IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Quantitative Estimation Of Casein In Different Milk Samples From Washim Dist. (M.S.)

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Abstract:

Milk proteins have high nutritious values as they contain all essential amino acids required by infant body. The lifestyle of people has been advanced in recent decades and the eating habits are also changing. As the population is increasing rapidly, the demand of high nutrition rich and cheapest food resources is also increasing. Milk can contribute in this perspective as it is cheap and a basic source of all valuable nutrients required for growth and development. The present work aims to estimate the amount of Casein present in 9 different natural milk samples including cow, buffalo, sheep, goat, horse, donkey and camel from Washim Dist. Maharashtra. In all the milk samples, ship milk contains highest casein concentration 5.82 ±0.02 gm/100ml and donkey milk contains lowest casein concentration 3.14 ±0.121 gm/100ml. If quantity of casein in milk is more, then the milk is supposed to be more beneficial. From the present research it can be indicated that milk of ship is more beneficial since it has highest concentration of casein.

Key Words: Milk, Casein, Precipitation, Protein, Amino acid, Washim Dist.

Introduction:

Milk and dairy products are consumed by billions of people every day. Milk and milk products are not only a good source of nutrition for people but it also provides livelihood opportunities for farmers, processors and shopkeepers. It is a white liquid produced by the mammary glands of mammals. All mammals, including humans, will normally produce milk to feed their offspring, weaning those offspring onto solid food as they get older. For infant mammals, milk is the richest source of energy. Since milk is generally viewed as a nutritious food with lots of vitamins, minerals, fats, proteins, etc. thus used for drinking purpose (Patil, et. al.,2019).

Milk contains numerous nutrients and it makes a significant contribution to meeting the body's needs for calcium, magnesium, selenium, riboflavin, vitamin B12 and pantothenic acid (vitamin B5). It contains proteins, fats, minerals, vitamins, carbohydrates, water, etc. All these constituents are present in milk of all

mammals but their proportions differ from one species to another. The quality, quantity and fat contents of milk also differ with the type of mammals and their fodder.

As an agriculture product, milk, also called dairy milk, is extracted from farm animals during or soon after pregnancy. Dairy farms produced about 730 million tons of milk in 2011, from 260 million dairy cows. India is the world's largest producer of milk, and is the leading exporter of skimmed milk powder, yet it exports few other milk products. The ever-increasing rise in domestic demand for dairy products in future (Mote et. al., 2021).

Casein is the name of related phosphoprotein. Casein has wide variety of uses, from being a major component of cheese, to use as a food additive, /to a binder for safety matches. As a food source, casein supplies for amino acids, carbohydrates and two inorganic elements, calcium and phosphorous (Patil, et. al., 2019). Casein (from Latin caseus "Cheese") is a family of related phosphor proteins (αS1, αS2, β, κ). These proteins are found in mammalian milk, making up 80% of proteins in cow milk and between 20% and 45% of proteins in human milk. The j casein has a wide variety of uses, from being a major component of cheese, to use as a food additive (Mote et. al., 2021). The most common form of casein is Sodium caseinate. Casein can be used in manufacturing of dairy products like curd, cheese, buttermilk, ice-creams, etc. Besides this, casein also have some non-food applications. Casein has good stabilising and emulsifying properties. Caseinate can act as good adhesive for wood, paper or glass. It also has other applications like paper coating, protective coating and foam, binders in processed meat, dressing of leather and man-made fibres, etc.

After knowing the importance of casein, the present research aims to estimate amount of casein present in different natural milk samples.

Materials and Methods:

- **Collection of Milk Samples:** 09 milk samples were collected from different mammals like cow, buffalo, goat, sheep, donkey horse and camel of Washim city. Natural milk was used to estimate casein concentrations in different samples. The milk samples were placed in ice and bought to the research laboratory of PG. Department of Zoology of R.A. Arts, Shri M.K. Commerce and Shri S. R. Rathi Science Mahavidyalaya Washim, Maharashtra. The collected milk samples were filtered to remove the insoluble impurities like hairs, dirt, etc.
- **Materials required:**
  Different Milk samples, 1% Acetic acid, Distilled Water, Beaker, Glass rod, Conical flask, funnel, filter paper, cheesecloth, pH meter, etc.
- **Casein Preparation:**
  100 ml of each milk sample was heated between 50-60 °C for about 5 minutes (pasteurization) to remove any bacteria. 1% Acetic acid was then slowly added with constant stirring. pH meter was used to check the pH of each milk sample. The pH must be 4.6 to 4.7. The precipitates of acidic casein were filtered with cheese cloth and washed with distilled with methanol to remove fats. After removal of

fats, the Precipitated Casein is filtered and washed with distilled water. It is filtered through cheese cloth and collected samples are dried and weighed accurately.

Result and Discussion:

Milk with higher quantity of casein is supposed to be more beneficial. Casein is a milk protein which is composed of alpha, beta, kappa and gamma caseins. To estimate the amount of casein in milk, 09 natural milk samples were studies including Indigenous cow, Jersey cow, Nagpuri buffalo, Murrah buffalo, goat, sheep, donkey, horse and camel. All the milk samples were collected from Washim District Maharashtra and stored in cool place before conducting the experiment. Samples were filtered to remove any kind of suspended impurities in milk. In milk casein comprises near about 70 to 80 % of total milk proteins. During the present study, the amount of casein (gm/100ml) precipitated from various milk samples of Indigenous cow, Jersey cow, Nagpuri buffalo, Murrah buffalo, goat, sheep, donkey, horse and camel was found to be 4.7 ±0.01, 4.81 ±0.028, 5.69 ±0.01, 5.62 ±0.025, 5.64 ±0.020, 5.82 ±0.02, 3.14 ±0.121, 4.57 ±0.060 and 4.59 ±0.011 respectively. From the recorded results, it can be said that cow milk has less amount of casein as compared to the amount of casein present in buffalo milk. Ship milk (5.82 ±0.02 gm/100ml) has comparatively high amount of casein as compared to goat milk (5.64 ±0.020 gm/100ml). The milk of Camel has higher concentration of casein than horse milk and horse milk have higher amount of casein than donkey milk. Among all natural milk samples, Sheep milk has highest amount casein (5.82 ±0.02 gm/100ml) as compared to other milk samples. Similarly, the milk of buffalo is also beneficial with casein concentration 5.69 ±0.01 and 5.62 ±0.025. donkey milk has lowest casein concentration 3.14 ±0.121 gm/100ml. More the concentration of casein present, more beneficial the milk is. Hence sheep milk can be more beneficial than other animal's milk.

Sr. No.	Type of Milk	Yield of Casein (gm)			Mean (Average)	Mean ± SD
		Sample 1	Sample 2	Sample 3		
1.	Cow milk (Indigenous)	4.71	4.69	4.7	4.7	4.7 ±0.01
2.	Cow milk (Jersey)	4.89	4.8	4.85	4.81	4.81 ±0.028
3.	Buffalo milk (Nagpuri)	5.69	5.7	5.68	5.69	5.69 ±0.01
4.	Buffalo milk (Murrah)	5.65	5.62	5.6	5.62	5.62 ±0.025
5.	Goat milk	5.62	5.66	5.62	5.64	5.64 ±0.020
6.	Sheep milk	5.8	5.84	5.82	5.82	5.82 ±0.02
7.	Donkey milk	3.22	3.2	3	3.14	3.14 ±0.121
8.	Horse milk	4.61	4.6	4.5	4.57	4.57 ±0.060
9.	Camel milk	4.60	4.6	4.58	4.59	4.59 ±0.011

Table 1: Weight of casein in different milk samples

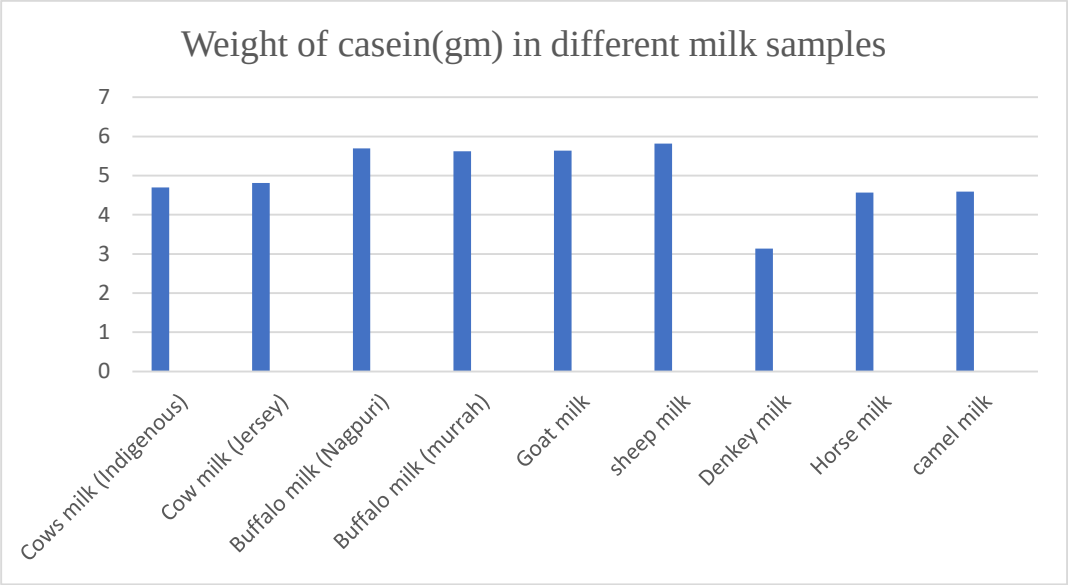

Figure 1: Graph showing weight of casein(gm) in different milk samples

Conclusion:

The present study concludes that Jersey cow's milk contains more casein as compared to milk of indigenous cow. Nagpuri buffalo's milk contains more casein concentration as compared to Murrah buffalo. Buffalo milk has higher casein as compared to cow milk. Sheep milk contains more casein than donkey milk. Camel milk has more casein concentration than Horse milk. Donkey milk has least casein concentration than any other milk sample studied in the present work. This study concludes that sheep milk is more beneficial with highest casein concentration 5.82 ±0.02 gm/100ml.

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