International Journal of Food Science and Nutrition
ISSN: 2455-4898
Impact Factor: RJIF 5.14
www.foodsciencejournal.com
Volume 2; Issue 6; November 2017; Page No. 215-216

Analysis of casein precipitation from the various milk samples available in market

Kulkarni CP
Department of Chemistry, Kirti M. Doongursee College of Arts, Science and Commerce, Dadar, Mumbai, Maharashtra, India

Abstract
Milk is important part of human life. It contains vitamins those play a vital role in milk uses human consumption. Since milk is generally viewed as nutritious food with lots of vitamins, minerals and fats, proteins etc thus used for drinking. It contains vitamins those play prophylactic role in cancer, autoimmune diseases, heart diseases etc. Vitamins play a vital role in milk used for human consumption. In the present study the precipitation of casein from the various milk samples such as cow milk, goat milk, buffalo milk and also the packed milk samples available in the local market were studied. The technique of precipitation of casein is used to predict the protein content in the milk samples.

Keywords: casein, milk, casein, cow, buffalo and goat

Introduction
Milk is an important source of all basic nutrients required for mammals including human beings. Milk from various mammals such as cow, buffalo, goat, sheep, camel, etc. is used for different nutritional purposes, e.g., feeding to young ones and preparation of some nutritional products such as milk cream, butter, yogurt, ghee, sour milk, etc. (Webb *et al.*, 1974) [7]. Nutritionally enriched milk and its products with enhanced biological potential and without health risks are generally demanded (Baloch *et al.*, 2006).
Since milk is generally viewed as nutritious food with lots of vitamins, minerals, fats, proteins etc thus used for drinking purpose. There are different sources of milk samples available, however sufficient information regarding their vitamin present, especially protein, fat etc. Milk is processed into a variety of dairy products such as cream, butter, yogurt, kefir, 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. This paper detects lactose, casein present in the milk (Abou, 2010) [1].
Casein is a slow digesting protein and it was suspended in the milk in a complex called micelle. Milk composition varies with the stage of location, age and breed. 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. The nitrogen content of milk is distributed among casein 76%, when protein and non-protein nitrogen is 6% (Coni *et al.*, 1995) [2]. 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. It is used in paints for fast drying water-soluble medium. Casein based glues are formulated from the mixture of casein, water, hydrated lime and sodium hydroxide (Webb *et al.*, 1974) [7].

Materials and Methods
Determination of casein in the milk
Place 10 g of the prepared sample into each of two flasks. Add one milliliter of phenolphthalein indicator solution, followed by 0·4 rnl of the potassium oxalate solution. Set aside for 2 minutes. Neutralize the contents of one of the flasks with the standard sodium hydroxide solution using the other flask as a blank. Add 2 ml of neutralized formaldehyde and again titrate with the standard sodium hydroxide solution to the same pink shade (Plummer 1988; Ghatak and Bandyopadhyay, 2007) [4, 3].

Calculation
The first titration value is not required, but the volume in milliliters of the standard sodium hydroxide used in the second titration shall be noted. Multiply this value by 1·38 to obtain the percentage of casein

Results and Discussion

Table 1: Yield of casein

S. No	Milk Samples	Yield of casein (grams)
1	Cow milk	6.9
2	Buffalo milk	4.8
3	Goat milk	5.4
4	Packed milk -1	6.2
5	Packed Milk - 2	3.5
6	Packed Milk - 3	5.8

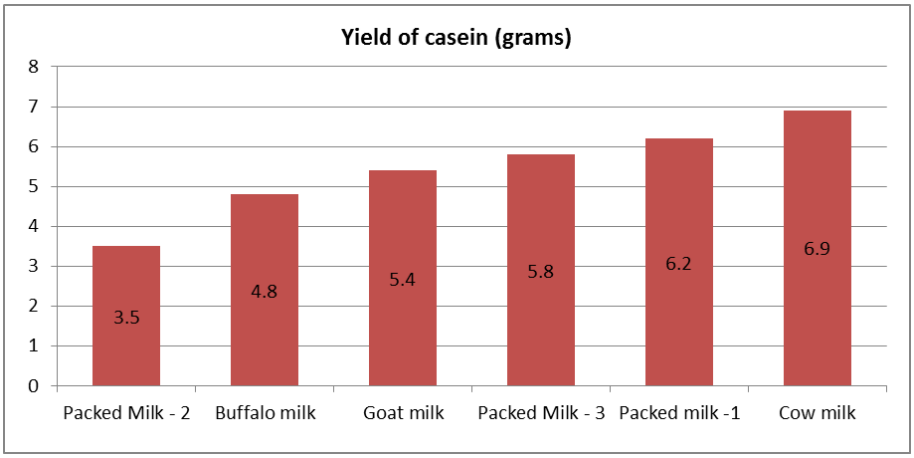

Fig 1: Casein from various milk samples

According to Sindhu (1998) [6] buffalo milk has about 11.42% higher protein than cow milk. The concentrations of both, the case in and whey proteins are different in cow and buffalo milk. Buffalo milk contains higher caseins and whey protein than cow milk. Whole of the caseins in buffalo milk is present in miceller form while in cow milk only 90-95% is the miceller casein and rest is present in the serum phase. The particle size of the buffalo miceller casein is larger at 110- 160 nm than that of cow miceller casein 70-110 nm (Saraswat, 1985) [5].

Protein Milk is a good source of high quality protein 30. Milk and milk products are the largest source of protein in per school children and the second largest contributor furthr to meat and meat products. Cows‟ milk contains about 3.5% protein by weight, and of this total protein, 80% is casein and 20% whey. Casein is the dominant protein in milk and can be fractionated into four major components: alpha, beta, gamma and kappa casein. Cow‟s milk contains about 4.5g lactose per 100g milk and there is some evidence that lactose is the least cariogenic of the common dietary sugars. In addition, various other components of milk have been considered to be protective against dental caries. Fat the fat content of milk varies depending on whether milk is whole, semi skimmed or skimmed.

The yield of casein precipitated from the various milk samples of, cow milk, buffalo milk and goat milk contains 6.9 gm, 4.8 gm and 5.4 gm respectively. Similarly, the milk samples availed from the market such as milk -1, milk-2 and milk -3 was 6.2gm, 3.5gm and 5.8gm 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. The dissimilarities between the milk samples -1, milk sample-2 and 3 is revealed that the market milk-3 may be adultered with water or any other substance.

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.

References

1. Abou Donia MA, Abou-Arab AAK, Enb A, El-Senaity MH, AbdRabou NS. Chemical composition of raw milk and the accumulation, 2010.
2. Coni E, Bocca A, Ianni D, Caroli S. Preliminary evaluation of the factors influencing the trace element content of milk and dairy products. Food Chem. 1995; 52(2):123-130.
3. Ghatak PK, Bandyopadhyay AK. Practical of Diary Chemistry, Kalyani Publishers, New Delhi, 2007.
4. Plummer DT. An Introduction to Practical Biochemistry. 3rd Ed. New Delhi: Tata McGraw-Hill Publishing Company Ltd. 1988, 160-161.
5. Saraswat BL. Effect of season on the nitrogen distribution of cow and buffalo milk. Asian Journal of Dairy Research. 1985; (2):108-1100
6. Sindhu JS. Chemical aspects of cow and buffalo milk in relation to quality of traditional dairy products. In Compendium: Advances in traditional dairy products. Centre for Advanced Studies in Dairy Technol. NDRI Karnal. 1998, 12-16.
7. Webb BH, Johnson AH, Alford JA. Fundmental of Dairy Chemistry. 2nd Ed. Westport, CT: AVI Publishing Co; Chapter I, 1974.