

**AMOUNT OF CASEIN PRESENT IN DIFFERENT
SAMPLES OF MILK**

BY

ARajendraprasad 006-21-4101 [MPC- I Yr] D.Moreshwar 006-21-417 [MPC- I Yr]

G.Sanjay 006-21-4109[MPC- I Yr]

Shaik Imam Pasha-006-21-4117 [MPC- I Yr]

B.Anjali 006-21-4105[MPC- I Yr]

Omkar 006-21-4120 [MPC- I Yr]

Ch. Tharun 006-21-4106 [MPC- I Yr]

T.Kumar 006-21-4118[MPC- I Yr]

E.Anvesh 006-21-4108 [MPC- I Yr]

J. Upender 006-21-4004[MPC- I Yr]

SUPERVISED BY

K.SUNEETHA

Asst.Prof. of Chemistry



**DEPARTMENT OF CHEMISTRY
KAKATIYA GOVERNMENT COLLEGE, HANAMKONDA.**

DEPARTMENT OF CHEMISTRY
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CERTIFICATE

This is to certify that the project report entitled “Amount of casein present in different samples of milk” submitted to head department of chemistry Kakatiya Government College, Hanamkonda it was carried out by the following students under my guidance. A.Rajendraprasad , D.Moreshwar, G.Sanjay Shaik, Imam Pasha,B.Anjali Omkar, Ch. Tharun , T.Kumar ,E.Anvesh] , J. Upender my guidance .

Signature of the Head

Signature of the guide

K. Suneetha

Asst. Prof. of Chemistry

AMOUNT OF CASEIN PRESENT IN DIFFERENT SAMPLES OF MILK

Aim:

To determine the amount of casein present in different samples of milk.

Introduction:

Milk is a multi nutrient fluid and it is the primary source of nutrition for human beings. 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 phosphor proteins. 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.

Casein is the main protein constituent of milk. It constitutes about 80% of the total protein in cow's milk and about 3% of its weight. It group of protein precipitated when the milk is slightly acidified. It dissolves slightly in water, extensively in alkalis' or strong acids. Casein is a complete protein meaning that it contains all of the essential amino acids, which the body can not manufacture on its own. When dried, it is a white, amorphous powder without taste and odour. It is a mixed phosphor protein and occurs in milk as calcium salt (calcium caseinate) in the form of micelle. The micelle has a negative charge. When an acid is added to the milk, the negative charges are neutralized.

Calcium caseinate + acetic acid \rightarrow casein (s) + calcium acetate (aq)

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. 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. 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%.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 (Figure -1). Casein based glues are formulated from the mixture of casein, water, hydrated lime and sodium hydroxide

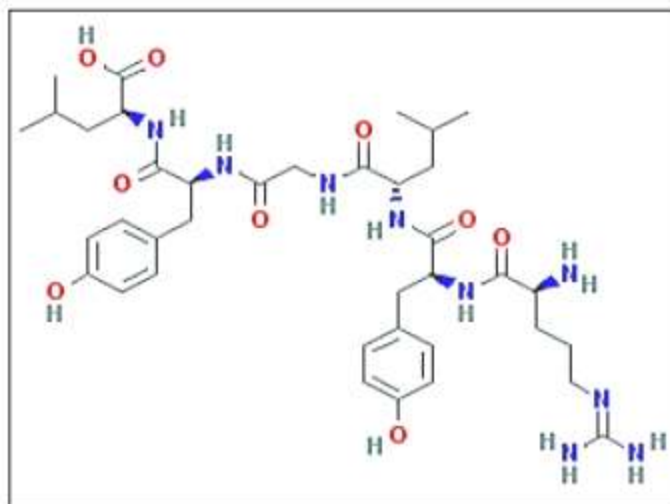
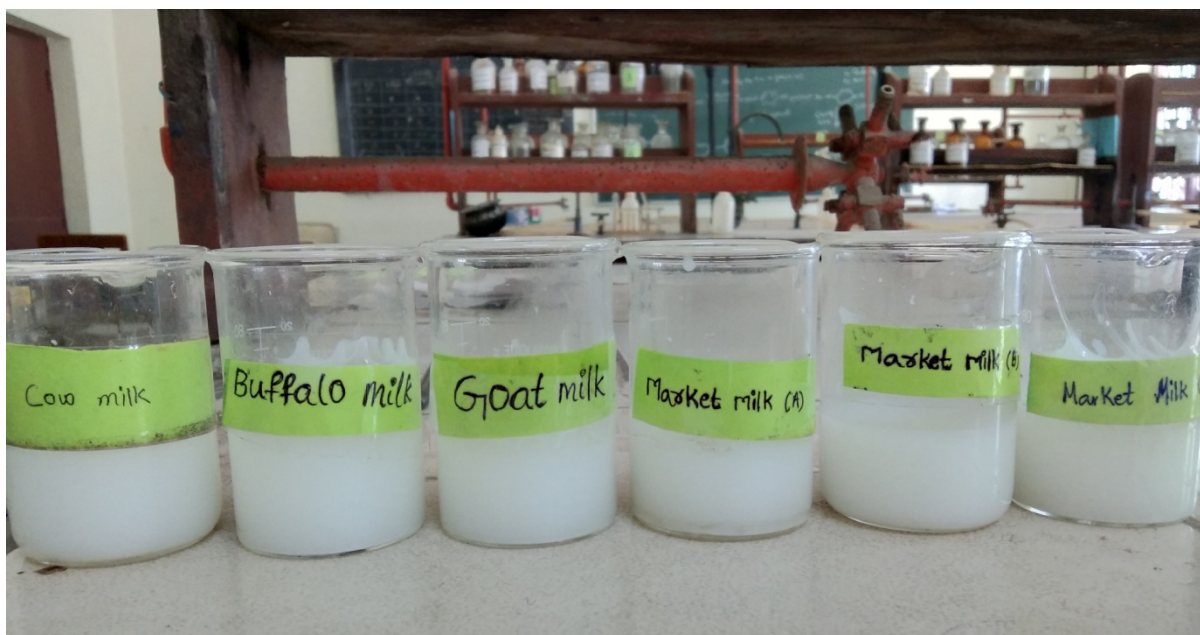


Figure 1: Structure of casein

Requirements:

Apparatus and Chemicals

- 250 ml beakers
- Funnel
- Glass rod
- Chemical balances
- Test tubes
- Filtration flask
- Bunsen burner
- Different samples of milk
- 1% acetic acid solution
- Saturated ammonium sulphate solution



Different samples of milk collected by the students

Procedure:

- Take a clean dry beaker, put into it 20cc of cow's milk and add 20 ml of saturated ammonium sulphate solution slowly and with stirring. Fat along with casein will precipitate out.
- Filter the solution and transfer the precipitates in another beaker.
- Add about 30 ml of water to the precipitate.
- Only casein dissolves in water forming milky solution leaving fat undissolved.
- Heat the milky solution to about 40° C and add 1% acetic acid solution drop wise, when casein gets precipitated.
- Filter the precipitate, wash with water and let the precipitate dry.



Amount of Casein in different samples of milk

- Weigh the dry solid mass in a previously weighed watch glass.
- Repeat the experiment with other samples of milk

Observation Table:

Volume of milk taken in each case = 20 ml.

S.No	Milk Samples	Yield of Casein(g)
1	Cow milk	7.8
2	Buffalo milk	4.0
3	Goat milk	6.4
4	Market milk-A	6.8
5	Market milk-B	5.5
6	Market milk-C	6.2

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, milk-B and milk -C was 6.8 g, 5.5 g and 6.2g 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 [5]. The dissimilarities between the milk samples –A, B and C is revealed that the market milk -B may be adulterated 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.

According to the research findings, cow milk contains the largest amount of casein protein. Thus, the cow milk is suitable for the best muscle growth and basic body building achievements. It was found that goat milk contains the small amount of casein protein. Although the mineral content of goat's milk and cow's milk is generally similar, goat's milk contains more calcium, potassium, iron, magnesium and sodium. All milk has lots of casein but there are different types of casein and for someone who has casein sensitivity, goat milk may provide an alternative to which they do not react.



Heating of the various Milk samples at 40 °C in the Laboratory



Filtration of casein from the acidified milk sample

References:

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