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Preparation and quality evaluation of buttermilk manufactured from admixture of camel and goat milk

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Abstract

The present investigation was undertaken to develop Buttermilk manufactured from admixture of camel and goat milk partial addition of different ratios of camel and goat milk. Control buttermilk sample had 0.45% fat, 1.38% protein and 5.11% totalsolids.

During the preparation of Buttermilk manufactured from admixture of camel and goat milk was added in different ratios. Control sample had buffalo milk. The treatments were evaluated for various organoleptic characteristic, physico – chemical parameters. After sensory evaluation Treatment T₂(60:40) is better for Buttermilk manufactured from admixture of camel and goat milk. It was found to have highest score of 8.5 for flavour and taste, colour and appearance score of 8.50, consistency is 8.78 overall acceptability score of 8.50.

The physico-chemical analysis results shows that Treatment T₂(60:40) had maximum total solid 4.92%, fat 0.27%, protein 1.43%, Lactose 2.22%, and ash content of 0.84% of Buttermilk manufactured from admixture of camel and goat milk.

Keywords: Buttermilk, camel milk, goat milk, organoleptic evaluation, compositional analysis

Introduction

Buttermilk is traditionally known as "*Chhash*" (Gujarat and MP), "*Mattha*" (UP and Delhi), "*Tak*" (Maharashtra), "*Ghol*" (Bengal). *Chhash* is also popular, as sour buttermilk, in several other parts of the world i.e. East Asia, Africa, Europe, etc. Buttermilk has mild pleasing flavour resulting from a blend of clean acid taste and delicate aromatic flavour and it should be free from off flavours like flat, metallic, yeasty or bitterness. The colour of the cultured buttermilk varies from yellowish creamy white for cow milk to creamy white for buffalo milk and should be free from browning and extraneous matter; smooth and glossy appearance of cultured buttermilk is preferred. It should have uniform thick consistency and should be free from churned particles and smooth texture is more preferred (Binjan K. Patel *et al.*, 2017) ^[7].

Buttermilk is a one of the mostly used byproduct of the milk which is prepared by churning of cream in butter making process. This contains lipids, proteins and vitamins which are water soluble. Currently various types of buttermilk preparation methods are available in the world. In the areas of Indian subcontinent the buttermilk is known as Traditional Buttermilk. In these areas buttermilk is prepared from curd. Buttermilk is very useful in the digestive problems and the diseases associated with the digestion. Very rich source of Potassium, Calcium, Phosphorus, VitaminB12, & Riboflavin were present in buttermilk and it is a good aid digestive problem (Sailajapalthur *et al.*, 2014) ^[8].

Buttermilk refers to a number of dairy drinks. Originally, buttermilk was the liquid left behind after churning butter out of cream. This type of buttermilk is known as *traditional buttermilk*. In Ayurveda, buttermilk is used both to maintain health and as a treatment against diseases. There are reasons behind these uses of buttermilk for health. It is easy to digest, has astringent properties and a sour taste. It improves digestion and alleviates the feeling of puffiness. It is a natural treatment against swelling, irritation and digestive disorders, gastrointestinal ailments, spleen maladies, anaemia and lack of appetite as it Contains All Essential Macronutrients.(DrVandana S Yeragi, 2016) ^[9].

Camel Milk

As stimulation of Food and Agriculture Organization (2013) the total population of camel in the world is believed to be 25.89 million, of which 89% are one-humped dromedary camels (*Camelus dromedarius*) and the remaining 11% are the two-humped (*Camelus bactrianus*)

that generally found in the cold deserts of Asia while more than 60% of the dromedary camel population is concentrated in the arid areas of North East African countries like Somalia, Sudan, Ethiopia and Kenya. Ethiopia ranks third in the world by the number of camel herd after Somalia and Sudan.

Goat Milk

There are nearly 500 breeds of goats in the world; however, only a half dozen are generally raised for their milk purpose and about 600-700 million of dairy goats are present in the world. They are living in climates ranging from high altitude

mountains to deserts. More than 95% of the goat population is found in developing countries. Worldwide trends of the evolution of the goat population and their products between 1969 and 2010 show a continuous and rapid increase relative to either cattle or sheep, especially in the developing countries. The major species of dairy goats are Anglo-nubian, British alpine, Toggenburg and Saanen. Toggenburg is the best breed that can produce a lot of milk; it is not uncommon to find a two gallon (7.57 liters) milk per day.

Chemical composition of milk of different species

Table 1: Composition of different components

Proximate	Water %	Protein %	Fat	Ash %	Lactose %
Camel	86-88	3.0-3.9	2.9-5.4	0.6-0.9	3.3
Buffalo	82-87	3.3-3.6	7.0-11.5	0.8-0.9	4.5-5.0
Goat	87-88	2.9-3.7	4.4-4.5	0.8-0.9	3.6-4.2

Materials and Methods

The experiment was conducted in Warnar school of dairy technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during March, 2019. The various materials and equipment's used in the present project and methods employed including analytical are described below.

Procurement and Collection of Ingredients

Camel Milk: It was collected from Arnav Enterprises in Jaipur.

Goat and Buffalo Milk: It was collected from local market of Prayagraj.

Culture: It was procured from NCDC, NDRI Karnal.

Cinnamon: It was collected from local market of Prayagraj.

Treatment Combination

T₀: Buffalo Milk (100), T₁: camel Milk + Goat Milk (50:50), T₂: Camel Milk +Goat Milk (60:40), T₃: camel Milk +Goat Milk (70:30).

Results and Discussion

The present investigation entitle "Preparation and Quality Evaluation of Buttermilk Manufactured from Admixture of Camel and Goat Milk" was carried out during March 2019 in Warnar school of dairy technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj (U.P.) India. The results of the present investigation, regarding the, preparation and quality evaluation of buttermilk manufactured from admixture of camel and goat milk have been discussed and interpreted in the light of previous research work done in India and abroad. The experiment was conducted in Completely Randomized design with 4 treatments, and five replications.

The results of the experiment are summarized below

Lactose percentage of Buttermilk manufactured from admixture of camel and goat milk, highest mean Lactose percentage was recorded in T₁ (2.50) followed by T₁ (2.33), T₂ (2.30) and T₃ (2.23).

Protein percentage of Buttermilk manufactured from admixture of camel and goat milk and control butter milk,

highest mean protein percentage was recorded in T₃ (1.46) followed by T₂ (1.44) T₁ (1.41) and T₀ (1.40).

Fat percentage of Butter milk manufactured from admixture of camel and goat milk and control butter milk, highest mean Fat percentage was recorded in T₀ (0.45) followed by T₁ (0.37), T₂ (0.29) and T₃ (0.24).

Ash percentage of Buttermilk manufactured from admixture of camel and goat milk, highest mean ash percentage was recorded in T₃ (0.92) followed by T₂ (0.88), T₁ (0.84) and T₀ (0.76).

Total Solid percentage Butter milk manufactured from admixture of camel and goat milk and control butter milk, highest mean Total Solid percentage was recorded in T₀ (5.11) followed by T₁ (4.96), T₂ (4.92) and T₃ (4.85).

Acidity percentage of Buttermilk manufactured from admixture of camel and goat milk and control butter milk, highest mean Acidity percentage was recorded in T₁ (0.48) followed by T₀ (0.44), T₂ (0.29) and T₃ (0.23).

pH of Buttermilk manufactured from admixture of camel and goat milk highest mean pH percentage was recorded in T₃ (5.07) followed by T₂ (5.05), T₁ (5.02) and T₃ (4.95).

Viscosity in Buttermilk manufactured from admixture of camel and goat milk and control butter milk, highest mean Viscosity count was recorded in T₀ (1.66) followed by T₁ (1.61), T₂ (1.61) and T₃ (1.59).

Yeast & Mould count content in Buttermilk manufactured from admixture of camel and goat milk and control Milk Beverage, highest mean yeast & mould count was recorded in T₀ (7.80) followed by T₁ (6.40), T₂ (6.20) and T₃ (5.40).

coli form test control and Buttermilk manufactured from admixture of camel and goat milk were found to be absent.

Colour & appearance score in Buttermilk manufactured from admixture of camel and goat milk samples of different treatments and control the highest mean colour & appearance score recorded in T₂ (8.50) followed by T₁ (8.44), T₃ (7.86) and T₀ (7.44).

Consistency score of butter milk samples, it can be seen that the highest score was obtained in case of T₂ (8.78) followed by T₁ (7.78), T₃ (7.50) and T₁ (6.70).

Overall acceptability in Buttermilk manufactured from admixture of camel and goat milk samples of different treatments it has been observed that the mean overall acceptability was recorded in T₁ (8.20), T₂ (7.67), T₃ (7.18), and T₀ (6.61) of Buttermilk manufactured from admixture of camel and goat milk sample respectively.

Table 2: Master table of experimental buttermilk

Parameters	T0	T1	T2	T3
1. Physico-Chemical Analysis				
Lactose %	2.50	2.33	2.30	2.23
Protein %	1.40	1.41	1.44	1.46
Fat%	0.45	0.37	0.29	0.24
Ash%	0.76	0.84	0.88	0.92
Total Solids %	5.11	4.96	4.92	4.85
Acidity %	0.48	0.44	0.29	0.23
pH	4.95	5.02	5.05	5.07
2. Rheological Analysis				
Viscosity (Cp)	1.66	1.61	1.61	1.59
3. Micro Biological analysis.				
Yeast & Mould (per gram)	7.80	6.40	6.20	5.40
Coliform	Nil	Nil	Nil	Nil
4. Organoleptic Scores (9 point hedonic scale)				
Colour & Appearance	7.44	8.44	8.50	7.86
Consistency	7.78	6.70	8.78	7.50
Flavour	7.24	6.76	8.50	7.86
Overall acceptability	7.14	6.72	8.58	7.12

Conclusion

The present investigation was undertaken to develop Buttermilk manufactured from admixture of camel and goat milk partial addition of different ratios of camel and goat milk. Control buttermilk sample had 0.45% fat, 1.38% protein and 5.11% total solid. During the preparation of Buttermilk manufactured from admixture of camel and goat milk was added in different ratios. Control sample had buffalo milk. The treatments were evaluated for various organoleptic characteristic, physico – chemical parameters. After sensory evaluation Treatment T₂ (60:40) is better for Buttermilk manufactured from admixture of camel and goat milk. It was found to have highest score of 8.5 for flavour and taste, colour and appearance score of 8.50, consistency is 8.78 overall acceptability score of 8.50. The physico-chemical analysis results shows that Treatment T₂ (60:40) had maximum total solid 4.92%, fat 0.27%, protein 1.43%, Lactose 2.22%, and ash content of 0.84% of Buttermilk manufactured from admixture of camel and goat.

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