

To Detect Types of Adulteration Present in Buffalo and Cow Milk Samples

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Abstract: - Milk is a pale liquid produced by the mammary glands of mammals. It is the primary source of nutrition for young mammals before they are able to digest other types of food. Early-lactation milk contains colostrums, which carries the mother's antibodies to its young and can reduce the risk of many diseases. Milk contains many other nutrients and the carbohydrate lactose. An emulsion is a suspension of droplets of one liquid into another liquid. Milk is an emulsion of fat in water. Butter is an emulsion of water in fat. The solute is known as the dispersed phase and the solvent is known as the continuous phase. Other examples of emulsions include margarine, mayonnaise, cream, and salad dressing. A colloidal solution is when matter exists in a state of division in between a true solution, which is sugar in water, and a suspension, which is chalk in water. The characteristics of a colloid are small particle size, electrical charge, and affinity of the particles for water molecules. In milk, the whey proteins are in colloidal solution. This paper detects various types of adulteration present in buffalo and cow milk samples.

Keywords: - Types of adulterants and adulterations etc.

I. INTRODUCTION

Milk is very valuable food, readily digested and absorbed. It consists of nutrients, which are needed for proper growth and maintenance of body. Milk and milk products form a significant part of the diet and a substantial amount of our food expenditures goes on milk and other dairy products. In Pakistan, milk is transported from the point of production to consumers and processing plants by middlemen called "Gawalas". They don't maintain proper hygienic conditions during this transport, which leads to increase the total viable bacterial count. They also adulterate milk to increase their profit margin by several chemicals like urea, starch, flour, cane sugar, vegetable oils, detergents etc. Various preservatives like formalin and some antibiotics are also added in milk to increase its shelf life. This addition decreases the nutritive value of milk. These adulterants, preservatives and drugs in milk cause very serious health related problems.

II. WHAT IS ADULTERATION?

Food is the basic necessity of life. One works hard and earns to satisfy our hunger and relax (enjoy) later. But at the end of the day, many of us are not sure of what we eat. We may be eating a dangerous dye, sawdust, soap stone, industrial starch, and aluminum foil and so on! Contaminated foods and drinks

are common sources of infection. Often, we invite diseases rather than good health.

Food adulteration 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

Food Adulteration takes into account not only the intentional addition or substitution or abstraction of substances which adversely affect nature, substances and quality of foods, but also their incidental contamination during the period of growth.

III. MATERIALS AND METHODS

1] Test for Detection of Salt:

Addition of salt in milk is mainly resorted to with the aim of increasing the corrected lactometer reading.

5ml of silver nitrate reagent is taken in a test tube. Add 2-3 drops of potassium dichromate reagent. Add 1 ml of milk in the above test tube and mix thoroughly. If the contents of the test tube turn yellow in colour, then milk contains salt. If it turn to chocolate or reddish brown in colour, the milk sample is free from salt.

2] Test for Detection of Pulverized Soap:

Take 10 ml of milk in a test tube and dilute it with equal quantity of hot water. Add 1 –2 drops of phenolphthalein indicator. Development of pink colour indicates that the milk is adulterated with soap.

3] Detection of Detergents in Milk:

Take 5 ml of milk in a test tube and add 1-2 drops of bromocresol purple solution. Mix well.

Appearance of violet colour indicates the presence of detergent in milk. Unadulterated milk Samples will show a very faint violet colouration.

4] Detection of Water in Milk:

Lactometer reading detects adulteration of milk with water.

Take raw milk in a long stemmed wide mouth bottle or a measuring cylinder. Place the lactometer in it taking care to see that the lactometer does not touch the sides of the bottle or the measuring cylinder. Note down the reading at the surface

of milk sample taken. Also note the temperature of the milk sample.

Though the adulteration of milk with water can be checked by lactometer reading, other adulterations too affect the lactometer reading. Hence freezing point depression, recognized by AOAC, is usually adopted.

Percentage of water added =

$$\frac{\text{Normal freezing point} - \text{Observed freezing point} * 100}{\text{Normal freezing point}}$$

Normal freezing point of milk is taken as -0.55°C . A tolerance level of 3% is given which is equivalent to specifying a minimum freezing point depression for authentic milk of -0.55°C .

5] Detection of Skim Milk Powder in Milk:

If the addition of nitric acid drop by drop in to the test milk sample results in the development of orange colour, it indicates the milk is adulterated with skim milk powder. Samples without skim milk powder shows yellow colour.

6] Detection of Vegetable Fat in Milk:

The characteristic feature of milk is in its fatty acid composition, which mainly consists of short chain fatty acids such as butyric, caproic, caprylic acid; whereas the vegetable fats consist mainly of long chain fatty acids and hence adulteration of vegetable fat in milk can be easily found out by analyzing the fatty acid profile by gas chromatography.

7] Detection of Buffalo Milk in Cow Milk:

The presence of buffalo milk in cow milk is tested by Hansa test. It is based on immunological assay. One ml of milk is diluted with 4 ml of water. It is then treated with 1 ml of antiserum. The characteristic precipitation reaction indicates the presence of buffalo milk in the sample taken. (The antiserum is developed by injecting buffalo milk proteins into rabbits).

IV. CONCLUSION

Adulterated Milk and Milk Products are dangerous to any leaving organism. Knowledge of adulteration of any food is essential for each and every leaving organism.

REFERENCES

- Bordin, G., CordeiroRaposos, F., De la Calle, B., & Rodriguez, A. R. (2001). Identification and quantification of major bovine milk proteins by liquid chromatography. *Journal of chromatography A*, 928(1), 63-76
- Dubey, P.C. And Gupta, M.P. (1986) Studies on Quality of Rabri. *J. AgricSci Res* 28:9-14. Milk Adultration: Methods Of Detection & Remedial Measures www.eshancollege.com20www.erppublication.org
- Kumar M., Rao, Y.S And Gupta, M.P. (1981) Chemical Quality Of Milk Based Sweets Sold In Agra And Mathura Cities. *J. AgricSci Re* 23:13-17
- Meisel H (1995) Application of fourth derivative spectroscopy to quantitation of whey protein and casein in total milk protein. *Milchwissenschaft* 50 247–251.
- Reid, J. R., Coolbear T., Ayers J.S., and Coolbear K.P.. (1998). The action of chymosin on k-casein and its macropeptide: effect of pH and analysis of products of secondary hydrolysis. *Int. Dairy. J.*, 7, 559-569., 1998.
- Meisel, H., &Carstens, J. (1989). Vergleichende Untersuchungen zur Bestimmung des Molkenprotein- und Caseinanteils in Milchprodukten mittels Casein-Phosphor-Methode, SDS-Elektrophorese und Polarographie. *Milchwissenschaft*, 44(5), 271-277.
- Varadaraj, M.C. Mahadev, B.S. And Ahmed, Ashfaq (1983). *Indian Dairyman* 35: 301.
- Calvo, M. M. (2002). Influence of fat, heat treatments and species on milk rennet clotting properties and glycomacropeptide formation. *European Food Research and Technology*, 214(3), 182-185.
- Bector, B.S., Ram, M. And Singhal, O.P. (1998) Rapid Platform Test for Detection / Determination Of Urea In Milk. *Indian Dairy Man* 50: 59-60.
- Varadaraj, M.C. KandNambudripad, V.K.N. (1982). *J. Fd. Sc.Tech.* 19: 53.
- Ferreira, I. M., & Oliveira, M. B. P. P. (2003). Determination of Caseinomacropeptide by an RP-HPLC Method and Monitoring of the Addition of Rennet Whey to Powdered Milk. *J. Liq. Chrom. Relat. Tech.*, 26(1), 99-107.
- Panda, D. And Bindal, M.P (1998 B) Detection Of Adulteration In Ghee With Animal Body Fats And Vegetable Oils Using Crystallization Tests *Indian Dairyman* 50: 13-16
- Kumar, R., Singh, D.K. And Chawla, N.K. (1998). Adulteration / Contamination Of Milk Demystified. *Indian Dairyman* 50: 25-33
- Miralles, B., Bartolomé, B., Amigo, L., & Ramos, M. (2000). Comparison of three methods to determine the whey protein to total protein ratio in milk. *Journal of dairy science*, 83(12), 2759-2765.
- Kumar A., Lal, D., Seth, R. And Sharma, R (2002) Recent Trends In Detection Of Adulteration In Milk Fat A Review *Indian J. Dairy Sci.* 55: 319-330
- PFA Act (1954) Prevention of Food Adulteration Act And Rules. Govt Of India Publication As Amended Upto Date.
- Sharma, S. K., Hill, A. R., & Mittal, G. S. (1993). An improved method to measure glycomacropeptides (GMP) in renneted milk. *Milchwissenschaft*, 48, 71-73.
- Singhal, O. P. (1980). Adulterants and methods for detection. *Indian dairyman*, 32(10), 771-774.
- Ghodekar, D.R., Dudani, A.J And Ranganathan, B (1974). *J. Milk Fd Techn* 37,199.
- Bitri L., Rolland M.P., Besancon P. (1993). Immunological Detection of Bovine Caseinomacropeptide in Ovine and Caprine Dairy Products, *Milchwissenschaft*, 48, 367–371.
- Subrahmanyam, M. (1981). Market survey of the quality of butter. *Indian dairyman*.
- Sharma G.S (1991) Quality Of Creamery Buller Marketed In Agra City M.Sc Thesis Submitted To Agra Univ. Agra.
- Sharma M.B. Gupta M.P. (1982) Quality Of Mawa Bhurfi Sold In Agra City *Asian J. Dairy Res* 1: 165-168
- Batis, V.K., Garg, S.K., Chander, H. And Ranganathan, B. (1981) *.Indian Dairyman* 33,435.
- echner E., Klostermeyer H. (1981). Nachweis Einer Verfälschung Von Magermilchpulver Mit Molkenpulver (Polarographische Methode), *Milchwissenschaft*, 36, 267-270.
- DE Souza E.M.T., Arruda S.F., Brandao P.O., Siqueira E.M. DE Almeida. (2000). Electrophoretic Analysis To Detect And Quantify Additional Whey In Milk And Dairy Beverages, *Ciênc. Tecnol. Aliment.*, 20(3), 314-317.
- Panda, D. And Bindla, M.P. (1998 A) Detection Of Adulteration In Ghee With Animal Body Fats And Vegetable Oils Using Opacity Test. *J. Dairyng Foods & Home Sci.* 17:31-36.