



Full Length Research Article

DETECTION OF FEW ADULTERANTS IN SAMPLES OF MILK COLLECTED FROM ANIMAL OWNER IN FRONT OF ME AND STALL VENDOR'S AT BIKANER

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ABSTRACT

Milk has been part of the human diet for millennia and is valued as a natural and traditional food. Milk in its natural form has a high nutritive value as it is a good source of quality proteins, fats, carbohydrates, vitamins and minerals. Quality control tests for milk are very important to assure adulterant free milk for consumption. In this paper detection of some common adulterants such as Starch, NaCl, Cane Sugar, Soda, Ammonium component and Formalin in milk samples collected from animal owner and local vendors have been discussed. It has been found that formalin was detected in all samples. Whereas in authoritative samples common adulterants were absent while in the samples collected from local vendors. NaCl, starch and cane sugar was found quite often in more than 4 samples and in 2 samples soda, ammonium components have also been detected.

Key words: Milk, Adulterants, Proteins, Fats, Carbohydrates, Vitamins, Minerals and Ammonium component.

INTRODUCTION

Milk is an essential commodity in daily life. It is not only a source of good quality protein, but also of calcium and riboflavin besides other nutrients. Milk in its natural form has high food value. It supplies nutrients like proteins, fat, carbohydrates, vitamins and minerals in moderate amounts in an easily digestible form. Due to its nutritive value, milk is significant to young and old people (Hemanth Singuluri and Sukumaran, 2014; Swathi and Naazia Kauser, 2015; Geeta Kumari Wasupalli *et al.*, 2015). It is easily digestible and hence is readily absorbed. Milk proteins also supply amino acids needed for the proper growth of adults and infants (Afzal *et al.*, 2011). Milk is a complex mixture and a liquid food, which can easily be adulterated. According to prevention of food adulteration act-1954 definition, "Milk is the normal mammary secretion derived from complete milking of healthy milch animal without either addition thereto or extraction there from. Quality control tests for milk are very important to assure adulterant free milk for consumption (Jivraj Makadiya and Astha Pandey, 2015). Adulteration of milk reduces the quality of milk and can even make it hazardous. Adulterants like soda, starch, cane sugar, ammonium components and formalin may be added to the milk. Most of the chemicals

used as adulterants are poisonous and cause health hazards. Adulterants are mainly added to increase the shelf life of milk. Some of the preservatives like acid and formalin are added to the milk as adulterants, thereby increasing the storage period of milk. Generally, Water is an adulterant in milk which is often always added to increase the volume of milk which in turn decreases the nutritive value of milk which if contaminated poses a health risk especially to infants and children (Ahmad, 2009; Mohamed Mansour El-Loly *et al.*, 2013; Ebadi and Shokrzadeh, 2006). Milk is the only substance which gives life to infants. The first food for survival comes from milk so basically we call it life. Every infant starts journey from milk being fed by mother milk, cow milk, buffalo milk or packaged, it is a birth right of every human to have hygiene food. The present case study carried out keeping in view the recent increasing trends of adulterations which poses inimical effects on human health.

MATERIALS AND METHODS

Milk samples

In order to get large number of available vendors in the local market of Bikaner two types of samples were collected. One from animal owner and lactation was performed in front of me in order to get purity of the sample. Other from the stall vendor's.

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Methods of Determination

There are many methods known for detection of adulteration in milk but the methods discussed below are simple but rapid and sensitive methods to detect adulteration. Analysis was performed simultaneously (Brendon D. Gill and Harvey E. Indyk, 2008).

Detection of starch as adulterant in milk

5 ml milk sample was taken in a test tube. 1 to 2 drops of iodine solution was added into it. Appearance of blue colour indicates the presence of starch in milk.

Detection of NaCl as adulterant in milk

1 ml milk sample was taken in a test tube. 0.1 ml 5% potassium chromate solution and 5 ml 0.1 N silver nitrate solution was added into it. Appearance of yellow precipitate indicates the presence of NaCl in milk.

Detection of cane sugar as adulterant in milk

10 ml milk sample was taken in a test tube. 1 ml conc. HCl solution and 0.1 g resorcinol powder was added into it and mix thoroughly. Test tube was placed in a boiling water bath for 5 min. Appearance of red colour indicates the presence of cane sugar in milk.

Detection of ammonium component as adulterant in milk

1 ml milk sample was taken in a test tube. 2 ml nessler reagent was added into it and mix well. Appearance of yellowish brown colour indicates the presence of ammonium component in milk (Banupriya *et al.*, 2014; Eman *et al.*, 2015; Haasnoot *et al.*, 2004).

Detection of ammonium sulphate as adulterant in milk

1 ml milk sample was taken in a test tube. 0.5 ml 2% NaOH solution, 0.5 ml 2% sodium hypochlorite and 0.5 ml 5% phenol solution was added into it and heat for 20 sec in a boiling water bath. Appearance of bluish colour indicates the presence of ammonium sulphate in milk (Kamao *et al.*, 2007; Laleye *et al.*, 2008).

RESULTS AND DISCUSSION

In Table 1 analysis of milk samples collected directly from owner and powdered samples have been reported while in Table 2 analysis of milk samples collected from local vendor have been given. It has been found that formalin was detected in all samples. Whereas in authoritative samples common adulterants were absent while in the samples collected from local vendors. NaCl, starch and cane sugar was found quite often in more than 4 samples and in 2 samples soda, ammonium components have also been detected.

Table 1. Adulterants in various samples of milk (Collected from in front of me)

S. No.	Milk Sample	Starch	NaCl	Cane sugar	Formalin	Soda	Ammonium component	Ammonium sulphate
1.	Buffalo milk	-	-	-	+	-	-	-
2.	Camel milk	-	-	-	+	-	-	-
3.	Cow milk	-	-	-	+	-	-	-
4.	Goat milk	-	-	-	+	-	-	-
5.	Powdered milk	-	-	-	+	+	-	-
6.	Soya milk	-	-	-	+	-	-	-

- = Not Detected in Milk
+ = Detected in Milk

Table 2. Adulterants in various samples of milk (Collected from local vendors)

S.No.	Milk Sample	Starch	NaCl	Cane sugar	Formalin	Soda	Ammonium component	Ammonium sulphate
1.	A	-	-	-	+	-	-	-
2.	B	-	-	-	+	-	-	-
3.	C	+	+	+	+	-	-	-
4.	D	+	+	+	+	-	-	-
5.	E	-	-	-	+	-	-	-
6.	F	-	-	-	+	-	-	-
7.	G	-	-	-	+	-	-	-
8.	H	-	-	-	+	-	-	-
9.	I	+	+	+	+	-	-	-
10	J	-	-	-	+	+	+	+

- = Not Detected in Milk
+ = Detected in Milk

Detection of Formalin as adulterant in milk

10 ml milk sample was taken in a test tube. 0.5 ml FeCl₃ solution and 5 ml conc. H₂SO₄ was added into it. Appearance of violet colour of the ring formed at the junction of the two liquids indicate the presence of formalin in milk.

Detection of Soda as adulterant in milk

2 ml milk sample was taken in a test tube. 2 ml 0.05% rosolic acid solution in alcohol was added into it. Appearance of rose red colour indicates the presence of soda in milk.

Conclusion

On the basis of data obtained in the present study, conclusion may be drawn that milk quality is not completely as per standards and adulteration in milk is still in practice and has not been checked completely. Most common adulterants which were found in all milk samples was formalin. The present research work is useful to the forensic fraternity receiving the milk samples in the lab to check the adulterant.

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