

A study on adulteration of milk and milk products from local vendors

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Abstract

Milk is an essential commodity in daily life. It is not only a source of good quality protein, but also of calcium and riboflavin besides other nutrients. Milk is most commercially sold commodity both by local vendor's as well super markets. Due to rules laid by FSSAI, most of the branded products follow appropriate quality in the marketed products. However in local products to increase the yield certain adulterants are added which may affect the nutritional quality of milk. Hence, to know the activity, the present study aimed at knowing adulteration in 5 selected local vendors and food samples selected were Milk, Curd, Buttermilk, Butter and Ghee. The adulteration observed mostly in Milk, Curd, and Buttermilk and Butter and Ghee were adulterated with certain vendors in most of Milk and Curd the water content is more, but in few samples urea and starch was also observed. Thus, the study clearly brought the fact that foods from local vendors had adulterated samples.

Keywords: Adulteration, milk safety, detergent in milk, fssai, quality of milk products

1. Introduction

Milk in its natural form has high food value. It supplies nutrients like proteins, fat, carbohydrates, vitamins and minerals in moderate amounts in an easily digestible form. Due to its nutritive value, milk is significant to young and old people [1].

The composition of milk varies considerably with the breed of cow, stage of lactation, feed, season of the year, and many other factors. However, some relationships between constituents are very stable and can be used to indicate whether any tampering with the milk composition has occurred [2-5].

A national survey in India has revealed that almost 70% of the milk sold and consumed in India is adulterated by contaminants such as detergent and skim milk powder, but impure water is the highest contaminant. According to National Survey on Milk Adulteration conducted by FSSAI (India) in 2011, water is the most common adulterant followed by detergent in milk. A survey by FSSAI in 2012, 68% milk samples was found to be adulterated in which 31 % were from rural areas. Of these 16.7 % were packet or branded milk and rest were loose milk samples from dairies. In the urban areas, 68.9 % milk was found to be adulterated with water, detergent, urea and skim milk powder. In Uttarakhand, 88% milk was found to be adulterated. Despite the laws governing the quality and sale of milk existing in India for decades, the adulteration of milk has not been

checked completely [6].

In order to keep milk temporarily fresh, some unethical activities are usually adapted to prevent the financial losses due to the spoilage of milk during its transportation and sale. For instance, the addition of water to increase volume of milk, thickening agents like starch, flour, skimmed milk powder, whey powder or other ingredients to counter the dilution and extend the solids content of the milk. Vegetable oil, sugarcane or urea to compensate the fat, carbohydrate or protein content of diluted milk. Some chemicals such as hydrogen peroxide, carbonates, bicarbonates, antibiotics, caustic soda and even the most lethal chemical formalin to increase the storage period of milk, ice to enhance the shelf life of milk; detergents to enhance the cosmetic nature of milk which diminishes foamy appearance and whitening of milk or calcium thioglycolate/ potassium thioglycolate/ calcium salts of thioglycolic acid and urea for whitening of milk and giving it a genuine look [7].

The adulteration of milk is banned due to the ill effects. Carbonate in milk produce gastrointestinal problems including gastric ulcer, diarrhoea, colon ulcer and electrolytes disturbance.

The hydrogen peroxide disturbs the antioxidants in the body disturbing the natural immunity hence increasing aging. Chloride in the

milk disturbs the acid base balance in the body and also blood pH. Ammonia in milk develops regression, loss of acquired speech and sensory disturbances [8] despite food legislation, adulteration remains uncontrolled, furthermore legal steps laid down in the PFA Act are extremely difficult to maintain due to inadequate and untrained man power and laboratory facilities [9]. Such is the state in the country where we are one of the largest nations of milk producers. In the year 2010-2011, India was ranked among the top 5 countries in the world producing 121.8 million tonnes of milk [10].

Food safety standards authority of India (FSSAI) conducted a survey in 2011 on milk adulteration in selected rural and urban areas, according to them the most common adulterant was found to be the addition of water, and the main reason for deviation from the standards was addition of glucose and skimmed milk powder. It also found that in some samples, detergent was mixed. Total of 1791 samples of milk were randomly collected from 33 states with a good mix of rural and urban areas as well as packaged and loose milk, after analysis 565 (31.5 per cent) samples were found to be conforming to the FSSAI standards whereas 1226 (68.4 per cent) samples of milk were found to be non-conforming[11].

Figure 1: MILK SAFETY IN INDIA¹³

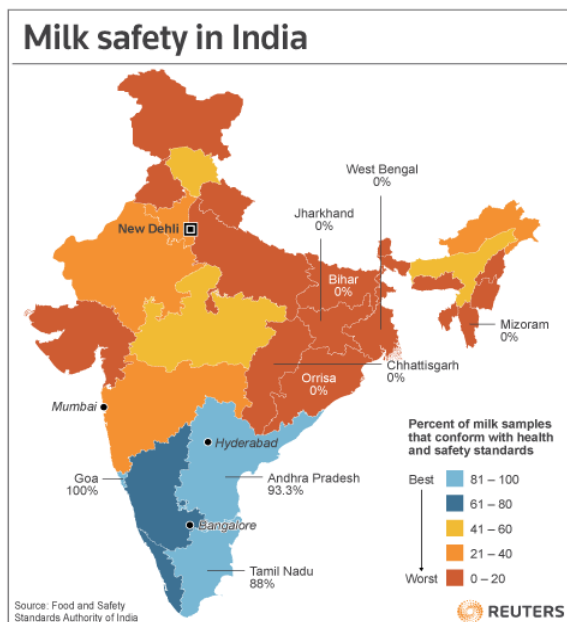


Table 1: Adulterants in the samples

Samples	Water Test	Urea Test	Starch Test	Detergent Test
No. of milk samples positive (out of 10 samples)	10(100%)	0	6 (60%)	1(10%)
No. of buttermilk samples positive (out of 10 samples)	10 (100%)	6 (60%)	0	8 (80%)
No. of butter samples positive (out of 10 samples)	10 (100%)	8 (80%)	2 (20%)	6 (60%)
No. of ghee samples positive (out of 10 samples)	10 (100%)	6 (60%)	4 (40%)	6 (60%)
No. of Curd samples positive (out of 10 samples)	10 (100%)	8 (80%)	0	4 (40%)

1.1 Objectives

To collect the samples of milk and its dairy products from different local vendors.

To identify the adulterants present in the samples and compare with the standard products.

2. Methodology

2.1 Survey Method

The local milk vendors were chosen via random sampling method. 50 samples from various vendors were collected in a sterilized container and subjected to laboratory techniques to determine the adulterants present in milk and its products.

2.2 Study Design: Random Sampling Design

2.3 Sample Size:

5 milk and its products were collected from 10 different local vendors (milk, buttermilk, curd, ghee, butter) located in Hyderabad (India). Total 50 samples were collected. Samples were kept in a sterilized container in fridge at 4^o which are analysed for adulteration properties which include (water test, urea test, starch test, detergent test,).

2.4 Test:

5 adulteration tests were conducted to detect common adulterants in milk and milk product samples collected from various areas in and around the campus of Osmania University College for women, Koti Hyderabad the tests conducted are as follows:

1) Water test:

To know the percentage of water added in the milk, as water is the most common adulterant added in the milk [12].

2) Urea test:

To know if urea is added in the milk to increase its SNF value.

3) Starch test:

To know the amount of starch added in the milk and milk product samples.

4) Detergent test:

To detect the presence of detergent in the milk and milk products.

3. Discussion and Conclusion

3.1 Adulteration tests for milk sample

All the ten milk samples were analysed for adulteration test, sample 1, 3, 4 & 8 were showing same results in all the adulteration tests. were samples 2, 5 & 9 were adulterated with water and starch similarly sample 6, 7& 10 were showing same results and they were adulterated with more amount of water and starch only sample 3 was differing from all the five samples as it was adulterated with water and detergent.

3.2 Adulteration tests for curd sample

All the ten milk samples were analysed for adulteration test, sample 3, 6 & 9 was adulterated with water, urea and detergent. Sample 1, 5, 7 & 9 was adulterated with water and detergent. 2, 4 & 8 were showing same results and they were adulterated with more amounts of water and urea only sample 5 was adulterated with water, urea and detergent.

3.3 Adulteration tests for buttermilk sample

All the ten milk samples were analysed for adulteration test, sample 1, 3 & 5 was adulterated with

water, urea and detergent. Sample 2, 4 & 6 was adulterated with 25% water and detergent. 7 & 9 was adulterated with 50% water and urea. Sample 8 &10 were showing same results and they were adulterated with 50% water, urea and detergent.

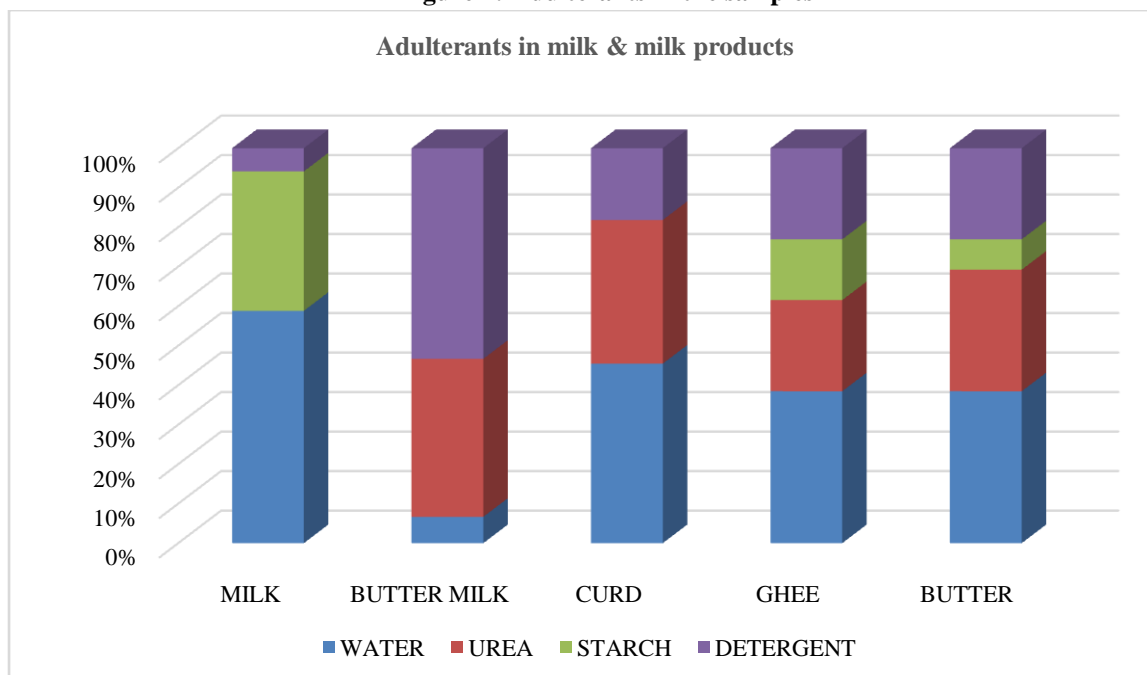
3.4 Adulteration tests for butter sample

All the ten milk samples were analysed for adulteration test, sample 2, 3& 7 was adulterated with 25% water, and urea starch and detergent. Sample 1, 5 &10 was adulterated with 25% water and detergent. 4 & 9 were showing same results and were adulterated with 25% water and urea. Sample 6 & 8 was adulterated with 25% water, urea and detergent.

3.5 Adulteration tests for ghee sample

All the ten milk samples were analysed for adulteration test, sample 1, 4, 8 &10 was adulterated with 25% water and starch. Sample 2, 7 & 9 was adulterated with 50% water and detergent. 3& 5 was adulterated with 25% water, urea and starch. Sample 6 was adulterated with 50% water, urea and detergent. Sample 5 was adulterated with 25% water, urea and detergent.

Figure 2: Adulterants in the samples



4. Conclusion

From the above study its evident that the so collected milk and milk products samples collected were adulterated with common adulterants like water, urea, detergent and starch, water being the most common adulterant, the milk samples collected were found containing excess water, starch and detergent, the buttermilk& curd samples were found to be having not just excess water but also had added urea and detergent, the butter & ghee samples on other hand were loaded with all the four adulterants i.e. water, urea, starch and detergent. Thus it was found that all the so collected milk and milk

products samples had varied proportions of common adulterants which might be detrimental to human health, therefore a governing body should periodically check these products for presence of these harmful ingredients.

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