

Increasing adulteration in milk as synthetic milk and methods for their detection

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There are increasing foul practices in different part of country for the preparation of synthetic milk. The composition of milk is well known so people involved in making such milk are mixing various harmful chemicals such as urea (to increase milk life), sodium bicarbonate detergent, vegetable oil, glucose and sodium salt to falsify the detection of milk from lactometer. As we can see from various reports that urea is present naturally in cow (35%) buffalo (50%) but sodium bicarbonate addition also falsifies the change in pH. there is no lactose, no real galactose but if they had mixed then one can detect the presence of lactose and galactose as well but apart from this there is tremendous increase in urea composition which can be easily detected and can't be hidden anyways. This is also one of the most dangerous composition which is not only harmful for children, growing babies or mothers and other patients. So it's essential to concentrate on urea for detection of synthetic milk. Several reports on urea estimation in milk based on enzyme-coupled electrode, infrared spectroscopy (IRS), flow injection and segmented flow methods, coupled with the colour reaction of diacetyl monoxime, have been published. However most of these methods cannot be performed in laboratories where major instrumental facilities are available.

Synthetic milk is an excellent imitation of natural milk. Milk fat is mimicked by vegetable oil. The nitrogen component in milk is mimicked by urea; detergents are added to make it frothy. This mixture is so expertly prepared that the specific gravity of the concocted milk is the same as natural buffalo

milk. This mixture is then mixed with natural milk in varying proportions. Such milk can be processed into "value added" products which bring in a bigger profit.

A recent Indian council of medical research (ICMR) report has suggested that such adulterated items have a cancerous effect on the human system and can lead to gradual impairment of the body. Milk is a complex mixture of water, lactose, fat, protein, minerals and vitamins distributed throughout colloidal and soluble phases. Although the cow is the principle source of milk for human consumption in the United States and many other parts of the world (DePeters 1992). In India most milk is obtained from buffalo. The composition of milk from buffalo is water (82.14%), fat (7.44%), protein (4.78%), lactose (4.8%) and ash (0.83%) (Rangappa and Achary, 1973).

According to one report (Aurora *et al.*, 2004) among leading study states for adulteration Rajasthan was having comparatively more adulterants (50%) than Delhi 39% than Haryana 37% than Punjab 25% out of 321 sample study. Not only the private sector is involved in such practices rather than may public sector is involved in maintaining minimum substandard quality of milk. According to the recent report of S. R. Bhatt *et al* 2009 many parts of Northern India (Meerut, Bulandshahar, Mathura and Varanasi) are having such practices well in both rural and urban areas while most of the children in these areas were affected by diarrhea and some were having eye sight problems. In this study the mean intake of children of age group 1-5 years was 156.42 ml/day, of age group 6-18 years was 500 ml/day, and children of age group 19-22 years consume milk on an average of 800 ml/day. The highest urea and detergent was detected in Meerut region in city area compared to (12.5%) in rural areas, while in Mathura it was

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32% in the city as compared to 11% in rural areas, and in Bulandshahar it was 18% in the city as compared to 11% in rural areas, while lowest concentration detected in Varanasi 10% in the city as compared to only 8% in rural areas. Detection of synthetic milk from natural milk can be done by the very simple method as observed below.

- Synthetic milk turns dark yellow in keeping for 3-6 hours while natural milk turns light faint yellow.
- Synthetic milk is more slippery in touch while natural milk is not slippery.
- Synthetic milk has bitter taste while, natural milk is not bitter.
- Synthetic milk on keeping in freeze forms an oily layer on the top of milk due to the presence of oil which floats over water while no such appearance occurs in natural milk.
- Synthetic milk makes a bad smell with dark yellow colour after storing for long hours but no such pungent bad smell appears in natural milk.

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