Determination of Starch and Canesugar in milk

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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 colostrum, which carries the mother's antibodies to its young and can reduce the risk of many diseases. Milk contains many other nutrients[1] and the carbohydrate lactose. We checked quality of milk and made comparative study of various buffalo and cow milk samples. In this paper various milk samples were analyzed for Starch and cane sugar and found that buffalo milk results were of higher quality than cow milk. Results of buffalo and cow milk samples were compared to its World Health Organization recommended value. Starch and cane sugar were found absent.**

***Keywords*-Precipitation, Filtration, Preparation of solution, refrigeration, Reflux process, End point, Standardizations, Milk products and different types of Cow and Buffalo milk samples etc.**

I. INTRODUCTION

Starch is one of the most abundant carbohydrates in nature and present in many food plants. Starch is by far the most consumed carbohydrates in the human diet. Traditional staple foods such as cereals, roots and tubers are the main source of dietary starch. Starch is one of the main energy sources in our diet. Chemically, starch is a polysaccharide consisting of a large number of glucose molecules. Starch has many applications, not only in the food industry. Starch and starch derivatives are widely used in paper manufacturing, in glues, such as wallpaper glue, cosmetics and even as a lubricant in oil drilling. Only the food applications are dealt with here.

The word starch is derived from the Middle English sterchen, meaning to stiffen, which is appropriate since it can be used as a thickening agent when dissolved in water and heated. Starch is a mixture of two polymers of glucose and thus has the general chemical formula of $(C_6H_{10}O_5)n$ with n the number of glucose monomers. Starch molecules may reach a DP (Degree of Polymerisation) from a few hundred to many thousands of glucose monomers. The two polymers of starch are amylose and amylopectin. Depending on the plant, starch generally contains 20 to 25 percent amylose and 75 to 80 percent amylopectin. In general grain-derived starches have higher amylose content as tuber-derived starches.

II. MATERIALS AND METHODS

For this Buffalo and Cow milk samples were used (each type four samples).All these samples were collected from Anandnagar, Dhyari, Hadapsar, Katraj around Pune in Maharashtra. The samples were kept refrigerated at 4°C and transported to the laboratory within 24 hours, prior to refrigeration. All the samples, for vitamin C determination were stabilized with 10% metaphosphoric acid. Upon arrival, the milk samples were stored at -20°C until analysis.

III. DETERMINATION OF STARCH IN THE MILK

Procedure-Weigh approximately 25 g sample in a 250 ml beaker. Add 20 ml of ethanol to curdle the milk. Filter the precipitate on a filter paper and wash the precipitate with 50% ethanol till the precipitate is free from lactose/sugar i.e. when the washings give a negative test with resorcinol. Transfer the precipitate to a 500 ml flask with about 200 ml water and add 10 ml concentrate HCl to hydrolyse the starch by refluxing in a boiling water bath for 2.5 hours. Cool and neutralise with 10% sodium hydroxide and sodium carbonate towards the end using litmus paper. Make up to 500 ml with water. Shake well and filter if necessary. Determine reducing sugar by Lane and Eynon method.

Calculation-

% starch = % reducing sugar x 0.9

IV. DETERMINATION OF CANE SUGAR IN THE MILK

Procedure –Take 1 ml of milk in a test tube. Add 1 ml of Resorcinol Solution and mix. Place the tube in boiling water bath for 5 min. Withdraw the tube and observe the colour. Appearance of deep red colour indicates presence of sucrose, or a ketose sugar. In pure milk samples no such red color is developed and sample remains white in nature. The limit of detection of method is 0.1%.

V. OBSERVATION TABLE

Sample Description	B_1	B_2	B_3	B_4	C_1	C_2	C_3	C_4
Starch %	AB	AB	AB	AB	AB	AB	AB	AB
Cane Sugar %	AB	AB	AB	AB	AB	AB	AB	AB

Note-

1. Buffalo milk samples-B_1, B_2, B_3, B_4 and Cow milk samples-C_1, C_2, C_3, and C_4.
2. Chemical Analysis was done per 100 gm. Starch and cane sugar were absent in all sample.

VI. RESULTS AND DISCUSSION

Carbohydrates are the body's most important and readily available source of energy. Even though they've gotten a bad reputation in the 2000s and have often been blamed for the obesity epidemic in America, carbs are a necessary part of a healthy diet.

The two major forms of carbohydrates are: simple sugars (simple carbohydrates), such as fructose, glucose, and lactose, found in nutritious whole fruits. starches (complex carbohydrates), found in foods such as starchy vegetables, grains, rice, and breads and cereals Carbohydrates are a main fuel source for some cells, especially those in the brain, nervous system, and red blood cells. Muscles also rely on a dependable supply of carbohydrate to fuel intense physical activity. Yielding on average 4 kcal per gram, carbohydrates are a readily available fuel for all cells, both in the form of blood glucose and that stored in the liver and muscles as glycogen. The glycogen stored in the liver can be used to maintain blood glucose availability in times when the diet does not supply enough carbohydrate. Regular intake of carbohydrate is important, because liver glycogen stores are depleted in about 18 hours if no carbohydrate is consumed. After that point, the body is forced to produce carbohydrate, much of which comes from breakdown of proteins in the body. This eventually leads to health problems. Carbohydrate comes from various food sources. Currently, the top five carbohydrate sources for U.S. adults are with bread, soft drinks, cookies and cakes (including doughnuts), sugars/syrups/jams, and potatoes. Clearly many Americans should take a closer look at their main carbohydrate sources and strive to improve them from a nutritional standpoint more whole grains, fruits, and vagetables.

Most people should get between 40 to 60% of their total daily calories from carbohydrates. It is best to get most of these calories from complex carbohydrates (starches) and natural sugars. In addition to calories, complex carbohydrates provide vitamins, minerals, and fiber.

To increase your intake of complex carbohydrates and healthy nutrients:

Eat fruits and vegetables.
Eat whole-grain rice, breads, and cereals.
Eat legumes (beans, lentils, and dried peas).

The favorite choice for the term "Milk" is 1 cup of Whole Milk which has about 11 grams of carbohydrate. The total carbohyrate, sugar, fiber and estimated net carbs

Calories	Fat	Carbs	Protein
73	3.96g	5.51g	3.93g

There are 73 calories in a 1/2 cup of Whole Milk.

Calorie breakdown: 49% fat, 30% carbs, 21% protein.

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