To Find Starch and Protein Present in Milk Ice Cream

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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 milk products.

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.

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.

II. MATERIALS AND METHODS

(1) Determination of Added Starch in Ice Cream:

The sample is made free from fat and the starch is precipitated with alcohol and made free from sugar. The precipitated starch is subjected to acid hydrolysis. The hydrolysate is freed from proteins using lead acetate and deleaded with ammonium oxalate. The reducing sugar is determined by Lane and Eynon method and multiplied with 0.9 to calculate the starch content.

Procedure:

Weigh 20 - 50 g of ice cream sample into a 500 ml beaker depending on the approximate starch content of the sample. Defat the sample with 5-6 washings with 15- 20 ml portions of petroleum ether (40-60°C).

Add enough water to make 100 ml, heat to 50-60°C (avoiding any gelatinisation of starch) and let stand for 1 hour stirring frequently to ensure complete solution of sugars. Cool and add equal volume of alcohol, mix, let stand for 1 hour or more. Centrifuge for 20 minutes at approximately 4000 rpm so that the precipitate is closely packed at the bottom of the centrifuge tubes.

Filter the solution using Whatman filter paper No 1. Transfer the precipitate using 5% alcohol on the filter paper. Wash the precipitate on the filter paper with successive 50 ml portions of 50% alcohol and filter until the washings are sugar free. Transfer the residue to a 500 ml conical flask with about 200 ml water and add 20 ml of conc. HCl of sp. gr. 1.125.

Hydrolyse starch by refluxing in a boiling water bath for 2- 2 ½ hours. Cool, transfer the hydrolysate to a 250 ml volumetric

flask, neutralise with Sod hydroxide and make it alkaline using litmus paper. Make up to volume. Shake thoroughly. Allow to settle for 20 minutes and filter.

Determine reducing sugars by Lane and Eynon method and calculate starch content by multiplying total reducing sugars with 0.9.

(2) Determination Of Protein (Kjeldahl Method) In Ice Cream:

The protein content is determined from the organic Nitrogen content by Kjeldahl method. The various nitrogenous compounds are converted into ammonium sulphate by boiling with concentrated sulphuric acid. The ammonium sulphate formed is decomposed with an alkali (NaOH) and the ammonia liberated is absorbed in excess of standard solution of acid and then back titrated with standard alkali.

Apparatus:

A Kjeldahl digestion flask - 500 or 800 ml

B. Kjeldahl distillation apparatus, -same digestion flask fitted with rubber stopper through which passes lower end of efficient rubber bulb or trap to prevent mechanical carry-over of NaOH during distillation. C. Conical flask, 250 ml D. Burette 50 ml.

Reagents:

A. Concentrated Sulphuric acid – sp.gr. 1.84

B. Sodium Hydroxide solution (45%): Dissolve 450 g of Sodium Hydroxide in 1000 ml water

C. Standard Sulphuric acid solution (0.1 N)

D. Standard Sodium Hydroxide solution (0.1 N)

E. Methyl Red Indicator solution: Dissolve 0.5 g methyl red in 100 ml of alcohol.

Procedure:

Weigh quickly about 5-8 g of the prepared ice-cream sample and transfer to a 500 or 800 ml Kjeldahl flask taking care to see that no portion of the sample clings to the neck of the flask. Add 0.5g of copper sulphate, 15 g of potassium sulphate and 40 ml of concentrated sulphuricacid. Add two to three glass beads. Place the flask in an inclined position on the stand in the digestion chamber and digest.

Heat the flask gently at low flame until the initial frothing ceases and the mixture boils steadily at a moderate rate. During heating rotate the flask several times. Continue heating for about an hour or more until the colour of the digest is pale blue.

Cool the digest and add slowly 200 ml of water. Cool, add a piece of granulated zinc or anti bump granules and carefully pour down the side of the flask sufficient sodium hydroxide solution (450g/ litre) to make the contents strongly alkaline(about 110 ml) before mixing the acid and alkaline layer. Connect the flask to a distillation apparatus incorporating an efficient flash head and condenser.

To the condenser fit a delivery tube which dips just below the surface of the pipetted volume of standard acid contained in a conical flask receiver. Mix the contents of the digestion flask and boil until 150 ml have distilled into the receiver. Add 5 drops of methyl red indicator and titrate with 0.1 N sodium hydroxide solution. Carry out a blank titration.

1 ml of 0.1 N H2SO4 = 0.0014g N.

In case of dairy ice cream / kulfi calculate milk protein as N x 6.38

In case of Frozen ,

calculate total protein as N x 6.25

III. 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.

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