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## “NEED OF CHECKING MILK ADULTERATION BEFORE CONSUMING”

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### **Abstract**

*Milk is the daily routine food consumed by human being all around the world as a good source of nutrient. The objective of present study is to collect the fresh raw milk from source Indian cow belonging to Chandrapur district polluted zone of mahashtra. Analysis of the entire sample was done by referring a manual of food safety and standards authority of Indian ministry of health and family welfare government of India New Delhi. Final outcome of result is that milk adulteration is social problem. It exist both in the backward and advanced countries. Consumption of adulteration milk causes serious health problems so there is a need of checking milk adulteration before consuming”*

**Keywords:** milk, analysis, formalin, cow etc.

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### **Introduction**

Milk is a nutrient-rich liquid food produced by mammary glands of mammals. It is the primary source of nutrition for young mammals including breastfed human infants [1]. Early-lactation milk, which is called colostrum, contains antibodies that strengthen the immune system, and thus reduces the risk of many diseases. Milk contains many other nutrients, including protein and lactose [2]. Adulteration is the act of addition of substances to a product that makes it unfit for consumption. These impurities are added to substitute the contents of a product at a cheaper rate to increase the quantity [3]. Milk adulteration is one of the most common and old form of adulteration. This is because India is the largest country in milk production and consumption according to WSPA (World Society for the Protection of animals) and the National Dairy Development Board, India. As the population increases, the demand will increase because there will be more mouths to feed. To meet the exponentially increasing demand, adulteration is being employed on regular basis [3]. Adulteration not only includes the intentional addition or substitution of materials but also the incidental

contamination during the process of preparation, storage and transportation. Adulterated food has adverse effects on health because of the toxic nature of the substituting compounds or lack of compounds of nutritional value.[3]. To increase the storage capacity of milk formalin is added as preservatives. Milk may contain the harmful bacteria and quality of milk can be check by methylene blue reduction test. To reduce the fat content of milk sugar and starch are added as an adulterant. Another adulterant is ammonium sulphate which increases the reading of lactometer. Another milk adulterant such as peroxide which causes the gastrointestinal complications [4]. One of the most important adulterant starch added which may cause severe stomach problems. Added urea may affect the kidney. Research study also shows that milk is also adulterated with water and oil [5]. Casein is one of the important proteins isolated from milk in various industries. Generally casein is present in milk as in complex form micelle [6] and is very hard to digest. Indian cow milk was found best according to this study when compared with the milk samples i.e. Buffalo and jersey cow. Milk is also contaminated with microbes so quality of milk should be

checked before consuming [7]. Water is the major source of adulteration of milk [8].

The chemical compounds which are added to the milk may increase the risk of health. Following adulteration are added, such as starch is one such component that is added to adulterate milk. The starch in milk was detected by using iodine solution, addition of which turns the milk solution to blue black colour due to formation of starch iodo complex. Quaternary ammonium compounds added in milk to control *Listeria monocytogenes* is the pathogenic bacteria which causes infection listeriosis. Added sodium chloride in milk is practiced with the aim of increasing the density of milk as well as the ash content in milk which has been adulterated with water. Nitrate is a polyatomic ion with the chemical formula  $\text{NO}_3^-$ .

Salts containing this ion are called nitrates. Nitrates are common components of fertilizers and explosive [9]. Nitrites and nitrates are used to enhance flavour and prevent microbial growth in food but it may increase risk of gastro intestinal cancer and chronic obstructive pulmonary disease. WHO has set the acceptable daily intake for the nitrate ion at 3.7 mg/kg of body weight and for the nitrite ion at 0.06 mg/kg of body weight. Formalin is a potentially hazardous toxic or injurious substance. It is a potent carcinogen [10] and an elevated dose of formalin can cause diarrhoea, vomiting and abdominal pain. It may also disturb the optic nerves and may cause blindness [11]. It is added to fresh milk as it could prevent curdling for days, the same way it

**Experimental Section**

## II Materials and methods: Chemical analysis

**Test for starch:** 5 mL of milk was taken in a test tube boiled it and then added 1-2 drops of iodine appearance of blue colour indicates presence of starch.

### **Test for cane sugar:**

10 mL of milk was taken in a test tube to that 5 mL of sodium hydrochloric acid and 1 gm of resorcinol was added and test tube was placed in boiling water appearance of

could preserve dead bodies. Hydrogen peroxide is chemical compound with the formula  $\text{H}_2\text{O}_2$ . Hydrogen peroxide is widely used for disinfection purposes by food industry enterprises. And it can be used as to sterilize the packaging of dairy products [12]. In some countries hydrogen peroxide is added to milk as an adulterant for shelf life extension. Hydrogen peroxide usually is not dangerous but at higher concentration it can create irritation to eyes and skin. Chloramines are a compound of chlorine and ammonia. It is quick in dissolving with the water. It serves as an alternative of chlorine to purify city water. More than 22% of United States municipal water treatment facilities use it. Chloramines can cause and aggravate respiratory problems. Chloramines fumes can cause an individual to become congested and causes sneezing, sinus congestion, coughing, choking, wheezing, shortness of breath and asthma.

Generally acid like benzoic acid and salicylic acid is used as preservation in food industry. It is added to milk preserve and thus increase the shelf life to milk. Milk after it is pasteurized. And these pasteurized milk in our home, when milk is pasteurized it is made safe by heating it just long enough to kill the diseases-causing germs.

Most nutrients remain in can stored in the refrigerator. So to check the adulteration we collect the sample of cow milk belonging to Chandrapur zone and it was tested by referring the manual of food safety and standards authority of Indian ministry of health and family welfare government of India New Delhi.

red colour indicates presence of cane sugar.

### **Test for ammonium compound:**

**Method-I:** To 1mL of milk 2% 0.5 ml of NaOH and sodium hypochloride and 0.5 ml of 5% of phenol was added and heated for 20 min. appearance of blue colour indicates presence of ammonium compound.

**Method-II:** 1-2 drops of nessler reagent was added to 1 mL of milk appearance of

grey colour indicates presence of ammonium compound.

**Test for sodium chloride:** To 1ml of milk 5 mL of silver nitrates along with 1-2 drops of potassium dichromate yellow colour appearance indicates presence of sodium chloride.

**Test for nitrates:** To 1 mL of milk 1-2 drops of diphenylamine was added appearance of blue colour indicates presence of nitrates.

**Test for hypochlorites and chloriammine:** To 5 mL of milk 1.5 mL of KI was added this solution was added further to 4 mL diluted HCl which was heated for ten minutes and cold water was added to this solution 1 mL of starch was added appearance of yellow colour indicates presence of hypochlorites and chloriammine.

**Test for formalin:** To 5 mL of milk 5 mL  $\text{H}_2\text{SO}_4$  and ferric chloride was added appearance of purple colour indicates presence of formalin

**Test for hydrogen peroxide:**

**Method-I:** To 5 ml of milk 3 drops of p-phenyldiammine was added appearance of blue colour indicates presence of hydrogen peroxide.

**Method-II:** To 5 mL of milk 3 drops of vanadium pentaoxide was added appearance of pink to red colour indicates presence of hydrogen peroxide.

**Test for benzoic acid and salicylic acid:**

To 5 mL of milk 3-4 drops of conc.  $\text{H}_2\text{SO}_4$  was added and 0.5% of  $\text{FeCl}_3$  was added appearance of buff colour indicates presence of benzoic acid and salicylic acid

Adulterants	IndianCowMilk	
Starch		-
CaneSugar		-
Ammonium Compound	Method-I	-
	Method-II	+
SodiumChloride		-
Nitrates		-
Hypochlorite and Chloramine		-
HydrogenPeroxide	Method-I	-
	Method-II	-
Benzoicacid and salicylic acid		+

Interpretation Table 1: Chemical analysis for raw milk.



Figure showing some results of chemical analysis of selected milk samples

### Results and Discussion

Milk adulteration of milk is social problem. It exist both in the backward and advanced countries. Consumption of adulteration milk causes serious health problems and a great concern to the food industry. A large number of research papers have been published to check milk adulteration. Our present milk analysis show the sample is positive for Ammonium Compound and Benzoic acid and salicylic acid (**Table I**).

### Conclusion

Present study reveals that before consuming milk it should be tested by proper authority before distribution.

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