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Review - A Brief Study on Milk

Karunasree P

GITAM University, Visakhapatnam, India

Review Article

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*For Correspondence

Karunasree P, MBA, GITAM University, Visakhapatnam, Andhra Pradesh, India, Tel: +919985642255

E-mail:

karunasreepandiri@gmail.com

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ABSTRACT

Milk is a lacteal secretion by the mammary glands of well evolved mammals. It is the essential outsource of nourishment for infants before they can eat anything. India ranks first in the production of Milk in the world. Increasing demand for dairy products for domestic use and gap between demand-supply led India to be the largest importer in the world. Milk supplements various types of essential nutrients to the mammals.

INTRODUCTION

Milk is a nutritive liquid form acquired from diverse animals for the man kind. Majority of the milk is produced by dairy cows, though milk from goats, buffalo, and reindeer is also consumed in various parts of the world. In some countries, raw milk is processed before using in the house hold. During processing the fats content of the milk is adjusted, diverse nutrients are introduced, and probably harmful microorganisms are killed.

HISTORY

Consumption of milk has been started from Neolithic age. Domestication of cattle, goats and sheep were mainly started in South West Asian countries around 7000BC [1-8]. Initially, animals are reared for the meat consumptions. But later, the killing of animals started for their leather, hair and they are used for labor work. In 4000 BC, the consumption of milk started by the human population [9-15].

Dairy domestication started in Southwest Asia and slowly it moved to European countries. Central Europe and the British are the first ones to milk from cattle [16-24]. During colonialism, tremendous increase in consumption of milk started. During Industrialization, Dairy industry has emerged as an Industry and boosted the income of the developed countries. Milk production became a source of income for the Countries [25-30].

Sources of Milk

Milk contains 80-90% water and remaining 10% nutrients (Carbohydrates, fats, minerals, proteins and vitamins).

Milk can be produced majorly by Dairy Cows, which is sent to various industries or households. Human milk can be distributed by Milk Banks provide human milk to newly born kids.

Dairy Cows contribute nearly 85% of the milk production in the whole world [31-37]. Apart from cows, milk can be produced from domestic animals like: goat, sheep, camel etc.,

Commercial production of milk by using various methods is done in industries to meet the demand [38-42].

Types of Milk

Milk can be differentiated based on the fat content and processing involved.

Milk can be differentiated based on the fat content and processing involved. Total urea content in the milk shall not be more than 700 ppm [43-55].

Whole milk

Semi skimmed milk

Skimmed milk

Reduced-fat milk (2%)

Low-fat milk (1%)

Toned milk

Full Cream Milk

Condensed milk

Properties of Milk

Physical properties of milk

1. Density: The density of milk depends on the temperature and the composition of the fat content. The density of milk lies within 1027 to 1033 kg/m³ at 20 °C

2. Colour: It is a yellowish white colour due to the presence of carotene pigment that is synthesized from the feed (green grass). The riboflavin present in whey is greenish in colour.

3. Freezing point: The freezing point of milk is -0.552 °C or 31 °F with an average of -0.522 °C which is lower than the freezing point of water [56-65].

4. Boiling point: Boiling point of milk is 100.17 °C. As milk is heavier than water, the boiling point of milk is heavier than water.

Chemical Properties of milk: Chemically milk is a composition of carbohydrates, fats and protein aggregates with minerals.

1. pH: The pH of milk lies between 6.4 to 6.8

2. Lipids: Milk contains fat globules. These fat globules are composition of triacylglycerols, phospholipids along with proteins.

3. Proteins: Milk contains 30 to 35g of protein/litre. Most of the protein is arranged in casein micelles.

4. Carbohydrates: Milk contains carbohydrates like lactose, glucose, galactose and other oligosaccharides.

5. Other Components: Other components present in milk are salts, minerals and vitamins [66-72].

Processing of Milk

Processing of milk involves a step by step process (**Figure 1**).

Collection and separation: Milk is collected from the farmers or from the farm directly and sent to the industry through tanks. At the milk processing plant, the milk is tested and the temperature is recorded [73-78]. Then the milk in the truck is weighed and is pumped into refrigerated tanks through adaptable stainless steel or plastic hoses.

The milk is separated for debris, bacteria, excess cream.

Pasteurization: Pasteurization is a process that kills bacteria and other harmful microorganisms in milk at low temperatures. So the milk is sent to the Pasteurization chamber [79-84]. Milk must be heated at 161°F or 72°C for 15 seconds and cooled to room temperatures.

Microfiltration is the process of filtering the milk and increases its shelf life [85-89].

Homogenization: It is the process of separating excess fat or cream from milk. In this process, the pasteurized milk is pressurized using Cylinder pistons. The force applied separates the fat from the milk. Then the milk is cooled to room temperature [90-93].

Marketing: This milk is packaged in a separate unit under hygienic conditions and sent to the warehouses for human supply. During this process, the unit is cleaned every day to avoid any contamination.

Nutritional Values

Milk contains protein ranging between 3.3%-3.9% while carbohydrates ranges between 4.7%-4.9%. Milk is a great source for calcium and vitamin D [94-100].

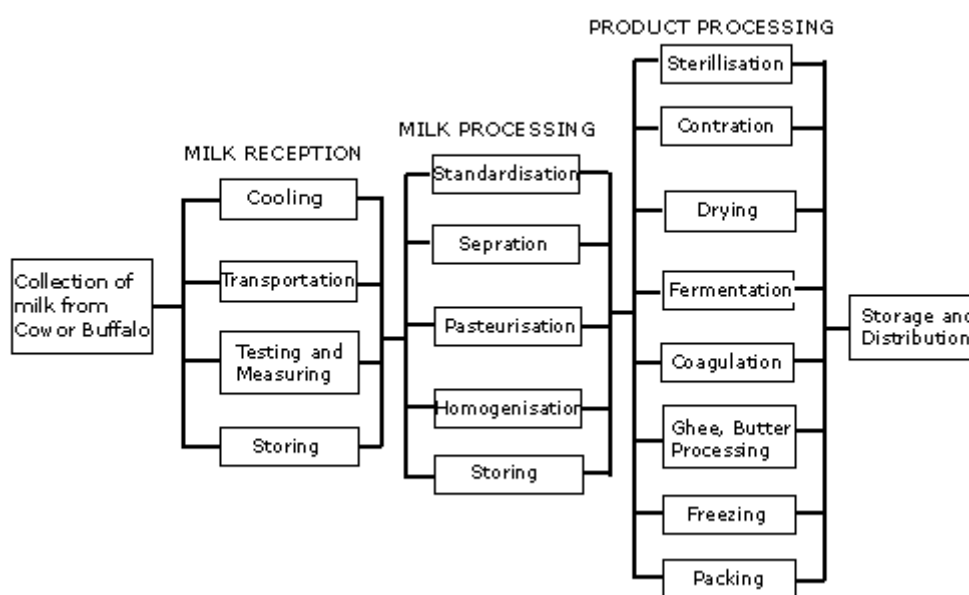


Figure 1. Processing of Milk

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