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Platform Tests for Detection of Milk Quality

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Abstract

Due to its high nutritious content, milk is prone to adulteration and rapidly contaminated by bacteria. Extra care should be made to avoid delivering any milk that is unfit for human consumption. Raw milk quality is a significant concern for social, economic, and health reasons. Therefore, platform tests must be performed in order to assess the milk's quality. These tests must be easy to perform, yield results quickly and accurately, and not call for the use of specialized or pricey equipment.

Keywords: Alcohol test, Platform tests, Quality, Raw milk, Platform tests

Introduction

Milk is a biological product that makes a good carrier for any ingredient without obviously changing its appearance. The quality of the raw milk used during its manufacture, processing, and handling circumstances determines the quality of milk and its products. Therefore, it is required to conduct a variety of fast tests known as "Platform Tests" to determine the quality of raw milk and determine if it is suitable for processing. For acceptance or rejection of incoming milk, a quick test is used to examine the milk. The tests conducted by the people in charge of collecting and/or receiving raw milk are frequently referred to as platform testing or milk reception tests. The tests in question are quick quality checks, with organoleptic tests being of utmost significance. Through these checks, milks of questionable or subpar quality can be filtered out before they are blended with bulk milk during milk collection and/or reception. Because one bad batch of milk can ruin the rest of the milk it is mixed with, this is crucially important in terms of processing and end product quality. Although the use of platform tests does not directly entail laboratory analysis of raw milk samples, in suspected situations a sample of milk should be taken for additional quality checks.

Precaution:

1. Raw milk should be tested.

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2. Separate curdled or spoilt milk.
3. The plant's raw milk receiving dock should have a temperature of 5°C.

Platform tests includes

a. Organoleptic evaluation
b. Clot on boiling test
c. Alcohol test
d. Resazurin test
e. Sediment test

Requirements: Milk cans or milk containers, Thermometer, dipper, plunger

A) Organoleptic evaluation

Following an examination of the milk sample, the following observations should be made:

a) Odour/ Smell:

1. It can be evaluated in a matter of seconds.
2. Take off the can's lid, hold it upside-down and elevated to your nose, and take a whiff to smell it.
3. Mark the scent or odour as typical or unusual. Normal milk smells pleasant and somewhat sweet.
4. Milk should not have any unsavouryflavours such as fishy, weedy or cooky.
5. Accept or reject the milk based on the organoleptic evaluation.

b) General appearance:

Check to see if the milk is clear or if any apparent dirt or foreign objects have gotten within the milk. If yes, explain how it works to determine how much dirt is in the milk and run the sediment test if necessary.

c) Colour:

Notice that milk is a light, white tint. Note whether the milk colour is normal or abnormal (bad colours include crimson, bloody, and bluish hues, among others).

d) Consistency:

Record the consistency of milk as normal, watery, thick, ropy, slimy, etc.

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B) Clot on Boiling Test (COB)

The acidity of milk will grow if it is left in its current state at room temperature; this is known as developed acidity. The calcium caseinate salt will dissociate when the acidity of milk is raised to more than 0.2 percent, which will cause coagulation when heated. This test is used to quickly determine whether milk has become more acidic. As was already said, heating will cause milk proteins that are sour to precipitate. Although slower than an alcohol test, this procedure is extremely helpful when one is not available.

Requirements: Milk sample test tube, hot water bath and pipette.

Procedures:

1. Using a graduated pipette, transfer 5.0 ml of milk into a 20 ml test tube.
2. Submerge the tube for five minutes in a boiling water bath. You might also place the tube over a flame and let the contents come to a boil.
3. Watch for clots or flakes to form on the test tube wall.
4. The appearance of flakes or clots signifies a positive test.

Interpretation: The presence of clots or flakes suggests that the acidity (over 0.17) and unsuitability for pasteurization.

C) Alcohol Test

The alcohol test is helpful as a gauge of milk's mineral composition rather than as a measure of its level of developed acidity. The test assists in identifying aberrant milk, such as colostrum, milk from animals lactating late, milk from animals with mastitis, and milk with an unbalanced mineral composition. It aids in the quick evaluation of milk's processing stability, notably for condensing and sterilization.

Requirements: Milk sample, 68 % Ethyl alcohol by weight or 75% by volume (Density 0.8675 g/ml at 27°C), test tube and pipette.

Procedure:

1. Use a graduated pipette to transfer 5.0 ml of milk into a test tube.
2. Add ethyl alcohol in an equal proportion.
3. With your thumb, cover the test tube's mouth and invert it several times to thoroughly mix the contents.
4. Check the test tube wall for any flakes that may appear.
5. The presence of flakes signifies a positive test.

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Interpretation: Flake formation indicates that the milk is abnormal, either because of a high acidity level or a salt imbalance. Such milk should not be subjected to high heat.

E) Sediment Test

Sediment test helps to assess the cleanliness of milk received.

Requirements: Long barrel suction type sediment tester, cotton discs (2.5 cm).

Procedure: -

1. Insert the sediment disc into the designated area to assemble the off-bottom sediment tester for cans and tankers.
2. Without touching the milk, dip the tester all the way to the bottom of the container.
3. Collect milk slowly from different parts of can bottom by pulling the plunger upwards.
4. Lift the sediment tester and press the plunger down and empty the tester.
5. Take apart the sediment tester and carefully remove the sediment disc. Weigh the disc or compare it to a standard sediment disc.
6. Classify milk using ISI standards.
7. Pour 500 ml of milk through the sediment tester if the sample is a mixed sample.

ISI Standards for Sediment

Amount of sediment	Grade
0.0 mg	Excellent
0.2 mg	Good
0.5 mg	Fair
1.0 mg	Poor
2.0 mg	Very Poor

D) Ten Minutes Resazurin Test

With regard to its impact on the rate of acid development, maintaining quality, and grading of milk, this test aids in determining the milk's hygienic and bacteriological quality. Most of the bacteria in milk have the ability to reduce and decolorize the resazurin dye. The M B.R. (Methylene Blue Reduction) test is similarly based on the same principles; however, this test uses the far more sensitive dye resazurin instead of methylene blue.

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Requirement: Milk, resazurin solution 10%, lovibond compactor with colour disc from blue to white, test tube, water bath, pipette 10ml and 1ml.

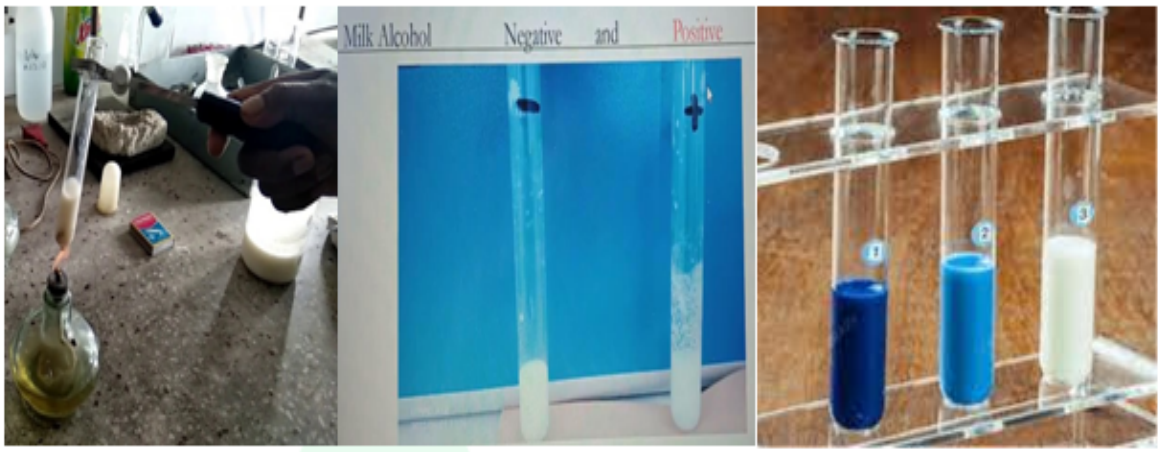
Procedure:

1. Thoroughly mix the sample.
2. Fill a previously sterilized test tube with 10ml of milk sample.
3. Immediately add 1 ml of the resazurin solution to the test tube, then immediately invert the test tube 2-3 times to mix the milk and dye.
4. Submerge the test tube for 10 minutes in a water bath set at 37.5°C.
5. After that, the tube is taken out of the water bath.
6. Continue comparing the test tube's colour to the standard disc until the colours match the comparator.
7. Note the disc's colour and number. Record half of the value if the colour falls between two disc numbers.

Interpretation:

The results shall be interpreted as follow:

Disc number	Milk quality	Remark
4 and higher	Satisfactory	Milk accepted
3.5 – 1.0	Doubtful	Perform other tests
0.5 – 0.0	Unsatisfactory	Reject milk



A) Clot on boiling B) Alcohol test C) Resazurin test

Figure 1: Platform Tests for Milk

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Conclusion:

Platform tests are frequently performed at collection and/or reception to quickly assess the quality of incoming raw milk. Both Milk Processing Plants and Milk Collection Centres conduct these. This is crucial in the processing of dairy products since one bad batch of milk can ruin an entire lot of blended milk. Platform testing do not necessitate the study of raw milk samples in a lab. The milk that is suspected will be separated and not combined with bulk milk. Rejected milk is milk that does not meet the requirements for the quality standards that were previously established.

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