



## Milk adulteration: A chronic fear of real time

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**Abstract:** Milk is a vital commodity in every day existence. It isn't always only a source of accurate first-rate protein, however additionally of calcium and riboflavin besides other vitamins. Milk being a complex mixture and a liquid food can easily be adulterated. According to PFA-1954 (prevention of food adulteration act) definition, "Milk is the normal mammary secretion derived from complete milking of healthy milch animal without either addition thereto or extraction there from." Milk contains more than 100 substances that are either in solution, suspension or emulsion in water, the important being casein - the major protein of milk, lactose - milk sugar, whey and mineral salts. Because of regulations laid through FSSAI, maximum of the milk products follow suitable nice within the marketed merchandise but still some adulterations have been observed through the course of time. However, merchandise to growth the yield certain adulterants are introduced which might also have an effect on the nutritional best of milk. The adulteration has been located by and large in milk, curd, Butter and Ghee having water content being extra, but in few samples urea and starch was also discovered. For this reason, the write up truly brings the reality that milk and milk products might be adulterated.

**Key words:** Milk; water; adulteration; adulterated milk; human health.

### Introduction

Milk is an almost ideal food. It has high nutritive value. It supplies body building proteins, bone forming minerals and health giving vitamins and furnishes energy giving lactose and milk fat. Milk in its natural form has high nutrient value. It's nutrients like proteins, fats, carbohydrates and minerals present in slight amount is found in an easily digestible form. Due to its nutritive value, milk is of importance to young and old human beings. The composition of milk varies extensively with the breed of cow, level of lactation, feed, seasons, and plenty of other elements. but, some relationships among ingredients are very strong and may be used to suggest whether any tampering with the milk composition has befallen. A national survey in India has revealed that almost 70% of the milk sold and consumed in India is adulterated with the aid of contaminants which include detergent and skim milk powder, but impure water is the major adulterant found.

From the public fitness point of view, the Government of India promulgated the prevention of food adulteration act (PFA act) in 1954. The act came into pressure for the primary time in 1955. It prohibits the manufacture, sale and distribution of not most effective adulterated foods but also foods infected with toxicants.

As per National Survey on Milk Adulteration performed by FSSAI (India) in 2011, water is the most commonplace adulterant accompanied through detergent in milk. As per survey by FSSAI in 2012, 68% milk samples were adulterated in which 31% were from rural areas. Out of these 16.7% were packet or branded

milk and rest have been free milk samples from dairies. (Ritambhara Singh, 2012)<sup>1</sup>. Within the urban regions, 68.9% milk was adulterated with water, detergent, urea and skim milk powder. In Uttarakhand, 88% milk becomes located to be adulterated. No matter the legal guidelines governing the pleasant and sale of milk current in India for decades, the adulteration of milk has now not been checked completely.

Milk adulteration has been widely seen in developing nations inclusive of Pakistan, Brazil, India, and China (Xiu and Klein, 2010)<sup>2</sup> (Faraz *et al.*, 2013; Shaikh *et al.*, 2013; Mu *et al.*, 2014; Singuluri and Sukumaran 2014)<sup>3</sup>. One of the oldest and major types of milk fraud is thru the addition of variable volumes of water to artificially increase its extent for extra profit; this may notably decrease the nutritional price of milk, and if the water brought is infected there is a hazard to human health due to capability waterborne sicknesses (Kandpal *et al.*, 2012)<sup>4</sup>. To the diluted milk, adulterants along with skim milk powder, reconstituted milk, urea, rice flour, salt, starch, glucose, vegetable oil, animal fat, melamine, and whey powder can be brought to increase the thickness and viscosity of the milk, and to keep the composition of fat, carbohydrate, and/or protein (Campos Motta *et al.*, 2014)<sup>5</sup>. Milk is a perishable commodity so there lies possibility to get spoiled in the course of transportation, in particular in summer months if powerful refrigeration isn't always available. Therefore, ice (which can be infected itself) and a few chemical substances including sodium bicarbonate, sodium carbonate, calcium hydroxide, caustic soda (sodium hydroxide), or chemical

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formalin are added to increase the shelf-lifestyles (Afzal *et al.*, 2011)<sup>6</sup>, (Akhtar *et al.*, 2015)<sup>7</sup>. Further, detergents are delivered to beautify the cosmetic nature of milk because the foamy look diminishes when diluted with water. Calcium thioglycolate, potassium thioglycolate, or calcium salts of thioglycolic acid have been introduced to provide whiteness in milk and to offer it a true appearance (Soomro *et al.*, 2014)<sup>8</sup>.

In India, adulterated and artificial milk troubles have been extensively stated within the mass media and this has been supported via reports from scientists and authorities' government (Lipp and Moore, 2013)<sup>9</sup>. Bhatt *et al.*, (2008)<sup>10</sup> surveyed a complete of 365 families in Uttar Pradesh, India, to quantify their children's daily consumption of milk, analyze milk samples from their household to check for the presence of urea, vegetable oil, and detergent, and to determine their effect on fitness. In general, 365 children were surveyed; 70 youngsters have been of the age group 1 to five yrs, a hundred and fifty have been aged 6 to 18 yrs, and a hundred forty-five were 19 to 22 yrs. Further, a hundred and sixty samples of milk have been accrued from specific neighborhood market vendors and stalls. The suggest consumption of milk with the aid of kids of the age group 1 to 5 yrs become 160 mL/d, for the age organization of 6 to 18 yrs it become 500 mL/d, and for the age group of nineteen to 22 yrs it become 800 mL/d. Fraud detection in milk samples with urea and detergent ranged from 8% in rural regions to as excessive as 40% in city regions. The maximum common place issues pronounced many of the youngsters surveyed were in relation to eyesight, diarrhea, and complications. Inside the age group of 1 to 5 yrs maximum of the youngsters were dependent on their mom's milk and consequently they showed the least impact on their fitness. Within the age group of 6 to 18, 28% of city youngsters have been stricken by headache, while best 4% of rural kids had been affected.

### Human health and milk adulteration

Some of the adulterants and malpractices related to milk production have brought on public health issues and malnutrition. The addition of water to milk decreases its nutritional price; for toddlers and kids this can be a critical subject as they are at an essential degree of growth and development and are dependent on milk merchandise for components of essential vitamins and so may be vulnerable to malnutrition. Indicators of undernourishment are manifested as baby-stunting, underweight, wasting, and vitamins-related infant mortality (FAO, 2013)<sup>11</sup>, (FAO, 2012)<sup>12</sup>. In China's "massive head ailment" scandal in 2004, after toddlers were fed a fake formula they rapidly misplaced weight. The toddlers have been said to have advanced "large head ailment," that is a symptom of acute malnutrition, describing the lack of flesh on the limbs and torso, which appear to shrink in contrast with the cranium (BBC news 2004)<sup>13</sup>. A further situation about the water used to dilute milk is that additionally it is received from a risky and less expensive supply and may be

contaminated with heavy metals, agricultural chemicals, or microorganisms. (BBC news, 2009)<sup>14</sup>. If milk of such bad general is consumed it poses an extreme danger to the health of its customers (Kandpal *et al.*, 2012).

If the water used in the adulterated milk is infected by pathogens, then this could nicely result in infective diarrhea in children, which can hamper their boom and development except offering them with less energy. Agriculture is a further source of chemical infection, with nitrate being the primary contaminant. Nitrate can purpose methemoglobinemia, or blue-infant syndrome, in method-fed toddlers less than 3 mo of age (Fawell and Nieuwenhuijsen 2003; Fernández-Luqueño *et al.*, 2013; Mudgil and Barak 2013)<sup>15</sup>

### Conclusion

The high nutritional value of milk and its relative low cost in comparison with other protein sources has made it form a major part of the diet of many populations globally. But, accelerating demand globally has made milk at risk of big ranges of fraudulent activity. Milk is an excessive - threat commodity of subject for fraudulent sports for monetary benefit whereby perpetrators may additionally increase food protection hazards and lessen nutritional first-rate thru intentional adulteration and/or malpractice beneath poor hygiene conditions, a loss of preservation, and no cooling centers. Milk used for human consumption can be adulterated with inferior, cheaper substances or hazardous chemical compounds, consisting of pond water, reconstituted milk powder, cane sugar, urea, melamine, glucose, and detergents. Milk can be adulterated to such an extent that there may be significantly less nutritional cost and it is able to additionally be toxic for public fitness, as proven in latest milk fraud scandals. Hence, more analysis is critical to generate attention about malpractices or negligence in milk production.

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