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MILK ADULTERATION – A REVIEW

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ABSTRACT

Milk adulteration is a common social problem in today. Apart from the ethical and economical issue, it also creates health hazards. Some of them may cause renal disease, skin disease, eye and heart problem or it may lead to cancer. So, for preventing these, detection and control of milk adulteration is very important. It is a common practice by the milk supplier to add water. Addition of water changes specific gravity of the milk and its natural color gets destroyed. To compensate specific gravity, different types of salt and sugar are used. Chemical adulterants are used for various purposes. The common adulterants are starch, urea, sugar, formalin, peroxides etc. Many studies on milk adulteration and detection have been carried out in different part of India. The present work will give a clear picture of the quality of milk available from the local market and this review tries to view the different adulterations in the milk samples. By this we can give awareness to the public.

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INTRODUCTION

Milk is the lacteal secretion produced from the mammary glands of the mammals^[1]. Milk in its natural form has very high food value. It gives nutrients like carbohydrates, vitamins, fat, protein and minerals in moderate amount in an easily digestible form. The important being casein, the major protein of milk lactose the milk sugar and mineral salts^[2]. The food guide pyramid gives an idea about how much amount of dairy based commodities must be served by an adult a day; it is 2-3 servings. Wholesome milk is the choice of every consumer, so the quality of the milk can be maintained only by securing its purity and cleanliness. Good quality milk is necessary for quality dairy products.^[3] Milk is a delicate commodity, which will get spoiled with the change in environment. In order to keep it fresh some unethical practices are done widely. Mainly these kinds of actions are done for the financial benefit and to prevent the damage during the transportation^[4]. Milk adulteration is an act of intentionally debasing the quality of food offered for sale either by admixture with or substitution of inferior substances or by the removal of some valuable ingredients^[5]. The nature of adulterants generally encountered in milk and milk products are water, removal of fat, addition of skim milk powder, thickening agents such as starch, flour, glucose, urea, salt, chlorine. Preservatives such as neutralizers which usually consists of sodium bicarbonate, sodium carbonate, sodium hydroxide and calcium hydroxide. Some rare case includes animal fats, aflatoxins and vegetable oils^[2]. India is a country which uses so many milk products and milk as such in diet. In the last few decades many reports have been published on adulteration of milk.

Water is the most common adulterant always added to increase the volume of milk. It will decrease the nutritive value of milk. Contaminated water used for adulteration, poses a health risk especially to infants.^[2, 6] Addition of water changes specific gravity of the milk and its natural color will also get changed. To detect water in milk lactometer is the mostly used scientific instrument. Formalin is a potentially hazardous toxic chemical. It is a potential carcinogenic. Formalin is mainly added to increase the shelf life of milk sample.^[3, 4] Chemical adulterants are used for different purposes. The common adulterants are starch, hydrated lime, sodium carbonate, formalin and ammonium sulfate. Sometime synthetic milk is prepared by mixing urea, caustic soda, refined oil, urea and detergents which has poisonous effect. A large number of research articles have been published on milk adulteration and detection, including some review papers.^[7] This paper tries to review from a different point of view by identifying different milk adulterants and the health hazards related to the adulteration.

Present status of milk adulteration:

Major percentage of natural milk contains water, but milk with added water is a serious concern to the milk consuming community.^[8] In one hand it decreases the nutritious value; on the other hand chemicals are added to compensate the density and color after dilution with water. Since addition of water is the easiest way of adulteration of milk, so a variety of techniques are also available for its detection. In a study that was done in Faisalabad shows about 93-97% of the samples were adulterated with water.^[9] Water content in milk is measured by hydrogen ion concentration which is based on the principle that milk with added water will become less acidic. The other method to determine the additional water content in milk is freezing point detection and density analysis by milk analyzer lacto scan. The basic principle is that milk diluted with more water freezes quickly and gives different readings at the output.^[6] Urea provides whiteness, increase the consistency of milk and for leveling the contents of SNF as are present in the natural milk.^[10]

In a study done in Andrapradesh some of the samples showed positive results for urea adulteration.^[4] The results of this study were correlated with the Remya et.al^[11]. Not only in milk but also the presence of urea as adulterant have been reported in other dairy items like Curd, Buttermilk, Butter and Ghee^[12, 13]. Starch and sugar were added to increase the thickness of milk after addition of water. Cane sugar is the commonly used sugar to adulterate the milk. Because sucrose is absent in the milk.^[9] The unethical use of these adulterants will lead to some serious health issues. If high amount of starch is consumed this can cause diarrhea due to the effects of undigested starch in colon, also the accumulation of cane sugar may prove fatal to diabetic patients.^[2, 14]

Peroxide and formalin are generally used to preserve shelf life of milk; presence of detergents on the other hand can be due to low maintenance of milk tanks while preparation or it can be used to mask fat value of milk^[2]. The presence of the formalin was reported earlier^[15, 16]. The presence of formalin may cause abdominal pain, elevated blood pressure, weak irregular pulse and it is a potent carcinogen^[17]; in some places the adulteration with hydrogen peroxide were found.

CONCLUSION

The milk available from the market in India must be analyzed thoroughly. Because India is such a country in which milk and milk products play an important role in different food items. Even though we have a good regulatory body, FSSAI, the analysis of large number of samples is found to be inefficient. This review gives a clear picture of milk adulteration inside and outside India. So stringent measures must be taken to control the adulteration that is harmful. The work that is going to be done in the light of this review will give the quality status of the milk that is available from the local market. Milk cannot be completely removed from the diet also all could not get the milk directly from the cattle. Thus the analysis of milk and milk products available in the market should be done and ensure those of good quality. Thus we can also contribute something to the future society.

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