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To study the Additives & Processing Techniques in Packet Milk Samples

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Abstract

Milk is the colloidal aqueous suspension consisting of many components, several of which include carbohydrates, lipids, fats, proteins, and phosphate. The percentage of each of these components will depends upon the source of the milk (e.g., cow, goat, etc.) as well as the methods used to process the milk. This study is done to survey the Additives & Processing Techniques in Packet Milk Samples, consumption and milk production in India. This survey will help in field of milk consumption of milk. By that point, the supply system for milk was the most highly organized and integrated of any food product. & milk adulteration.

Keywords: milk, lipids, fats, protein, phosphate,

INTRODUCTION

Milk is the colloidal aqueous suspension consisting of many components, several of which include carbohydrates, lipids, fats, proteins, and phosphate. The percentage of each of these components will depends upon the source of the milk (e.g., cow, goat, etc.) as well as the methods used to process the milk. Milk is the nutrient liquid secreted by the mammary glands of female mammals. It can reduce the risk of many diseases in both the mother and baby. The exact components of raw milk vary by species, but it contains significant amount of unsaturated fats, protein, and calcium. In many ethnic groups, people lose the ability to digest milk after childhood; so many traditional cuisines around the world do not feature dairy products. On the other hand, those cultures that do tolerate milk have often exercised great creativity in using the milk of domesticated ruminants, especially cows, but also sheep, goats, yaks, water buffalo, horses, & camels. In daily life, buffalo, & cow's milk has been processed into dairy products such as cream, butter, yoghurt, ice creams, and specially the more durable and easily transportable product, cheese. Industrial science has brought us casein, whey protein, lactose, condensed milk, powdered milk, and many other food additive and industrial products. Milk is a complete diet as it contains in its Minerals, Vitamins Proteins, Carbohydrates, Fats and Water. Average composition of milk from different sources is given below:

Table No 1 Nutrition chart of milk

Source Of milk	Water (%)	Minerals (%)	Proteins (%)	Fats (%)	Carbohydrates (%)
Cow	87.1	0.7	3.4	3.9	4.9
Goat	87.0	0.7	3.3	4.2	4.8
Sheep	82.6	0.9	5.5	6.5	4.5

Milk is a white 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, 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. Milk is an emulsion of butterfat globules within water-based fluid. Each fat globule is surrounded by a membrane consisting of phospholipids and proteins; these emulsifiers keep the individual globules from joining together into noticeable grains of butterfat and also protect the globules from the fat-digesting activity of enzymes found in the fluid portion of the milk. Milk contains dozens of other types of proteins besides the caseins. The carbohydrate lactose gives milk is sweet taste and contributes about 40 % of whole cow milk's calories.

1.1 Food product for humans : In many cultures of the world, especially the West, humans continue to consume milk beyond infancy, using the milk of other animals (especially cattle, goats and sheep) as a food product Milk is processed into a variety of dairy products such as cream, butter, yogurt, ice cream, and cheese. Modern industrial processes use milk to produce casein, whey protein, lactose, condensed milk, powdered milk, and many other food-additives and industrial products Whole milk, butter and cream have high levels of saturated fat. The sugar, lactose, is found only in milk, forsythia flowers, and a few tropical shrubs. The enzyme needed to digest lactose, lactase, reaches its highest levels in the small intestine after birth and then begins a slow decline unless milk is consumed regularly.

Table no 2: Per capital consumption of milk and milk products in selected countries in 2011

Country	Milk (liters)	Cheese (kg)	Butter (kg)
United States	75.8	15.1	2.8
United Kingdom	105.9	10.9	3.0
India	39.5	-	3.5
Germany	51.8	22.9	5.9
China	9.1	-	0.1

1.2 Industrialization: The growth in urban population coupled with the expansion of the railway network in the mid-19th century, brought about a revolution in milk production and supply. Individual railway firms began transporting milk from rural areas. Urban demand began to grow, as consumer purchasing power increased and milk became regarded as a required daily commodity. Over the last three decades of the 19th century, demand for milk in most parts of the country doubled, or in some cases, tripled. Legislation in 1875 made the adulteration of milk illegal - this combined with a marketing campaign to change the image of milk. The proportion of rural imports by rail as a percentage of total milk consumption in London grew from under 5% in the 1860s to over 96% by the early 20th century. By that point, the supply system for milk was the most highly organized and integrated of any food product.

Fig 1: Milk transportation in Maharashtra.

The first glass bottle packaging for milk was used in the 1870s. The first company to do so may have been the 'New York Dairy Company' in 1877. The Express Dairy Company in England began glass bottle production in 1880. French chemist and biologist 'Louis Pasteur' invented Pasteurization, a method of killing harmful bacteria in beverages and food products.

1.3: Sources of milk: In the Western world, cow's milk is produced on an industrial scale and is by far the most commonly consumed form of milk. Commercial dairy farming using automated milking equipment produces the vast majority of milk in developed countries. Dairy cattle such as the Holstein have been bred selectively for increased milk production. These animals include buffalo, goat, sheep, camel, donkey, horse, reindeer, and yak. The first four respectively produced about 11%, 2%, 1.4% and 0.2% of all milk worldwide in 2011.

2. PROCESSING METHODS

Fig 2: Collection of milk

In most Western countries, centralized dairy facilities process milk and products obtained from milk (dairy products), such as cream, butter, and cheese. In the US, these dairies usually are local companies; while in the Southern Hemisphere facilities may be run by very large nationwide or trans-national corporations.

2.1 Pasteurization: Pasteurization is used to kill harmful microorganisms by heating the milk for a short time and then immediately cooling it. The standard high temperature short time (HTST) process produces a 99.999% reduction in the number of bacteria in milk, rendering it safe to drink for up to three weeks if continually refrigerated. Dairies print

expiration dates on each container, after which stores remove any unsold milk from their shelves. A side effect of the heating of pasteurization is that some

Fig no 3 : Pasteurization machine

vitamin and mineral content is lost. Soluble calcium and phosphorus decrease by 5%, thiamine and Vitamin B12 by 10% and vitamin C by 20%. Because losses are small in comparison to the large amount of the two B-vitamins present, milk continues to provide significant amounts of thiamine and vitamin B12. The loss of vitamin C is not nutritionally significant, as milk is not an important dietary source of vitamin C.A newer process, ultra pasteurization or ultra-high temperature treatment, heats the milk to a higher temperature for a shorter amount of time. This extends its shelf life and allows the milk to be stored unrefrigerated because of the longer lasting sterilization effect. Pasteurisation kills many harmful micro-organisms by heating the milk for a short time and then cooling it for storage and transportation. Pasteurisation milk is still perishable and must be stored cold by both suppliers and consumers. Milk may also be further heated to extend its shelf life through ultra-high temperature treatment (UTH), which allows it to be stored unrefrigerated or even longer lasting sterilisation. Those preferring raw milk argue that the pasteurisation process also kills beneficial micro-organisms and important nutritional constituents. However, unpasteurised milk can harbour harmful disease causing bacteria such as tuberculosis, brucellosis, salmonella, diphtheria, and Escherichia coli. The cows must be maintained in very sanitary conditions and a watchful eye kept as to disease testing and vaccinations for this to be completely safe. Cheeses made with raw milk are regarded as safer as the milk typically had to be heated to some extent anyway to make the cheese, and this would kill many of the dangerous organisms possibly present.

Fig No 3 Micro filtration Machine

Microfiltration is a process that partially replaces pasteurization and produces milk with fewer microorganisms and longer shelf life without a change in the taste of the milk. In this process, cream is separated from the whey and is pasteurized in the usual way, but the whey is forced through ceramic micro filters that trap 99.9% of microorganisms in the milk (as compared to 99.999% killing of microorganisms in standard HTST pasteurization). The whey then is recombined with the pasteurized cream to reconstitute the original milk composition.

3:VARIETIES AND BRANDS: Milk products are sold in a number of varieties based on types/degrees of:

- Additives (e.g. vitamins),
- Age (e.g. cheddar),
- Coagulation (e.g. cottage cheese),
- Farming method (e.g. organic, grass-fed).
- fat content (e.g. half and half),
- Fermentation (e.g. buttermilk),
- Flavourings (e.g. chocolate and strawberry),
- Homogenization (e.g. cream top),
- Reduction or elimination of lactose,
- Mammal (e.g. cow, goat, sheep),
- Packaging (e.g. bottle),
- Pasteurization (e.g. raw milk),
- Water content (e.g. dry milk)

3.1 :Reduction or elimination of lactose: Lactose-free milk can be produced by passing milk over lactase enzyme bound to an inert carrier. Once the molecule is cleaved, there are no lactose ill effects. Forms are available with reduced amounts of lactose (typically 30% of normal), and alternatively with nearly 0%. The only noticeable difference from regular milk is a slightly sweeter taste due to the generation of glucose by lactose cleavage. It does not, however, contain more glucose, and is nutritionally identical to regular milk.

3.2: Additives and flavouring: In areas where the cattle (and often the people) live indoors, commercially sold milk commonly has vitamin D added to it to make up for lack of exposure to UVB radiation. Reduced-fat milks often have added Milk often has flavouring added to it for better taste or as a means of improving sales. Chocolate milk has been sold for many years and has been followed more recently by strawberry milk and others. Some nutritionists have criticized flavoured milk for adding sugar, to the diets of children commonly in India.

3.3: Packaging in India: Commonly sold in 500 ml plastic bags and in bottles in some parts like in west. It is still customary to serve the milk boiled, despite pasteurization. Milk is often buffalo milk. Flavoured Milk is sold in most convenience stores in waxed cardboard containers. Convenience stores also sells many varieties of milk (such as flavoured and ultra-pasteurized) in different sizes, usually in aseptic cartons.

Fig no 5 Worker keeping milk packet in aseptic cartons.

Australia and New Zealand:

Distributed in a variety of sizes, most commonly in aseptic cartons for up to 1.5 litres, and plastic screw-top bottles beyond that with the following volumes; 1.1 L, 2 L, and 3 L. 1 litre milk bags are starting to appear in supermarkets, but have not yet proved popular. Most UHT-milk is packed in 1 or 2 litre paper containers with a sealed plastic spout.

3. Canada

1.33 litre plastic bags (sold as 4 litres in 3 bags) are widely available in some areas (especially the Maritimes, Ontario and Quebec), although the 4 litre plastic jug has supplanted them in western Canada. Other common packaging sizes are 2 litre, 1 litre, 500 ml, and 250 ml cartons, as well as 4 litre, 1 litre, 250 ml aseptic cartons and 500 ml plastic jugs.

4. China

Sweetened milk is a drink popular with students of all ages and is often sold in small plastic bags complete with straw. Adults not wishing to drink at a banquet often drink milk served from cartons or milk tea.

CONCLUSION:

Milk is a colloidal aqueous suspension consisting of many components, several of which include Carbohydrates, lipids, proteins, and phosphate. The percentage of these components will depends Upon the source of the milk (e.g. cow, buffalo, goat, etc.) as well as the methods used to process the milk.

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