



Detection of common adulterants in milk from Delhi and NCR

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ABSTRACT

Milk adulteration has been a significant problem in most of the developing countries including India. The present study was conducted to detect the presence of some common adulterants in milk procured from Delhi and NCR. Thirty milk samples, both open and branded were qualitatively analyzed for adulteration. These samples were tested for alkalinity, neutralizers, skimmed milk powder (SMP) and presence of various sugars. All the samples were found to be alkaline showing various degree of alkalinity. In addition, cane sugar and maltose were also present in all the samples. Among these, 73.3% tested positive for neutralizer and 10% for SMP. However, glucose and starch were absent in all the samples.

Keywords: Adulteration, Alkalinity, Milk, Neutralizers, SMP, Sugars

INTRODUCTION

Under the Prevention of Food Adulteration Act, 1954, adulteration is defined as intentional addition or substitution/abstraction of substances which adversely affect the nature, substance and quality of foods. Also, incidental contamination during the period of growth, harvesting processing, transportation and distribution is considered as adulteration. Milk adulteration is a rampant practice in developing countries including India, Pakistan and Bangladesh (4, 9, 10, 16). Recently, there were many reports of milk adulteration from different parts of India (2012; 2014). Milk is adulterated with several chemicals like urea, starch, formalin, boric acid (5). Milk is transported from the point of production, to the processing units and finally to consumers by middlemen. So debasing can be done at any of these points.

Milk is considered to be a complete food as it is a valuable source of good quality protein, carbohydrates (in the form of lactose), vitamins, minerals, importantly calcium and water (8). Milk also provides all the substances in easily assimilable form. Adulterated milk can have threatening consequences for growing children, pregnant women, developing foetus and patients who are the primary consumers of milk. Hence, it is important that the consumer has an access to unadulterated pure

milk. In view of this, the present study was aimed at assessing the quality of milk (both open and branded) supplied in various regions of Delhi and NCR.

METHODOLOGY

30 milk samples (open and branded) were collected in 50 ml falcon tube under aseptic conditions from different regions of Delhi and NCR (Noida, Gurgaon), India. The samples were coded and qualitatively tested for adulteration with neutralizers, various sugars, and skimmed milk powder (SMP). Also, the pH of the milk samples was tested. All these tests were carried out with the milk adulteration kit manufactured by HIMEDIA Laboratories, Mumbai. Each test was carried out in duplicates. The tests were carried out at room temperature (25°C).

RESULTS

All the milk samples collected from Delhi as well as NCR (open and branded) were found to be alkaline showing varying degree of alkalinity (data not shown). Neutralizers were present in 73.3% samples and skimmed milk powder in 10% samples (Fig. 1). All the samples tested negative for glucose and starch, whereas, cane sugar and maltose were present in all the collected samples (open as well as branded).

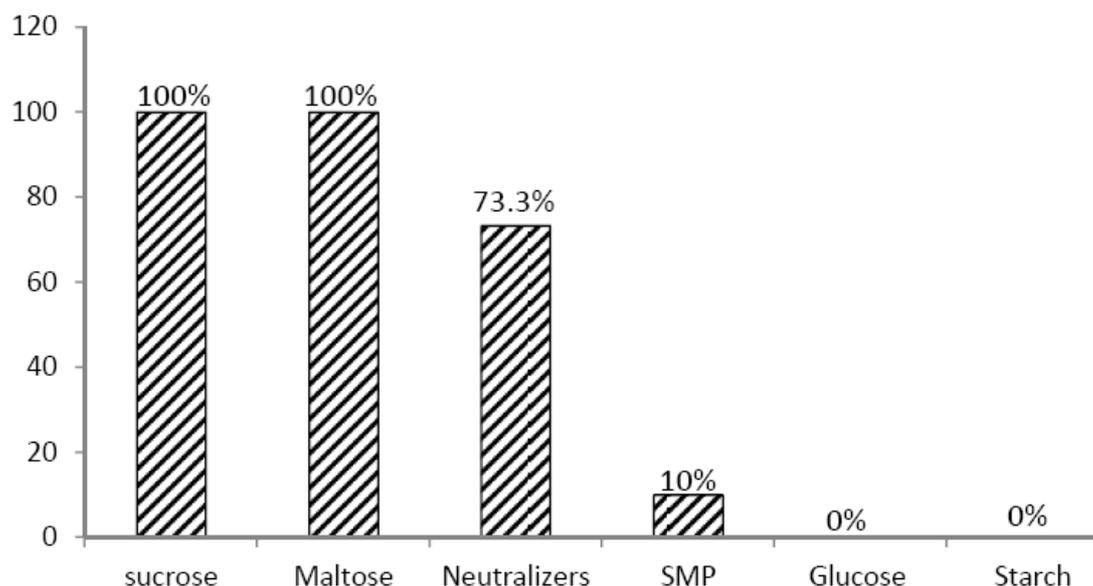


Figure 1. Percentage of Milk samples from Delhi and NCR showing various adulterants. Thirty samples obtained from different regions were tested for the adulterants. The number of samples that tested positive were calculated as percentage of the total number of samples analyzed (n=30).

DISCUSSION

Normal milk has a pH of 6.7 (8). However, all the milk samples that were tested from Delhi and NCR were alkaline in nature. Similarly, all the samples tested from Hyderabad showed alkalinity (16). Alkalinity generally results from adulteration of milk with neutralizers/stabilizers. Usually neutralizers are added to prevent curdling and thereby, increase the shelf life of milk. 73.3% of the milk tested from Delhi and NCR contained neutralizers (Fig.1) In many regions of Pakistan and India, milk has been reported to be adulterated with caustic soda, sodium carbonate and sodium bicarbonate to neutralize the pH and acidity of milk by the milk traders (2, 4, 7,16).

Milk primarily contains lactose sugar (14). The lactose gives milk its sweet taste. However, in all the samples tested, presence of sucrose/cane sugar was observed (Fig.1). The presence of cane sugar in milk has been reported from many regions of India as well as Pakistan (11; 4; 16). Also poor quality glucose has been reported in many studies (13, 4). However, similar to the study in Hyderabad, in all the samples we tested from Delhi and NCR, glucose was absent. Surprisingly, maltose which has never been reported as an adulterant earlier in milk was found to be uniformly present in all the samples from Delhi, Gurgaon and Noida. Usually, sugars other than lactose are added to give diluted milk its characteristic sweetness and also increase the thickness of milk to adjust the lactometer reading.

Starch is another common carbohydrate adulterant that has been reported in milk samples from different places (3,4). High amount of starch may cause diarrhea and its accumulation may be problematic in patients detected with diabetes. However, adulteration with starch was not observed in any samples from Delhi or NCR.(16) had also reported the absence of starch in samples collected from Hyderabad, India.

According to the law, the addition of skimmed milk powder (SMP) to pure milk is an offence. Cheap skimmed milk powder is usually added to increase the SNF (solid not fat) value of diluted milk. 10% samples tested positive for the presence of SMP(Fig.1). Interestingly, 3 branded milk samples procured from Gurgaon, Noida and West Delhi were found to be adulterated with SMP. Recently, a snap shot survey was conducted by FSSAI (Food Safety and Standard Authority of India) at the national level to assess the quality of milk and 44.69% samples contained skimmed milk powder (2014). Also, a recent study in 2014 reported that 80% milk samples in Hyderabad were adulterated with SMP (16).

CONCLUSION

Milk is an important component of human diet, especially of growing children, pregnant women and patients. Thus adulteration of milk poses a serious threat. In this preliminary study, most of the milk samples from Delhi and NCR were found to be non-conforming to the standards laid down by FSSAI. The only remedy to this persistent problem is to create awareness among consumers regarding their rights. The consumer can get milk (food) analyzed, as per section 40 and 42 of Food Safety and Standards Acts, 2006 and Section 2.2.4 of the Food safety and Standards Rules, 2011.

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