



Quantitative Analysis of Casein Precipitation from the Various Milk Samples

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ABSTRACT

Milk is a multivitamin fluid and it is the primary source of nutrition for human. It consists of 80% of proteins. The protein in the milk is classified into casein and whey protein. Milk protein consists of 80% of casein and 20% whey protein. 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. This study deals with the precipitation of casein from the various milk samples such as cow milk, goat milk, buffalo milk and also the samples that availed from the market. The technique of precipitation of casein is used to predict the protein content in the milk samples.

Keywords: Casein; Milk; Protein; Acetic acid

INTRODUCTION

The quantity, quality and fat-content from the various milk samples differ with the type of particular mammals and their fodder. The composition of milk varies with according to the animals from which it comes, providing the correct growth rate and development for the young of that species [1]. Casein is a slow digesting protein and it was suspended in the milk in a complex called micelle. The micelles are spherical and are 0.04 to 0.03 μm in diameter. Milk composition varies with the stage of location, age and breed [2]. Milk is colloidal nature due to the presence of proteins. The proteins are heavy molecules; they form colloids when dispersed in water medium. The primary function of protein in living cells is to promote growth and maintenance [3]. The nitrogen content of milk is distributed among casein 76%, when protein and non-protein nitrogen is 6% [4]. The structure of protein consist of a polypeptide chain of amino acids joined together by peptide linkages. Around the world, there are more than six billion consumers of milk and milk products. Over 750 million people live in dairy farming households [5]. It is used in paints for fast drying water-soluble medium (Figure 1). Casein based glues are formulated from the mixture of casein, water, hydrated lime and sodium hydroxide [6].

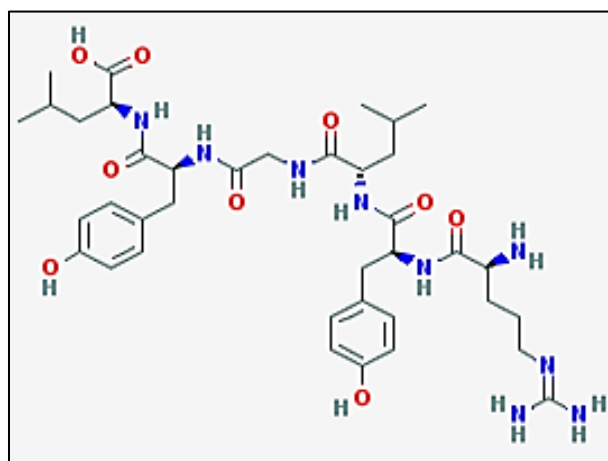


Figure 1: Structure of casein

MATERIALS AND METHODS

The collected milk samples are filtered for the removal of insoluble impurities like dirt, hair etc. The filtered 120 ml of milk samples are taken in a 250 ml beaker and it was heated to 60°C then cooled to room temperature. The milk samples were treated with 11 ml of 5% acetic acid, followed by continuous stirring. The samples are kept for 10 minutes and undisturbed. The casein molecules in the milk samples begins to precipitate at the bottom of the beaker, because due to the negative charge in the milk permits the dispersion of casein in it, when the positively charged acid is added to the milk samples, it neutralizes the negatively charged casein. The milk samples reached to the pH 4.7 the precipitate was formed. This is known as acid casein [7]. It is filtered through the cheese cloth, and the collected samples are dried and weighed accurately (Figures 2 and 3).

Various Milk Samples



Figure 2: Milk samples



Figure 3: Yield of casein

RESULTS AND DISCUSSION

Table 1: Yield of casein

No	Samples	Yield of casein (grams)
1	Cow milk	7.8
2	Buffalo milk	4
3	Goat milk	6.4
4	Market milk - A	6.8
5	Market Milk - B	5.5

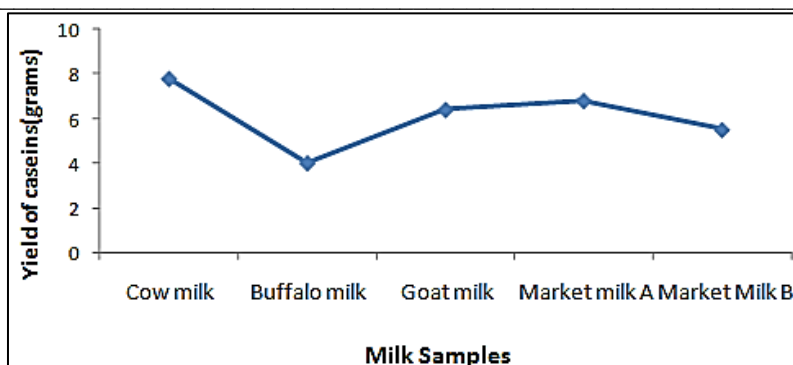


Figure 4: Casein from various milk samples

The yield of casein precipitated from the various milk samples of goat milk, cow milk and buffalo milk contains 6.4 gm, 7.8 gm and 4 gm respectively. Similarly, the milk samples availed from the market such as milk -A and milk -B was 6.8 gm and 5.5 gm respectively. This shows that the casein precipitated from the cow milk contains more amount of casein protein than the goat and buffalo milk samples. The lower amount of casein in the buffalo milk is may be due to the more fat content in it [8]. The dissimilarities between the milk samples -A and B is revealed that the market milk -B may be adulterated with water or any other substance (Table 1 and Figure 4).

CONCLUSION

This study clearly indicated that the amount of casein precipitated from the cow milk was higher than that of the other milk samples. The quantitative analysis of casein precipitated from the various milk samples provide the ample scope to the cottage cheese manufacture.

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