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Research Article

FORMULATION OF BEETROOT CREAM CHEESE SPREAD

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ABSTRACT

Milk is a mammal's first food after birth. Cows' milk contains relatively large amounts of the fifty-five essential nutritional elements – however it is not a complete food as it lacks vitamin *D* and iron.Cream cheese is a soft, mild, rich, unripened cheese and is a creamy white, slightly acidic tasting product with a diacetyl flavor.The beetroot is the taproot portion of the beet plant, Other than as a food, beets have use as a food coloring and as a medicinal plant. Beetroot cream cheese was prepared using standard procedure. The product was tested for pH, acidity, moisture, fat, protein, color stability, serial dilution and sensory analysis. The pH of the product increased from 4.9 to 4.54 from day 1 to day 25. The acidity increased from 0.53 to 0.93 from day 1 to day 25. The fat content of the spread was 28.7%, moisture content was 55% and protein content was 11.8. The product was stable at acidic conditions and gave red color when treated with different acids and gave out different colors when treated with different alkalis. On serial dilution the product had a microbial load of 145 CFU/ml of spread by the 25th day. An overall organoleptic acceptance 8.2±0.2 was recorded for the spread. The shelf life of the spread under refrigerated condition was 30 days. Thus the formulated product paves way for Value added spread.

INTRODUCTION

Milk is a mammal's first food after birth. Cows' milk contains relatively large amounts of the fifty-five essential nutritional elements – however it is not a complete foodas it lacks vitamin *D* and iron (Amiot. 1985). In the USA milk proteins supply more than27% of the recommended daily protein allowances which amounts in adults to 0.8 gproteins per kilogram of live weight per day (Amiot. 1985). Cream cheese is a soft, mild, rich, unripened cheese and is a creamy white, slightly acidic tasting product with a diacetyl flavor. It is usually manufactured by the coagulation of cream or mixture of milk and cream by acidification with starter culture and is ready for consumption after the manufacturing process is complete (Guinee *et al.*, 1993). It is used as a spread on bagels, as a salad dressing, and as an ingredient for making several kinds of desserts, such as cheesecake. The beetroot is the taproot portion of the beet plant usually known in North America as the beet, also table beet, garden beet, red beet, or golden beet. It is one of several of the cultivated varieties of *Beta vulgaris* grown for their edible taproots and their leaves (called beet greens).

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These varieties have been classified as B. vulgaris subsp. vulgaris Conditiva Group. Other than as a food, beets have use as a food coloring and as a medicinal plant. Many beet products are made from other Beta vulgaris varieties, particularly sugar beet.Usually the deep purple roots of beetroot are eaten boiled, roasted or raw, and either alone or combined with any salad vegetable.

OBJECTIVES

To formulate a value added cream cheese spread and To assess its chemical, microbiological and sensory parameters. To analyze the stability of the product in terms of its color and its microbial qualities.

REVIEW OF LITERATURE

Cream cheese is a soft fresh acid-coagulated cheese product, which is acidified by mesophilic lactic acid starter culture, i.e. Lactococcus and Leuconostoc. Cream cheese products are categorized into two main types based on the different fat content in the initial mix and the final composition. These are double-cream cheese with at least 9-11% fat content in the initial mix, and single-cream cheese with 4.5-5% fat content in initial mix.

Cream cheese was first made by using the cooked-curd method, which was developed in the early twenties, and the cold-pack and hot-pack methods were developed, and are still used at present. The products with high quality should have a uniform white to light cream color with a lightly lactic acid and cultured diacetyl flavor and aroma. The texture of the products should be smooth without lumps, grittiness, or any indication of cracking and wheying off, and with the ability to spread at room temperature. In the last two decades ultrafiltration (UF) process has proven to be successful in the dairy industry and particularly in cheesemaking. Ultrafiltration allows the concentration. Separation and recovery of individual milk components. The application of CF process accounts for about 3 9 of total world cheese production and it is postulated that this process contributes to higher cheese yield. An accurate assessment of the cheese yield produced by the additional method as compared to the UF method in cream cheese making: is crucial in the evaluation of milk component utilization and cheese production costs. This research was conducted to manufacture cream cheese by additional method from skim milk and from ultra-filtered skim milk (retentate) as a source of proteins and butter oil as source of fat. Research was carried out to determine and compare the cheese yields and milk component recovery (fat and proteins) in both methods. In conclusion. The application of LF in recombined cream cheese making, 0 resulted in higher cheese yield by 14.5%. Total nitrogen (TS) and fat recoveries in L. cheese were higher by 12% and 6.5% respectively.

MATERIALS AND METHODS

Procurement of Ingredients

Fresh and sound vegetable of Beetroot (*Beta vulgaris*), onion and garlic were procured from a local market in Chennai, Tamil Nadu. Good quality milk was procured from a local milk booth in Chennai, Tamil Nadu Other ingredients like Salt, Pepper, Vinegar, Curd, Sugar and oil were procured in good quality.

Preparation of Cream Cheese

1 cup Milk was boiled and 1 Tbsp of lemon juice was added and stirred continuously until the whey water and cheese separates. The mixture was poured into a muslin cloth and the water was drained. It was washed twice with cold water in order to remove the lemon flavor.

It was kept under a container for 15 minutes to drain the water. 1 Tbsp of curd was added and mixed well. It was transferred to a mixer and ground to a smooth paste. The mixture was again transferred to muslin cloth and hung for about 6 hours until all the liquid is drained. Once the liquid was drained the cream cheese was collected in a bowl and refrigerated overnight until further use.

Preparation of Beetroot puree

25g of beetroot, 10g of onion and 5g of garlic were dry roasted and cooled. This mixture was ground to a fine paste.

Preparation of Beetroot Cream Cheese Spread

200g cream cheese, 80g curd was added and whipped thoroughly. To this 2tsp salt, 1tsp pepper powder, 2tsp sugar powder, 2tsp vinegar was added and whipped. 20ml of oil was added and whipped. Finally 25g of the beetroot puree was added and mixed well. The spread thus prepared was stored under refrigeration temperature (4ºC) until further analysis.

Determination of Moisture content

5g of the beetroot spread was weighed in a moisture dish. It was kept in hot air oven at 105ºC for 4 hours. The weight of the dish before and after drying was noted. (AOAC, 2005)

Determination of pH

pH of the spread was determined using a pH meter. Electrode was immersed into the spread and identified if it was acidic or basic. (AOAC, 2005)

Determination of Fat Content

Fat content was found by using Gerber's method. 1g of sample was taken in a centrifuge to which 1ml amyl alcohol and 1 ml conc. Sulphuric acid was added and centrifuged.

Determination of Titratable Acidity

Acidity of the spread was found using approved acid- base titration method (Ranganna 1956)

Determination of color stability

Color stability of the spread was found by treating the spread with different acids and bases.

Microbial Analysis

It was done by serial dilution method. The petri dishes were kept in the incubator for 24 hours and the microbial growth was counted using a digital colony counter.

Sensory Analysis

Sensory analysis was carried out for the spread using a 9 point hedonic scale (9= like extremely and 1 = extremely dislike). 20 semi- trained panelist were selected and the spread was evaluated for properties like color, appearance, texture, taste, after taste, mouth feel and overall acceptability.

RESULTS AND DISCUSSION

pH

As the product is acidic the pH of the spread had a slight increase on storage

Table 1. pH of spread on storage

pH	Day 1	Day 5	Day 10	Day 20	Day 25
	4.9	4.87	4.8	4.63	4.54

pH level for cream cheese is 4.4- 4.9. The pH of the spread is well within the prescribed limits.

TITRATABLE ACIDITY

Table 2. Acidity of spread on storage

Acidity	Day 1	Day 5	Day 10	Day 20	Day 25
	0.53	0.57	0.69	0.85	0.93

FAT CONTENT

Fat content of the spread was 28.7% whereas cream cheese has a fat content of 30% (Chanokphat Phadungath et al, 2005).

MOISTURE CONTENT

Moisture content of the spread was 55% whereas cream cheese has a moisture content of 60% (Chanokphat Phadungath et al, 2005).

PROTEIN CONTENT

Protein content of the spread was 11.8% whereas cream cheese has a protein content of' 8-10 %
(Chanokphat Phadungath et al, 2005).

COLOR STABILITY

Table 3. Color stability of spread on storage

ACID					
	Day 1	Day 5	Day 10	Day 20	Day 25
Sulphuric acid	Red	Red	Red	Red	Red
Hydrochloric acid	Red	Red	Red	Red	Red
Nitric Acid	Red	Red	Red	Red	Red
ALKALI					
Sodium hydroxide	Whitish yellow	Whitish yellow	Whitish yellow	Whitish yellow	White
Potassium hydroxide	Yellow	Yellow	Yellow	Yellow	Whitish yellow
Sodium bi carbonate	Pink	Pink	Pink	Faint pink	Faint pink

Color of the spread was stable with acid. It gave out different colors when treated with different alkalis.

SERIAL DILUTION

Table 4. Microbial load of spread on storage

Serial Dilution	10^5	10^6
Day 1	24	7
Day 5	48	36
Day 10	76	54
Day 20	108	89
Day 25	145	102

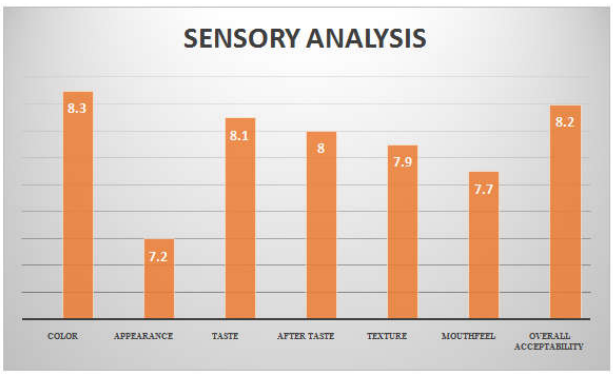

Figure 1. Sensory analysis of Beetroot spread

By the 25th day the product had a microbial load of 145 CFU/ml of spread.

SENSORY ANALYSIS

An overall organoleptic acceptance 8.2±0.2 was recorded for the spread. The formulated product paves way for Value added spread.

Table 5. Sensory analysis of Beetroot spread

PARAMETERS	VALUES
Color	8.3
Appearance	7.2
Taste	8.1
After taste	8
Texture	7.9
Mouthfeel	7.7
Overall acceptability	8.2

Conclusion

Sensory analysis revealed that the product is well acceptable. The shelf life of the spread under refrigerated condition was 30 days. Thus this study paves way for the formulation of a value added cream cheese spread for health conscious consumers.

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