Analysis of Traditional Turmeric Milk Concentrations in Intensifying Shelf life of Raw Milk through Physiological, Microbiological and Biochemical Parameters.

Abstract

The raw milk sample collected directly from cow through milk man may be contaminated with microbes through various sources. The present work holds systems thinking which collaborate the studies on shelf life of milk through physiological, microbiological and biochemical parameters. Various turmeric concentrations on the milk sample presented preservation for raw milk at 0.1gm for 50ml of sample taken. MBRT test revealed that the milk sample with 0.1gm of turmeric can be kept for 2.30 hours without any alteration in its quality and is proved to be a vital technique in the absence of any refrigerated conditions. The SPC presented very few colonies which were less than 30 considering the standard plate count value of 30-300. The sample was assayed for its bacterial load was found to be Gram positive in nature. Biochemical test for identification of bacteria predicted the presence of Lactobacillus species which was found to be active after the time interval of preservation.

Hypothesis

Turmeric has antimicrobial properties that can inhibit the growth of microorganisms in milk, extending its shelf life.

Keywords

Turmeric, Milk, Shelf life, MBRT, Biochemical, Microbiological.

Problem Statement

Investigate the effectiveness of traditional turmeric milk in extending the shelf life of raw milk by analyzing its impact on microbiological, biochemical, and sensory parameters.

Research Questions

1. Does turmeric milk exhibit antimicrobial properties against common milk-borne pathogens?

2. Can turmeric milk extend the shelf life of raw milk by inhibiting microbial growth and spoilage?

3. How does turmeric milk affect the biochemical composition of raw milk during storage?

Introduction

Milk is considered to be a unique secretion of mammary glands, with all the essential nutrients that enriches and fulfil the nutritional requirements of offspring. Chemically, milk is considered to be constituted of more than 100 separate entities that varies within species. Milk is considered to be an opaque white fluid having various constituents in a colloidal suspension or solution upon a physical point of view. The physicochemical behaviour and chemical makeup provide an explanation and forms the basic criteria for milk processing and it's by products. Milk that draws from any animal is considered to be sterile, without any bacterial content. The need for safety measures to keep it sterile starts from the point it leaves the udder of animal.

Microorganisms that are capable of contaminating milk are prevalent in nature making it unsuitable for processing and unfit for consumption. There is the traditional practice of boiling the raw milk within hours of production which provides safety but not minimizing the microbial load. Increasing raw milk storage time prior to pasteurization may affect product shelf life. Raw milk was stored at 4.5ºC for 0, 2, 4 and6 days prior to pasteurization. Milk samples from each pasteurized lot were analysed after continuous storage at 4.5ºC. The raw and pasteurized samples were analysed for coli forms, psychotrographs and total bacteria count. Flavour scorer were also determined.

No correlation were significant between raw and pasteurized samples and total bacteria or coli form counts. Related were flavour score and days held raw. Psychotropic counts and age of the raw milk were correlated from correlations of flavour scores with shelf life of milk a predictive equation is performed for analysis. Species belongs to Bacillus has got a tremendous role in keeping quality of milk samples. The organism can survive high temperature which was used for processing of food samples.

Reducing substances formed by the microbes as their metabolites are the key reason behind the change in colour formed by MBRT. The quicker disappearance of colour is directly proportional to the total number of bacteria. This is a true indication of the total metabolic reaction proceeding in the surface of bacteria.

Some may retain conventional pasteurization technique thereby extend the shelf life of milk through HTST Pasteurization techniques. The method may enable a shelf life of 14 to 28 days depends on the quality of raw milk samples prior to pasteurization. There is the second process which extends the shelf life through UP, Ultra pasteurization where the milk is heated to 280 ºC for 2 seconds.

Turmeric holds multiple medicinal properties and is considered to be as a natural preservative. Turmeric milk is healthy and is considered to be as a golden remedy diet for many ailments. Curcumin, the polyphenol from turmeric is a good aid in controlling inflammation. Turmeric milk relieves joint pains. The natural preservative turmeric, is considered to be rich in antioxidants, which can protect your body from damages caused by free radicals. Turmeric holds the ability to control blood sugar levels and boost immunity as well as brain functions. The present work aims to assess the antibacterial property of turmeric that can preserve milk.

Materials

1. Milk
2. Turmeric
3. Test tube or agar plates
4. Incubator
5. Bacteria or microbial culture

Methods

Methylene Blue Reductase test After a prompt sterilization of all utensils, 1 ml of methylene blue was added to the test tubes which are followed by the addition of 10ml of milk. An incubation period of 10 minutes will be provided under 35 ºC. A uniform creaming is created when temperature reached 36 ºC with slow inversion of the tubes. Special precautions are followed, not to shake the tubes. The tubes were covered to keep out from light. The samples were checked for discoloration after 30 minutes and subsequent changes were noted. The reduction time in whole hours between sample addition and discoloration were recorded.

Activity of Turmeric

Turmeric milk solutions of varying concentrations were prepared and the methylene blue reductase tests were performed. The assay was performed under different concentrations of turmeric and different milk dilutions as well as comparing with different quantities of the milk sample.

Standard Plate count

0.1ml from the serially diluted samples were transferred to petri plates. The nutrient agar plates were then overlayed with second layer media and the same was incubated for 24 hours under 37 ºC.

Gram's staining

Standard Protocol of Gram's stain was applied on to the respective table.

Biochemical Analysis

Various Biochemical analysis were performed for the assay of the bacterial load as per the standard protocols.