FOOD SCIENCE RESEARCH JOURNAL;
Volume 2 Issue 1
(April, 2011) Page : 46-49

RESEARCH ARTICLE

Received : January, 2011; Accepted : March, 2011

Detection of ill-effects of urea adulterated milk in Varanasi

ANITA SINGH, JUHI SHARMA AND SHUCHI RAI BHATT

ABSTRACT

Urea in adulterated milk is one of the major health concern, it is especially harmful to pregnant women, children, and the sick. A sophisticated and reliable detection system is needed to replace current diagnostic tools for the urea in the milk. Samples of urea adulterated milk were analysed and their effect is assayed through survey in different parts of Varanasi (Uttar Pradesh). Children of age group 1-5 years consumes about 50-250 mg of milk daily, while of age group 6-18 years of children consumes about 250-1000 ml milk/day and children of age group 19-22 years consumes milk about 500-1000 ml/day. Addition of urea is on large scale creating huge problems of headache, eyesight and diarrhoea in children.

Singh, Anita, Sharma, Juhi and Bhatt, Shuchi Rai (2011). Detection of ill-effects of urea adulterated milk in Varanasi, *Food Sci. Res. J.,* **2** (1) : 46-49.

Key words : Urea adulterated milk, Health, Problems, Children

INTRODUCTION

Food adulteration is a crucial problem faced by human population today. Adulteration of food is commonly practiced by traders in India, it poses a major threat to human health. Food is the fuel of life. If the fuel is adulterated, there is no salvation for the consumer, whether, it is a human being, or a vehicle. Food adulteration, which is an act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by the removal of some valuable ingredient, it is something which has been rampant in our country. This is, despite of the existence of a stringent law against food adulteration. It might appear astonishing, but it has been prevalent from ancient times all over the world. Thousands of litres of adulterated milk mixed with chemicals with deadly health effects are making their way every day. Standard quality tests have proved inadequate for identifying such milk. Criminals running illegal but very profitable dairies and a host of individual milkmen extract fat (cream) from natural milk and then mix urea, caustic soda, detergents and formalin - which causes irreparable damage to body organs and can sometimes be life-threatening - before pushing the adulterated milk into the market. The illegal milk suppliers have also taken to using fake packages of well-known brands of dairy products. This was discovered during the weekend raids. Where monitoring is not up to the mark, this becomes dangerous for the consumers."This daily intake is white poison for children and adults. The adulterants cause diseases of the stomach, intestine, head, skin and the kidneys. Drinking such milk over a long period could result in death,"

"A very small amount of urea can lead to vomiting, nausea and gastritis," said Dr M. P Sharma, Head of Internal Medicine at Rockland Hospital. More serious damage can be caused by formalin. While the immediate effect of drinking milk adulterated with urea, caustic soda and formalin is gastroenteritis, the long- term effects are far more serious. The health impact of drinking adulterated milk with these chemicals is worse for children. Pregnant women are particularly vulnerable to the impact of these chemicals, which can also harm the foetus. The chemicals worsen the condition of those with pre-existing heart or kidney problems. Urea is particularly harmful for the kidneys, and caustic soda is a slow poison for people suffering from hypertension and heart ailments. Urea and caustic soda are very harmful to the heart and liver.

Recent major adulteration incidence in Varanasi:

2009,26 Octobers Varanasi- In collection of food sample as per norms is evident, especially from Varanasi Nagar indicate that as many as 58 food samples (90% of them being dairy product), which failed food analysis test, have been registered under PFA act and the no. of failed samples can be close to 100,(till the month of September) this year have failed the food analysis test, showing signs of adulterations, while over 450 cases have been pending for the past 5 years.

Another interesting revelation of the cases of food adulteration registered under PFA act in the city is the fact that ¾ of the cases belong to adulteration of milk product, including khoya, sweetened curd and even cream in different parts of city. Similarly, areas that have registered max. number of samples of food adulteration includes Sigra, Luxa and Nadesar while Trans Varuna areas include Pandeypur and Bhojubir (source: Times of India).

While reports of the district administration suggested that around a dozen samples of milk products including khoya, paneer and chena were taken from khoya mandi (chowk) and adjoining areas in the city. It may be mentioned here that there is a daily consumption of more than 1 lakh litres of milk in the region, out of which nearly 30,000 litres are supplied through milk co-operatives while rest come from 'doodh mandis'(milk market), where milk is supplied from milkmen in the region.

As per Dr BK Singh, a Senior Health Officer of VNN, around 100 cases of food adulteration in different parts of the city are under investigation and most of them are of milk adulteration. Over 50 cases have been already filed under Prevention of Food Adulteration Act in the court of Chief Judicial Magistrate (CJM) and here also adulteration of milk products has been found to be maximum.

MATERIALS AND METHODS

Preschool (1 to 5 years) and school going (6 to 18 years) children in urban and rural area from different areas of Varanasi had been surveyed. A total of 365 household were surveyed in which 70 children were of age group 1 to 5 years, 150 children were of age group 6 to 18 years and 145 children were of age group 19 to 22 years. Since it was household survey, the homemaker of the household was interviewed for intake of milk. The region of study selected was Varanasi. The milk collected from the household and tested for the presence of urea and detergent. The frequency method was employed for calculation. The survey includes consumption of milk/day, their effect on health such as headache, eye sight problem and diarrhoea. Also 130 sample of milk were collected from different local market, vendors and stalls of Varanasi.

Method of urea detection:

Qualitative analysis of urea detection was done by method described below: 5ml of milk was taken in a test tube. 20mg of soybean powder and 2 drops of 0.5% aqua solution of bromothymol blue was added. The sample was mixed well. After ten minutes development of the blue colour indicated the addition of urea in the sample. A confirmatory test was done by adding 5ml of milk with 5ml paradimethyl amino benzaldehyde (16%). If the solution turns yellow in colour, then the given sample of milk is added with urea.

RESULTS AND DISCUSSION

The mean intake of milk per day of each individual was calculated by statistical method of mean and their standard deviation is given in Table 1. The concentration of urea was calculated from standard graph and the pH was evaluated, since normal milk has pH range of 6.5-7.0 given in Table 2. Normally milk has urea concentration of 100-110mg/litre. Concentration above this is considered as adulterants and causes major health problems. Urea added changes the pH and food value of the milk. So a standard graph was prepared using the pH of the different

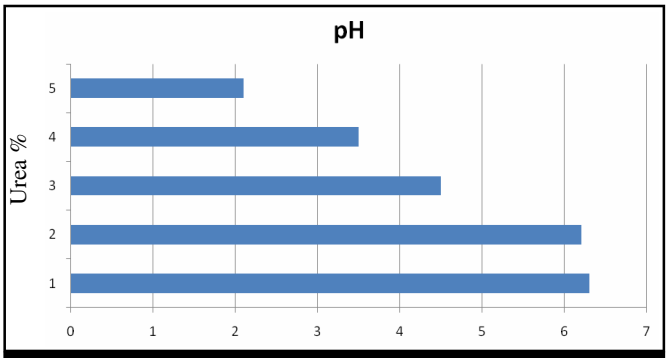

Fig.1 : Showing variation of pH with different concentration of urea

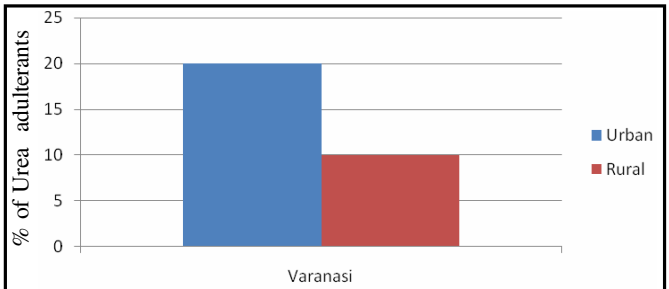

Fig. 2 : Showing variation of urea and detergent

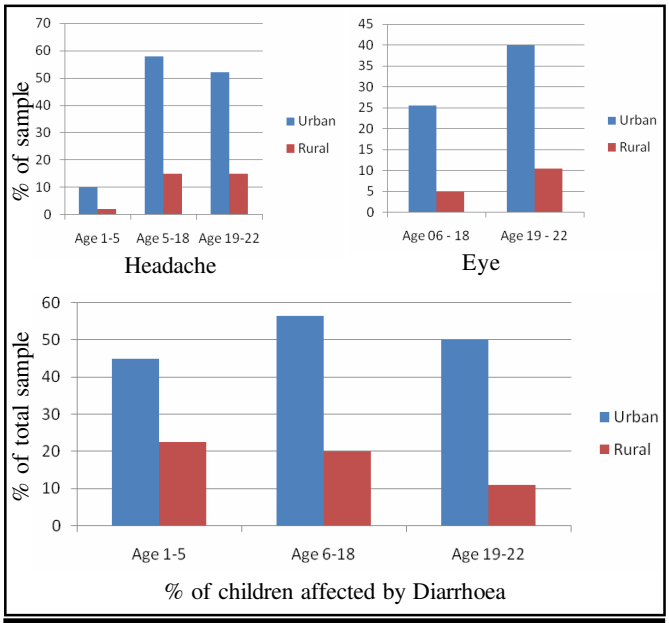

Fig. 3 : Showing children affected by synthetic milk in different age group (a) Headache (b)Eyesight; (c) Diarrhoea

Table 1 : Showing nitrogenous constituents of milk

Nitrogenous material	
Ammonia	2-12mg
Amino acid	3.5mg
Urea	100mg
Creatine and Createnine	15mg
Uric acid	7mg
Gases	Milk exposed to air
Carbon di oxide	15mg
Oxygen	7.5mg
Nitrogen	15mg
Trace elements	Cu, Fe, Rb, Li, Ba, Mn, Al, zn, B, Co, I,
Occasionally present	Mc, Cr, Ag, Sn, Ti

concentration of urea so that urea concentration can be determined quickly.

The mean intake of children among age group from 1-5years was 156.42ml/day, age group from 6-18 years was 500ml/day and children of age group from 19-22 years consumes milk on an average 800ml/day.

The milk is staple food for both the group of children urban as well as rural area. From both the regions a wide

Table 2 : Average composition of milk

Item	Average milk composition
Water	87.00
Lactose	4.90
Fat	3.70
True protein	3.00
Crude protein	3.10
Casein	2.60
Ash	0.80
Other	0.50

Table 3 : Showing average milk consumed by different age group

Age (Years)	Children	Mean of milk consumed	SD	Range
1-5years	70	156.428	53.78	50-250
6-18years	150	500	274.77	250-1000
19-22 years	145	800	224.22	500-1000

variation of adulterants mixing was observed. The adulterants have been detected by doing the test as described and it was found that adulteration practice was higher in urban area compared to rural area. Through the household survey of health of children that consumed maximum milk in their age group, amazing result has been obtained. In the pre school age group from 1-5years most of the children are dependent on mother's milk, therefore less children have effect on their health related problems like diarrhoea and eyesight problems. Table 2 shows that 28% urban children of age group 6-18 have been affected by headache, while only 4% rural children were affected of same age group. This percentage increases with the increase in age and 38% urban children of age group 19-22 were affected by headache, while only 12% rural children were affected from same age group. Eye sight problem was also detected in survey, and 11% urban children of age group 1-5years were affected by eye problems, while only 3% rural children were affected of same age group while 57% of urban age group 19-22 was affected by eyesight problem, while only 16% rural children were affected of same age group. In the age group 19-22 of total sample 52% of urban children were affected as compared to only 12.5% in rural areas. Diarrhoea most often in school going children was one of the major

Table 4 : Effect of urea on different age groups in urban area

Age group	No. of children	Headache	Eye problem	Digestion/Diarrhea	Normal
1-5years	70	Nil	8	32	38
6-18years	150	42	86	86	60
19-22years	145	56	76	76	69

Table 5 : Effect of urea on different age groups in rural area (365 samples)

Age group	No. of children	Headache	Eye problem	Digestion/Diarrhoea	Normal
1-5years	70	Nil	2	16	54
6-18years	150	6	25	25	125
19-22years	145	16	18	18	127

Table 6 : Sample tested in rural area (sample tested 50)

No. of sample	City	Urea	
		>5%	<1%
50	Varanasi	4	46

Table 7 : Sample tested in urban area (sample tested 80)

No. of sample	City	Urea	
		>5%	<1%
80	Varanasi	12	68

Table 8 : Comparison of effect of synthetic milk in rural and urban area in different age group of children

Occurrence of diseases	1-5 years		6-18 years		19-22 years	
(% of samples)	Rural	Urban	Rural	Urban	Rural	Urban
Headache	0	0	4	28	12	38
Eyesight	3	11	16	57	12.5	52
Diarrhoea	22	45.7	16.6	57.3	12.5	52

concerns. In age group 1-5years, 45% of total sample in urban area was affected by diarrhoea as compared to only 22% in rural areas. In the age group 6-18 years, 57% of total sample in urban children were affected by diarrhoea as compared to only 16% in rural areas. While in age group 19-22 years, 52% of total sample in urban children were affected by diarrhoea as compared to only 12.5% in rural areas.

Conclusion:

The following result were obtained from the work

– Synthetic milk has lower or higher pH than normal milk depending on the adulterants mixed. Thus by using pH paper, we can quickly know the difference between normal and synthetic milk.

– Use of synthetic milk is affecting mostly the school going children in age of 6-18 years of age group.

– The children have most of the problem with their eyesight, headache and diarrhea.

– Urban area are mostly affected than rural area since demand is high and to meet such huge demand synthetic milk are used that are able to meet the demands.

REFERENCES

Dean, J.A.(Ed.). (1985). *Lange's handbook of chemistry* (13th Ed.). New York: McGraw-Hill, pp. 3-36

DePeters, E.J. and Ferguson, J.D. (1992). Nonprotein Nitrogen and Protein Distribution in the Milk of Cows. *J. Dairy Sci.,* **75**: 3192-3209

Mabrook, M.F. and Petty, M.C. (2003b). A novel technique for the detection of added water to full fat milk using single frequency admittance measurement. *Sensors & Actuators* B, **96** : 215-218.

Rangappa, K.S. and Achary, K.T. (1973). *Indian dairy products.* Bangalore, India: Asia Publishing House

Ropstad, E. and Refsdal, A.O. (1987). Herd reproductive performance related to urea concentration in bulk milk. *Acta. Vwt. Scand.,* **28**:55.

Times of India (lucknow).

ICMR 2000

Willard, H.H., Merrit, L. L., Dean, J. A., and Settle,F.A.(2003).

Address for correspondence :
ANITA SINGH
Department of Food and Nutrition, Faculty of Home Science,
Sri Agrasen Kanya Autonomous P.G. College
VARANASI (U.P.) INDIA

Authors' affiliations :
JUHI SHARMA AND SHUCHI RAI BHATT
Department of Food and Nutrition, Faculty of Home Science,
Sri Agrasen Kanya Autonomous P.G. College
VARANASI (U.P.) INDIA