IN INVITRO ANALYSIS OF NUTRITIONAL COMPOSITIONS OF MILK FROM UMBALACHERI AND JERSEY COW

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ABSTRACT :
The present study was investigated to milk nutritional compositions of Umbalacheri and Jerry cow. The levels of Carbohydrate, protein, lipids and amino acid were higher concentration in Umbalacheri cattle milk when compared to Jersey cow milk. The vitamin A, C, D and E were present in both Umbalacheri cattle and Jersey cow milk. Umbalacheri cattle shows the presence of all the elements while nitrate was absent in Jersey cow milk the Umbalacheri cattle milk has rich nutritional value than the Jersey cow milk. This study revealed that the regular intake of milk protects the stress-mediated diseases such as cancer, arthritis, cardiovascular diseases etc. and also Umbalacheri cattle cow milk is promoted as a suitable alternative to breast milk and infant formula.
Key words: Umbalacheri, Jersey, Carbohydrate, protein, lipids, amino acid.

I.INTRODUCTION

Milk is as ancient as mankind itself, as it is the substance created to feed the mammalian infant. All species of mammals produce milk for this purpose. Milk is a very complex, naturally possessing many chemical and physical components. All milks contain the same kind of constituents but in varying amount. Within a given species, genetic factors and environmental conditions such as the climate and the stage of lactation influence the composition. Animal source foods are a rich source of iron, vitamin A, zinc, and iodine, the micronutrients with the highest global prevalence of deficiency.

World Health Organizational (WHO) review of nationally presentative surveys from 1993 to 2005 indicates that 47% of preschool children worldwide suffer from Anemia. Among animal source foods, milk is believed to play a unique role in promoting children growth and development.

Consumption of Cow's milk is a relatively recent phenomenon that dates back to the beginning of animal domestication [5]. Given that milk is intended to support the growth and development of nursing mammals, it has been hypothesized that consumption of Cow's milk during childhood will have a positive impact on linear growth [2] This process may be driven by the energy or protein content, by specific micronutrients or their combination, or by other factors present in milk.

It also comprises functional elements, such as traces of vitamins, enzymes and dissolved gases, and contains dissolved salts, especially in the form of phosphates, nitrates and chlorides of calcium, magnesium, potassium and sodium. It also contains dissolved gases (5% by volume), mainly carbon dioxide (CO_2), nitrogen (N) and oxygen (O_2) [4].

Recently, natural foods, dairy products and derived antioxidants such as vitamins and phenol phytochemicals have received growing attention. Milk contains a wide array of compounds with established or putative pro- or antioxidant function. The functions of these compounds have been intensively studied. The present study was made to investigate the nutritional composition of milk of Umblachery and Jersey cow.

II.MATERIALS AND METHODS

A. Collection of samples

The milk was collected from October in2019forUmblachery cattle and Jersey cow milk collected at Pandarampatti, Thoothukudi district, Tamil Nadu, India.

B.Qualitative Analysis of Vitamins

Vitamin- A Vitamin-C Vitamin -D Vitamin -E

Qualitative Analysis of Inorganic Elements

1.Calcium 2. Magnesium 3. Sodium 4. Potassium 5. Iron 6. Sulphate 7. Phosphate
8. Chloride 9. Nitrates

Quantitative analysis of Biochemical parameters

Total Protein was estimated by the method [16].

Total lipids in milk were estimated by the method of [17]

To estimate the amount of carbohydrate present in the given sample by using Anthrone method [18]

Estimation of Amino acids (Ninhydrin method) in milk were estimated. [12]

III. RESULTS AND DISCUSSION

The present study was carried out to analyse the various biochemical parameters in Umbalacheri cattle (Nattu Madu) and Jersey cow milk. The observations made on different Milk were compared as follows.

Table 1 and Figure 1- Shows the biochemical analysis of different milk. The levels of Carbohydrate, protein, lipids and amino acid were increased in Umbalacheri cattle milk when compared to Jersey cow milk.

Table.1: Biochemical analysis of milk

S. No	Biochemical	Results (mg/L)	
		Umblachery cattle (Nattu Madu)	Jersey cow milk
1	**Carbohydrate**	72.41 ± 0.54	63.72 ± 4.15
2	**Protein**	1.96 ± 0.18	1.67 ± 0.15
3	**Lipids**	0.18 ± 0.13	0.12 ± 0.09
4	**Amino acids**	45.63 ± 0.45	36.45 ± 0.39

Values are expresses as Mean ± SD for six values

Fig: 1: Biochemical analysis

Fig.2: A Qualitative analysis of Vitamins in Milk Umblachery cattle and

B. Qualitative analysis of Vitamins in milk Jersey cow

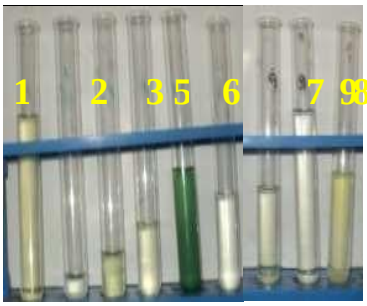
The present study was carried out to analyse of Qualitative of Vitamins in Umbalacheri cattle (Nattu Madu) and Jersey cow milk. The observations made on different milk were compared as follows.

Table 2 shows the Qualitative analysis of Vitamins in Milk. The vitamin A, C, D and E were present in Umbalacheri cattle and Jersey cow milk. **Qualitative analysis of minerals** The following elements were found in Umbalacheri cattle and Jersey cow milk. In Umbalacheri cattle shows the presence of calcium, sodium, magnesium, potassium, sulphate, nitrate, iron and chloride were presented. In Jersey cow shows the presence of calcium, sodium, magnesium, potassium, sulphate, Iron and chloride were presented and nitrate was absence in following Table 3.

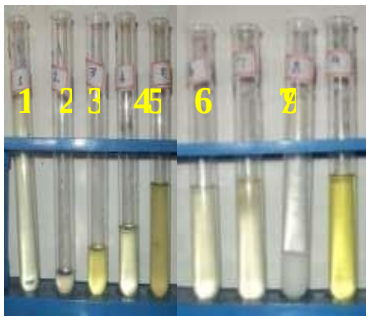
S. No	Minerals	Milk	
		Umbalacheri cattle (NattuMadu)	Jersey cow milk
1.	Calcium	+	+
2.	Magnesium	+	+
3.	Sodium	+	++
4.	Potassium	+	+
5.	Iron	+	+
6.	Sulphate	+	+
7.	Phosphate	+	+
8.	Chloride	+	++
9.	Nitrate	+	-

(- Absent, + present and ++ High concentration)

Fig.2A and B: Qualitative analysis of minerals in Milk



A: Umbalacheri cattle and (Nattu Madu) milk



B: Jersey cow milk

Biochemical studies are very important from the nutritional point of view. Carbohydrate play a vital role as energy precursors for fish under stress conditions [15]. Glucose is a carbohydrate that has a major role in the bioenergetics of animals, being transformed to chemical energy (ATP), which in turn can be expressed as mechanical energy. Changes in carbohydrate metabolism measured as plasma glucose (energy substrate whose production is thought to metabolically assist the animal to cope with an increased energy demand caused by stress) used as general stress indicators in fish [14]. Glucose (or glucose 6phosphate) is released through the degradation

of glycogen by glycogen phosphorylase (GP) [11], and energy is mainly supplied by the oxidation of glucose and lactate as a result of carbohydrate metabolism [7].

Protein is essential for the sustenance of life and accordingly exists in the largest quantity of all nutrients as a component of the human body [13]. Proteins are of important as structural compounds, biocatalysts and hormones for control of growth and differentiations [1]. Protein is a main component constituent of tissue and organs. They are precursors of other nitrogen compounds (enzymes, hormones, slurry, neurotransmitters, cofactors, etc) and constitute an important energy source. The effect of dietary lipid levels on growth performance varies considerably within species, size, age, diet and composition, range of lipids level tested and rearing conditions [1] [19].

Vitamins work with other substances in the body like enzymes and minerals. Together they perform such functions as strengthening bones, healing wounds, keeping the skin healthy, building cells, and helping to resist infections. The amounts of vitamins ingested from food are measured in micrograms or milligrams [10] [20 - 27].

Vitamins are separated into two groups, fat soluble and water soluble. The fat-soluble vitamins are A, D, E, and K, and can dissolve in dietary fats and are stored in the liver and body fat. The body stores them for a longer amount of time, so they are not needed every day. Too much of these vitamins can become toxic and cause health problems. The water-soluble vitamins are made up of 8 B vitamins and vitamin C. Water soluble vitamins dissolve in water, and are not stored in the body. Rather they travel through the bloodstream and need to be replenished every day. These vitamins are easily destroyed during food preparation and storage.

Vitamin E remains the most mysterious of vitamins. The body needs it but it lacks does not lead to any known disease. Vitamin E is the most exploited vitamin in that it is sold as a cure-all and even as an anti-aging potion. Vitamin E, vitamin C, and beta carotene are antioxidants. Some studies suggest that the trio might help to strengthen the body's immune system and play a role in cancer prevention [10].

Vitamin C, or ascorbic acid, is one vitamin humans cannot make; they have to get it from food. Vitamin C helps hold the cells together, heal wounds, and build bones and teeth. The best sources for vitamin C are citrus fruits, strawberries, melons, and leafy green vegetables. Vitamin C also helps to absorb and use Iron. It is important to protect the vitamins in fruits and vegetables from being destroyed; simple ways of doing this include refrigeration, washing them before cutting them, storing them in airtight containers, and avoiding high temperatures and long cooking times [10].

All human beings require a number of complex organic/inorganic compounds in diet to meet the need for their activities. The important constituents of diet are carbohydrates, fats, proteins, vitamins, minerals and water [6]. Every constituent plays an important role and deficiency of any one constituent may lead to abnormal developments in the body. Milk is the rich source of elements essential for human beings. There is a relationship between the element content of the plant and its nutritional status. Some elements are essential for growth, for structure formation, reproduction or as components of biologically active molecules while others have some other beneficial effects [8]

Qualitative or quantitative determination of mineral elements present in plants is important because the concentration and type of minerals present must often be stipulated on the label of a food. The quality of many foods depends on the concentration and type of minerals what they contains, also play a very significant role against a variety of degenerative diseases and processes, they may also prevent and reduce injury from environmental pollutants and enhance the ability to work and learn, some minerals are essential to a healthy diet (e.g. Calcium, Phosphorus, Potassium and Sodium) where as some can be toxic (e.g. Lead, Mercury, Cadmium and Aluminium). It is clear that mineral nutrition is important to maintain good health and because of that determination of As, Ca, Fe, Mg, Na, K, Zn, Ni, Co etc. have been added to Ayurvedic Pharmacopoeia of India (The Ayurvedic Pharmacopoeia of India, 1999). From ancient times, Swarnabhasma (gold ash) has been used in several clinical manifestations including loss of memory, defective eyesight, infertility, overall body weakness and incidence of early aging. Hence, their presence is vital for the health and to cure diseases. Mineral content indicates the nutritive value and potentially act as a cofactor for the biological activity exhibited by the plant extracts studied.

CONCLUSION

Milk and dairy products, which are basic foods for human development, can be beneficial for the oxidative defence of consumers by several mechanisms. In the present study was made to investigate the biochemical, vitamins and elements of milk in Umbalacheri cattle and Jersey cow. The levels of Carbohydrate, protein, lipids and amino acid were higher concentration in Umbalacheri cattle milk when compared to Jersey cow milk. The

vitamin A, C, D and E were present in both Umbalacheri cattle and Jersey cow milk. Umbalacheri cattle shows the presence of all the elements while nitrate was absent in Jersey cow milk. Overall, it can conclude that the Umbalacheri cattle milk has rich nutritional value than the Jersey cow milk. This study suggested that regular intake of milk protect stress-mediated diseases such as cancer, arthritis, cardiovascular diseases etc. and also Umbalacheri cattle cow milk is promoted as a suitable alternative to breast milk and infant formula.

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