

A REVIEW ON CASIEN FROM VARIOUS MILK SAMPLES ITS USES AND IMPORTENCE

P. Harsha Vardhan¹, N. Kalyan², A. Naga Durga Prasad³, V. Tejeswara Rao^{4*}

^{1,2,3} M.Sc. (Final) Analytical chemistry, MVR Degree and PG College, Visakhapatnam

^{4*} Associate professor, Department of chemistry, MVR Degree and PG College, Visakhapatnam.

Abstract:

The milk proteins are the oldest and most widely consumed food proteins. There is currently a large interest in these substances, both in nutritional field and in technological application. Casein proteins are a family of proteins involved in the production of cheese and fermented milk. They are very important nitrogen compounds not only for the dairy products production, but they are also additives in medicine, and they have a technical use in cosmetics, paints and adhesives. : Milk is an important part of human life and supposed to be a nutritious food which contain about 80% proteins. Milk proteins consist of 80% casein (soluble protein), 2-8% lactose (milk fat) and remaining is whey (byproduct of cheese and casein manufacture). Casein is more important and contain almost all essential amino acids. The purpose of the present work was to estimate the amount of casein in different milk samples including natural milk (cow, buffalo, sheep and goat).

Keywords: Milk powder, casein, Amino Acids, paint, cheese

Introduction:

The prime sources of milk are cow, milk and goat, but additionally now a day's milk also can be preserved in the form of powder to get utilized further as per the requirement. There are huge important milk products, which are essentially made up from milk. Hence the quality of milk utilized to prepare these different milk products is very important. [1-5]

The milk is an essential requirement for healthy growth of human being and animals. Essentially milk completes the diet of nearly all mammals. Milk is a multi-nutrient fluid and it is the primary source of nutrition for human & many of the animals.

By changing the eating habits, lifestyle of people has been advanced. The people are demanding high nutritious and cheapest food resource for their proper growth and development. In this perspective, milk can

contribute to ensure food security. Milk is a cheapest and basic source of all valuable nutrients required for the normal body growth and the brain development. Milk is a whitish liquid produced by the mammary glands of female mammals to feed or nourish their young ones. It is the richest and appreciable source of energy for infant mammals including human beings. Milk is an excellent source of proteins, fats, vitamins, minerals and antioxidants. It is a versatile ingredient used for the production of many dairy products i.e. cheese, yogurt, butter, creams, ice creams etc. It contains protein (3.4%), lactose (4.8%), fats (3.6%), water (87.5%), vitamins and minerals (0.7%) . Consumption of milk varies according to the age groups of people. There are about six billion people in the world who consume milk and other milk products [6-12].

The function of casein is to provide energy to human body. The name of casein is related to the family of phosphoproteins. These proteins are commonly found in the mammalian milk. In every country around the world, the demand of milk is very high due to its high protein value and essential growth constituents.

According to the research, in addition to the casein, protein, fats etc. there some transition elements are also present in the milk, some of them are beneficial for healthy growth of animals but at the same time some elements might not be useful to the animals including human being. Hence, the metals which are present in the all the sources of milk must be rectified, so that their advantages and disadvantages can be explore. In most of the research work the quantitative measurements of milk sample is investigated. But, for comparative assessments the quantitative and qualitative investigation is very useful to draw some important conclusions regarding the composition of milk from various sources like cow, buffalo and goat milk composition [13-17].

Casein is the name for a family of related phosphoproteins (α S1, α S2, β , κ). These proteins are commonly found in mammalian milk, making up 80% of the proteins in cow milk and between 20% and 45% of the proteins in human milk. Casein has a wide variety of uses, from being a major component of cheese, to use as a food additive, to a binder for safety matches.

Composition

Casein contains a fairly high number of proline residues, which do not interact. There are also no disulfide bridges. As a result, it has relatively little tertiary structure. It is relatively hydrophobic, making it poorly soluble in water. It is found in milk as a suspension of particles called "casein micelles" which show only limited resemblance with surfactant-typemicellae in a sense that the hydrophilic parts reside at the surface and they are spherical. However, in sharp contrast to surfactant micelles, the interior of a casein micelle is highly hydrated. The caseins in the micelles are held together by calcium ions and hydrophobic interactions. Any of several molecular models could account for the special conformation of casein in the micelles. One of them proposes the micellar nucleus is formed by several sub micelles, the periphery consisting of microvellosities of **κ -casein**. Another model suggests the nucleus is formed by casein-interlinked fibrils. Finally, the most recent model proposes a double link among the caseins for gelling to take place. All three models consider micelles as colloidal particles formed by casein aggregates wrapped

up in soluble κ -casein molecules. The isoelectric point of casein is 4.6. Since milk's pH is 6.6, casein has a negative charge in milk. The purified protein is water-insoluble. While it is also insoluble in neutral salt solutions, it is readily dispersible in dilute alkalis and in salt solutions such as sodium oxalate and sodium acetate.

Uses of Casein

Paint

Casein paint is a fast-drying, water-soluble medium used by artists. Casein paint has been used since ancient Egyptian times as a form of tempera paint, and was widely used by commercial illustrators as the material of choice until the late 1960s when, with the advent of acrylic paint, casein became less popular. It is still widely used by scene painters, although acrylic has made inroads in that field as well.

Glue

Casein-based glues, formulated from casein, water, hydrated lime and sodium hydroxide were popular for woodworking, including for aircraft, as late as the de Havilland Albatross airliner. Casein glue is also used in transformer manufacturing (specifically transformer board) due to its oil permeability. While largely replaced with synthetic resins, casein-based glues still have a use in certain niche applications, such as laminating fireproof doors and the labeling of bottles.

Cheese making

Cheese consists of proteins and fat from milk, usually the milk of cows, buffalo, goats, or sheep. It is produced by coagulation of casein. Typically, the milk is acidified and then coagulated by the addition of rennet, containing a proteolytic enzyme, typically obtained from the stomachs of calves. The solids are separated and pressed into final form. Unlike many proteins, casein is not coagulated by heat. During the process of clotting, milk-clotting proteases act on the soluble portion of the caseins, κ -casein, thus originating an unstable micellar state that results in clot formation. When coagulated with chymosin, casein is sometimes called **paracasein**. Chymosin (EC 3.4.23.4) is an aspartic protease that specifically hydrolyzes the peptide bond in Phe105-Met106 of κ -casein, and is considered to be the most efficient protease for the cheese-making industry (Rao et al., 1998). British terminology, on the other hand, uses the term caseinogen for the uncoagulated protein and casein for the coagulated protein. As it exists in milk, it is a salt of calcium.

Plastics and fibre

Some of the earliest plastics were based on casein. In particular, galalith was well known for use in buttons. Fiber can be made from extruded casein. Lanital, a fabric made from casein fiber (known as Aralac in the United States), was particularly popular in Italy during the 1930s. Recent innovations such as QMilch are offering a more refined use of the fiber for modern fabrics.

Protein supplements

An attractive property of the casein molecule is its ability to form a gel or clot in the stomach, which makes it very efficient in nutrient supply. The clot is able to provide a sustained slow release of amino acids into the blood stream, sometimes lasting for several hours. Often casein is available as hydrolyzed casein, whereby it is hydrolysed by a protease such as trypsin. Hydrolysed forms are noted to taste bitter and such supplements are often refused by infants and lab animals in favor of intact casein.

Medical and dental uses

Casein-derived compounds are used in tooth remineralization products to stabilize amorphous calcium phosphate (ACP) and release the ACP onto tooth surfaces, where it can facilitate remineralization.

Manufacturing Paint with the help of Casein



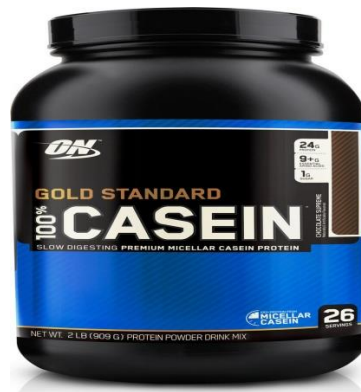
Cheese Making



Plastics and Fibres



Protein Supplements



Medical and dental uses



Uses Of Caseins And Caseinates

Rennet Casein

Rennet casein is a product different from acid casein. In industry, it is used principally in the production of artificial substances in the plastics category. Casein polymerized with formalin is known as galalith, and synthetic fibres of casein are known as lanital. In spite of the large supply of various plastics which compete directly with galalith, there is still some demand for casein for galalith production. Small quantities of rennet casein are also used as a raw material for processed cheese. Rennet casein is insoluble in water.

Acid Casein

Acid casein dominates the world markets. It is used in the chemical industry as an additive in paper manufacture for the glazing of paper of fine quality. For paper industry applications, it is particularly important that

the casein is free from fat and contains no particles of foreign or burnt matter that might make spots on the paper. To obtain extremely low fat content in skim milk, it should be passed through a microfiltration plant (MF) in combination with pasteurization. Each industry has its own strict quality specifications.

Conclusion:

As casein is major protein present in milk, contains almost all essential amino acids and important for digestion, growth and development. From this study, it is concluded that sheep milk is more beneficial for humans as compared to cow, buffalo and goat milk as it contains high amount of casein (g/100mL) 5.81 ± 0.01 in un-boiled form and 5.69 ± 0.021 in boiled sample than other natural milk samples. The casein percentage in sheep milk is also highest 5.64 ± 0.01 & 5.52 ± 0.021 in un-boiled and boiled milk samples respectively.

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