

Adulteration of milk in Kumbanad region

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ABSTRACT

Milk is an easily accessible food that can be swiftly digested and absorbed. From infancy to adolescence, milk and milk products in diet plays a significant part in growth and development. Negligence to maintain proper hygienic conditions and addition of adulterants in milk to increase the profit margin has become very common in India. Milk samples collected from local vendors were tested for various adulterants like detergent, glucose, starch, water, urea, Vanaspati and synthetic milk. Results showed absence of adulterant in most of the milk samples. Present study attempted to bring in awareness on milk adulteration & various simple methods for its reliable detection.

1. Introduction

Milk is the lacteal secretion of the mammary gland of mammals. In many parts of the world, cow is the principal source of milk for human consumption. About 4.5% fats, 3.8% proteins, 4.9% lactose, and 13.9% total solids are present in cow's milk (Khan et al., 2005). India is the second largest milk producing country in the world after the United States contributing 9.5 percent of the global cows' milk production and first for buffalo milk production. Water is often used for diluting the milk while sugar, urea, and starch are treated to mimic the color, consistency, and nitrogen content. To meet the increasing demand due to the rapid growth in popularity, adulteration is being commonly practiced in India at a large scale. Long and short-term health problems are caused due to the consumption of adulterated milk (Handford et al., 2016). With the increase of fraudulent practice in the dairy industry, proper control methods are required to detect the authenticity of milk and milk products. Various tests are designed to determine the adulteration in milk. Chemical method is one among such tests. Here the adulterant is treated with a particular chemical compound and its presence results in giving a colored compound. Chemical Tests are very specific to the product and the negative result will not be obtained.

In Pathanamthitta district, Kumbanad is a town in the state of Kerala, India. The city has a tropical climate and is located at 9.352°N 76.661°E.

The objective of this study was to find out milk quality in Kumbanad region. This study will generate some valuable information about quality of milk provided in the locality.

2. Materials and Methods

2.1. Sample Collection

Milk samples were purchased from 4 local vendors of different locality near Kumbanad. Samples from the vendors were collected in a sterilized container and subjected to laboratory techniques for the detections of adulterants.

2.2. Chemical test for detections of adulterants

Collected sample were tested as per following test (Pradeep et al., 2016).

2.2.1. Urea

About 2ml of sample is taken in a test tube. 1ml of phenol red (indicator) is added to the sample and was kept in water bath at 35°C for 5 min. To this 0.5 ml of urease is added. Appearance of peach colour indicated trace amount of urea. Reddish brown color was seen for low concentrations, Pink color for moderate concentration and Magenta for high concentration.

2.2.2. Detergent

About 5-10 ml of sample with equal volumes of water was taken in a test tube and was shaken vigorously. Formation of lather confirms presence of detergent.

2.2.3. Starch

A few drops of iodine solution were added to the milk samples. Appearance of blue black color indicates presence of starch.

2.2.4. Glucose

About 2 ml of milk sample was taken in a test tube and equal volume of Benedict's reagent was added to it. This was then kept in boiling water bath for 5 minute and was observed for color changes. Appearance of blue color indicates no glucose present. While green color indicates trace amount. Yellow, orange, red colors were observed low, moderate and high concentration respectively.

2.2.5. Vanaspati

Take 3 ml of milk sample was taken in a test tube. About 10 drops of hydrochloric acid was added to it followed by one tea spoonful of sugar. The mixture was examined after 5 min. The red coloration indicates the presence of Vanaspati in milk.

2.2.6. Water

A small amount of milk was placed on a smooth slant surface. Adulterated milk will not leave a trail and slides faster.

The milk is diluted to increase quantity and thereby decrease quality.

2.2.7. Synthetic milk

Take a drop of milk and rub it between fingers. Soapy feeling on rubbing between fingers indicates the presence of synthetic milk. Synthetic milk is made by mixing urea, detergent paints and oils etc.

3. Observation

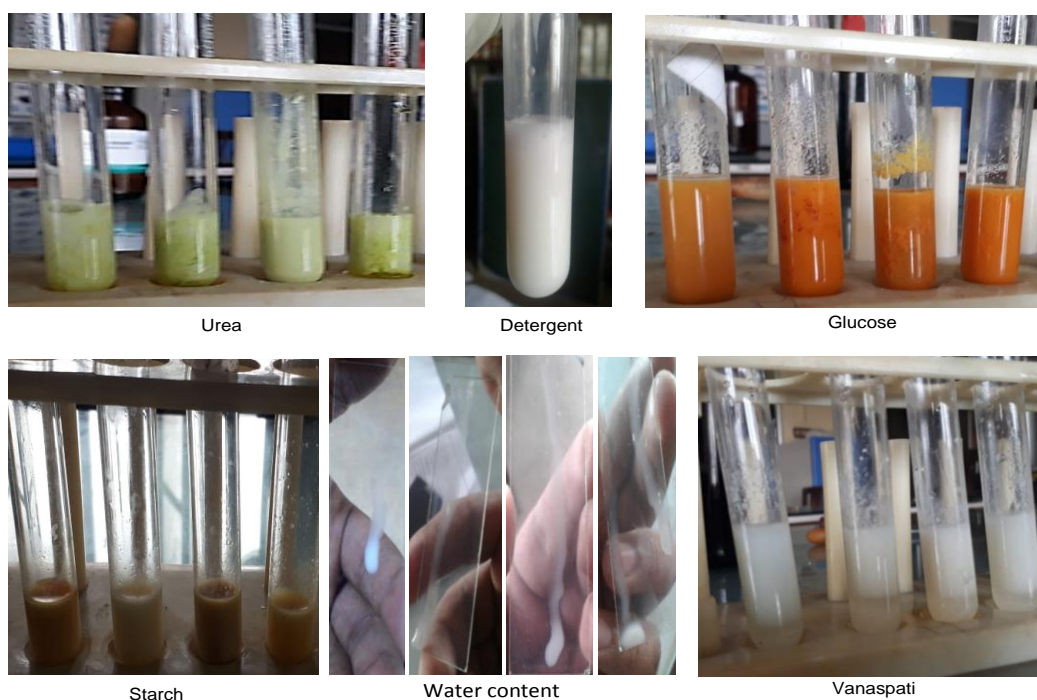
The observations for the milk samples after chemical testing are summarized in Table-1.

- Sample 1: Local vendor from Kumbanad
- Sample 2: Local vendor from Nellimala
- Sample 3: Local vendor from Pazhekavu
- Sample 4: Local vendor from Karilamukku

Table-1

Results of chemical test				
	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4
UREA	x	x	x	x
DETERGENT	x	x	x	x
STARCH	x	x	x	x
GLUCOSE	✓	✓	✓	✓
VANASPATHI	x	x	x	x
WATER	x	x	x	x
SYNTHETIC MILK	x	x	✓	x

x Absence of adulterant
 ✓ Presence of adulterant



4. Result and Discussion

These four milk samples were collected from different places near Kumbanad. The chemical tests performed on milk samples showed negative results for all tests except glucose. Moderate amount of glucose was present in all samples. However sample 3 showed presence of synthetic milk. This may be due to intentional addition or accidental contamination. These chemical tests are highly specific and can detect even trace amounts of the respective adulterant present in milk.

5. Conclusion

The quality of milk in developing countries like India is very poor. Negligence to maintain proper hygienic conditions and

addition of adulterants in milk to increase the profit margin has become very common among traders. As adulteration is becoming a common practice in India, it is consequential that consumers be aware of the methods for detecting these adulterants.

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