper handling. Due to the contamination the milk spoils and become harmful for human. So the milk pasteurization is necessary to find the good quality of milk. Milk pasteurization is prime reason to killing Mycobacterium tuberculosis.

During processing the fat content of the milk is adjusted, various vitamins are added and potentially harmful bacteria are killed. In addition to being consumed as a beverage, milk is also use to make butter, cream, yogurt, cheese and variety of other products.

MATERIALS AND METHODS

Organoleptic test:

With the help of taste buds present on the tongue we can guess the acidity as well as quality of the products. As we know that acids are sour in taste, thus if the products test is too sour we can tell that its acidity is high. Although we can know the quality of the product through OT but we cannot tell the accurate acidity of the product. To know the exact acidity we have to perform different experiment

The products are tested properly i.e before acidity test of the product we should test the product on the tip of our tongue

Determination of CLR (Correct Lactometer Reading) of milk sample:

About 50 ml of milk sample was taken in container, and then the temperature was maintained to 21˚C with help of thermometer. After measuring the temperature the milk was measured by measuring cylinder and a lactometer was dipped into the milk container. Then the lactometer floats in the milk. Through the lactometer the density was measured as how much the lactometer was dipped into the milk container.

Determination of fat percentage in milk sample (Geber Method):

About 10 ml of conc. H_2SO_4 was taken in butyrometer which was measured by Tilt measure apparatus. Then 10.75 ml of milk was added slowly along the sides of the tube by 10.75 ml pipette and 1ml of isoamyl alcohol was added. After this shake well at 45˚ angles . Then the butyrometer was allowed for centrifuge at11000 rpm for 3-5 minutes. After centrifugation percentage of milk fat was measured.

Detection of acidity of the milk sample (% of lactic acid):

About 10 ml of milk sample was pipette out in a small beaker. Then 3-4 drops of phenolphthalein indicator was added to it. And mixed thoroughly. Then the sample was titrated against0.1N sodium hydroxide. After titration when the colour of sample become light pink then the titration was stopped he titrated value of the milk sample was taken as the difference between the initial burette reading and final burette reading.

Calculation:

The acidity of the milk sample can be calculated by the following formula % lactic acid of milk = titrated value X 0.09

Detection of MBRT (Methylene Blue reduction test) of milk:

About 10 ml of milk sample was taken by pipette in a test tube. Then 1ml of methylene blue indicator was added to it and mixed properly. After this the test tube was placed into water bath, and temp maintained 37°C . The change of colour was observed at different time interval.

Determination of bacteria present in the milk (Bacteriology test)

To determine the number of bacteria present in milk sample two types of media were used

i. VRBA (Violet Red Blue Agar)
ii. PCA (Plate Count Agar)

VRBA media was used for coliform bacteria and PCA for all types of bacteria. At first the stock solution was prepared and from this the bench solution was prepared, from the bench solution the serial dilution was prepared upto the dilution factor $10^{-}7$ for culturing. Then the media was prepared and maintained the pH. The pH of the VRBA was adjusted to7.9 at 25°C and adjusted to PCA is 7.0at 25°C . The sterilized petridish was taken and 1ml of diluted solution was taken by micropipette and VRBA media was added in to the

petridish. The petridish were moved in to 8 shapes for mixing and allowed to solidify. In this way the PCA plate were prepared .After solidify the plates were placed into incubator at temperature 37°C for growth of microbes. The result must be seen in 24 hours in PCA plates.

Preparation of stock solution:

4.25 gm potassium dihydrogen phosphate+ 50% NaOH, pH adjust to 7.2, volume make up was done to 100 ml by adding distilled water.

Preparation of bench solution:

100 ml of distilled water+ 0.1ml stock solution

Calculation:

N= C/(n1+n2) x 0.1 x d

N=Total coliform

C= Total no. Of colony found

d= Dilution factor corresponding to 1st dilution

n1= the no. Of colonies in the 1st dilution, n2= the no. Of colonies in the 2nd dilution.

RESULT

Organoleptic test:

The presence of sourness determined the acidity of the product.

Table1: Determination of CLR of milk:

Name of the sample	Temperature	Density
Sample A	21°C	24.4

Table2: Determination of Fat percentage of milk by Gerber method

Name of the sample	Fat % in Greber method
Sample A	4.5

Table 3:Determination of Percentage of Lactic acid

Name of the sample	Time of observation	Titrated value	% of lactic acid
Sample -A	10 A.M	1.4	0.126%
	11 A.M	1.5	0.135%
	12 A.M	1.5	0.135%
	P. M	1.6	0.144%
	P.M	1.7	0.153%
	P.M	1.8	0.162%

Table 4: Determination Of MBRT

Name of sample	Time of testing	Time of observation	MBRT hour
Sample A	10 A.M	4 P.M	6 hour

Determination of bacteriology in VRBA media and PCA media:

There was no bacteria grown in the medium after incubation of 24 hour but 1.4 x 10^{-} in 10^{-2} dilution.

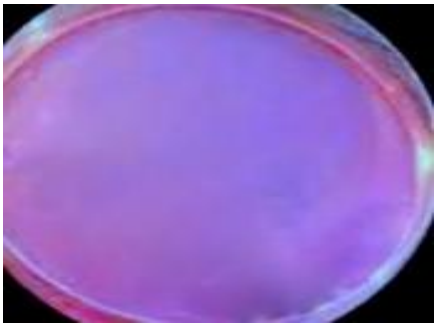

Fig : VRBA medium contain plate

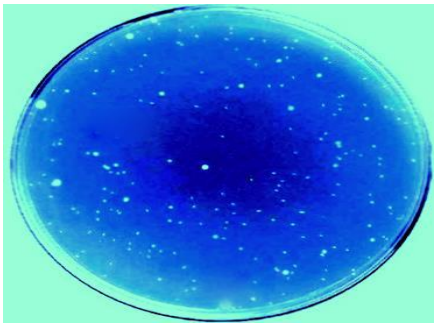

Fig: PCA medium with lactobacillus colony.

DISCUSSION

To know quality of milk various experiment carried out:

- The presence of acid is determined by the sense organ that is the tongue.
- At the temperature 21° C, the density of sample is 24.
- The fat percent can be measured by Gerber method and average is recorded, this sample contains 4.5 %.
- Then the percentage of lactic acid milk sample was tested. In sample A the time of observation started at 10 AM and the lactic acid percentage is 0.126. The percentage was measured at an interval of an hour and after 5 hours the percentage is 0.162. The lactic acid develops slowly.
- Methylene blue reductase test shows the freshness of milk. Sample A took the highest time i.e. 6 hours.
- In bacteriological test in VRBA media, the coli form bacteria was nil in sample A. After 24 hour of incubation there is no appearance of any coli form bacteria. Then in PCA media, after 48 hour incubation sample A shows less number of bacteria in 10^{-2} dilution. The bacteria appear in PCA media. In bacteriological count the sample A shows the presence of some type of bacteria.

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*Corresponding Author:
rajeshkumarmeher99@gmail.com