Original Research Paper

Biological Science

ASSESSMENT OF ADULTERATION FOUND IN DIFFERENT MILK SAMPLES COLLECTED FROM AKOLA CITY.

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ABSTRACT 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. This study was conducted to evaluate different milk samples of different dairy farms and hotels located in Akola. The study was carried out keeping in view the recently emerging concern of adulteration of natural milk with various illegal substances to increase its marketability. The nature of adulterants generally encountered in milk and milk products are water samples. Results showed that pH of milk samples were alkaline and normal, formalin is absent in all samples, urea is present in some sample , starch powder were absent in all samples, neutralizers , shampoo and detergents were detected in some sample . Percentage of sodium chloride and skim milk powder were observed in samples. Some traces of ammonium sulfate and pond water were also recorded in some samples. Other adulterants like boric acid and nitrate were absent.

1. INTRODUCTION:-

The nature of adulterants generally encountered in milk and milk products are water, removal of fat, addition of skim milk powder, reconstituted milk, 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 rarities include animal fats, aflatoxins and vegetable oils.

Thus it is obvious that apart from less harmful adulterants, toxic and potentially injurious substances also are being added to milk. Despite food legislation, adulteration remains uncontrolled, furthermore legal steps laid down in the PFA Act are extremely difficult to maintain due to inadequate and untrained man power and laboratory facilities. Such is the state in the country where we are one of the largest nations of milk producers. In the year 2010-2011, India was ranked among the top 5 countries in the world producing 121.8 million tonnes of milk.

India's milk production is estimated to rise by 5 per cent to 129 million tonnes in the current calendar year on account of strong prices and growing demand.The country had produced 123 million tonnes of milk in 2011. Calender Year (CY) 2012 milk production is estimated at 129 million tonnes, 4.87 per cent up over CY 2011. CY 2011 fluid milk production is raised at 123 million tonnes, 1.23 per cent higher than previous estimates reflecting strong monsoon and good fodder availability, Non-fat Dairy Milk (NFDM) stocks grew significantly in 2012 as output rose in response to remunerative prices and the government's prohibition on milk powder exports.

Purpose of study:- The study was carried out keeping in view the recently emerging concern of adulteration of natural milk with various illegal substances to increase its marketability. The Food Safety and Standards Authority of India found that 70% of the milk sold in the country is adulterated. In urban areas, 68.9% of milk samples had been adulterated, compared to 31% of samples in rural areas. The regulator found that 70% of the samples collected in India contained substances other than milk. Although buying packed milk was a safer bet than loose milk, the regulator found that one in three packed milk samples in cities were adulterated There are various ways and means of adulteration that are encountered in the market milk. However, the chances of adulteration are much more in loose milk than in packaged milk.

A glass full of milk a day is healthy for overall health but what if it is adulterated? Milk adulteration is increasing day by day and many. People are not even aware that they are having adulterated milk. When we have a glass of milk in the morning we may consume many other things unknowingly as it may contain water, starch, detergent, glucose, formalin, soda, urea which ultimately leads to gastrointestinal problems, food poisoning, nausea, vomiting and many health hazards.

Among all these water is the most common adulterant, but problem is not only with its dilution but the major problem occurs when they use contaminated water which affects our health.

2:- Material and Methods

2.1 Sample collection:- Different milk samples, from different company were collected for analysis from the various dairy of akola city and were brought to the Research Laboratory, Dept. of Zoology, Shri Shivaji College Akola for analysis.

2.2 Kit Method:- Different methods were used for different parameters by using adulteration testing kit supplied by Himedia. By observing colour changes we can decide presence or absence of different parameters.

Total 17 parameters were studied such as follows:-
1) Alizarin
2) Formaline
3) Urea
4) Starch
5) Neutralizers
6) Detergent
7) Sodium Chloride
8) Skim milk Powder
9) Sugar
10) Glucose
11) Hydrogen Peroxide
12) Cellulose
13) Maltose
14) Ammonium Sulphate
15) Protein
16) Boric acid
17) Pond water / Nitrate

3 Observation and result

Detectection of different parameters Milk Analysis result Chart

	Parameters	Milk Sample from different milk vendors									
		1	2	3	4	5	6	7	8	9	10
1	pH	Alk	Alk	Alk	Norm	Norm	Alk	Alk	Alk	Alk	Norm
2	Formaline	×	×	×	×	×	×	×	×	×	×
3	Urea	×	×	P	×		×	×			
4	Starch	×	×	×	×	×	×	×	×	×	×
5	Neutralizers	P	×	×	×	×	×	×	×	×	×
6	Detergent	×	×	×	×	P	P	×	×	×	P
	Sampoo	×	P	×	×	×	×	×	×	×	×
7	Sodium Chloride	P	×	P	P	×	P	×	×	P	×

8	Skim milk Powder	×	×	×	P	×	×	×	×	×	P
9	Sugar	×	×	×	P	P	×	×	P	×	
10	Glucose	×			P	P	P	×	×	X	×
11	Hydrogen Peroxide	×	×	×	×	×	×	×	×	×	×
12	Cellulose	×	×	×	×	×	×	×	×	×	×
13	Maltodextrin	×	×	×	×	×	×	×	×	×	
14	Ammonium Sulphate	×	P	P	×	×	×	×	×	×	×
15	Proteins	% is more	% is more	N	N	% is more	N	Norm	Nor	N	N
16	Boric Acid	×	×	×	×	×	×	×	×	×	×
17	Pond water/Nitrate	P			×	×	×	×		×	×
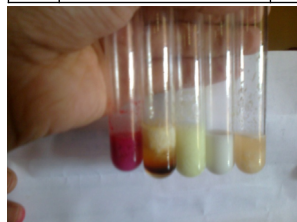
Test for alizarin, formaline, urea, starch, neutralizers

Test for sodium chloride, skim milk powder detergent, sugar, glucose

Test for hydrogen peroxide, cellulose, maltose

Test for ammonium sulphate, protein, boric acid, pond water, nitrate

4. DISCUSSION

Survey for adulteration testing

Study was conducted in the department of zoology, Shri Shivaji Science college akola to evaluate and compare with different buffalo milk samples of different dairy farms located in different region. These samples were analyzed for composition and adulteration. Results showed that maximum fat, protein, ash and water contents were observed in samples S1 (7.35%), S3 (3.8%), S1 (0.71%) and S5 (84.8%), respectively. Minimum values of fat, protein, ash and water were observed in samples S4 (6.98%), S2 (3.50%), S5 (0.60%) and S1 (82.8%), respectively. Maximum total solids were recorded in sample S1 (17.2%), while minimum in sample S5 (15.2%). Our analysis showed that no adulterants were found in these samples. The statistical analysis showed that the fat, protein, water and ash contents of these milk samples collected from different areas were significantly different ($p < 0.05$).

Study was carried out keeping in U.P. view the recently emerging concern of the adulteration of the natural milk with the synthetic milk. Synthetic milk is prepared by emulsifying vegetable oils with appropriate amount of detergent and urea. Samples of the natural milk with synthetic milk were analyzed for concentration of urea and detergent and their effect is assayed through survey in different population in Uttar Pradesh, India. Children's had different range of intake of milk. 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's of age group 19-22 consumes milk about 500-1000 ml milk /day. Addition of synthetic milk is on large scale in Meerut district of U.P. and mostly urea in such milk creating huge problem of headache.

CONCLUSION

1) It is apparent from the analyses that a large number of samples procured did not conform to the legal standards prescribed by the Food Safety and Standards Authority of India (FSSAI). These results clearly suggest that most of the milk samples were adulterated.

2) The study indicates that addition of water to milk is most common adulterant. Addition of water not only reduces the nutritional value of milk but contaminated water may also pose health risk to the consumers.

(3) Most of the milk samples were prepared with added adulterants during their production and processing or added intentionally according to one's own choice to generate money. In a country such as India where milk and milk products play an important role in different foodstuffs, this analysis carried out should bring about more awareness to the general public about the malpractices or negligence in milk production

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