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Evaluation of yield of chakka and total solids in soy enriched probiotic shrikhand

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Abstract

The effects of neutrase enzyme in soy enriched probiotic shrikhand was studied. The yield of chakka and total solids in soy enriched enzymatically modified probiotic shrikhand was determined by treating with Neutrase. Synbiotic Milk was prepared by substitution of enzymatically modified soymilk to bifidogenic milk at 10 per cent, 15 per cent and 20 per cent levels. It was found that the yield of chakka from SSyM₁₅ is 24.63 ± 0.99 and there is significant increase in yield of chakka ($P < 0.01$) with addition of neutrase in soy enriched enzymatically modified probiotic shrikhand. It was found that there was significant decrease in total solids recovery with increasing substitution of Neutrase at SSyM₁₀, SSyM₁₅ and SSSyM₂₀.

Keywords: Soy enriched probiotic shrikhand-Neutrase-Synbiotic milk

Introduction

Shrikhand is sweetened and sour taste popular Indian dessert prepared by the fermentation of milk. To make it more acceptable dietetic food, partially skimmed milk, soy milk, Enzyme (Neutrase) and probiotic micro organism *Bifidobacterium longum* were used for the preparation of soy enriched enzymatically modified probiotic shrikhand. (Kulkarni *et al*, 2006) [3].

For small-scale production of shrikhand the traditional method is followed widely. In this traditional method milk is heat treated and after bringing it room temperature, it was fermented using a culture to make curd, and then filtered using a muslin cloth to remove whey. The thickened mass obtained known as chakka is pressed over a strainer to get a smooth product which when mixed with sugar gives shrikhand.

Material and methods

Soy flour was procured from market and was used to prepare soy milk. It was treated with proteolytic enzyme, Neutrase for the preparation of Enzymatically Modified Soy Milk and subsequent addition to synbiotic milk (SyM) at 10, 15, 20 per cent levels. *Bifidobacterium longum* culture was activated by propagation in reconstituted sterile skim milk. Enzymatically modified synbiotic soy milk was treated with 1.5 % starter culture and incubated at 37°C for about 10 hours to reach acidity of 1%. (Boghra *et al*, 2000) [1].

The whey was drained and chakka that was collected was kneaded with sugar and cardamom to make delicious soy enriched enzymatically modified probiotic shrikhand.

Yield and total solids recovery

The yield of chakka was calculated from the ratio of the weight of curd used and weight of chakka obtained.

$$\text{Per cent of yield} = \frac{\text{Weight of chakka}}{\text{Weight of curd}}$$

The total solids content of chakka was estimated as per FSSAI standards [2].

Total solids

The total solids content of chakka was estimated as per FSSAI Manual method of analysis of foods: Milk and milk products-2015.

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Results

The yield of chakka and total solids in soy enriched enzymatically modified probiotic shrikhand are given hereunder.

Table 1: Yield of chakka in soy enriched enzymatically modified probiotic shrikhand

Curd samples	Percent Yield of chakka
Control	22.32 ^a ± 0.08
SSyM ₁₀	23.01 ^b ± 0.28
SSyM ₁₅	24.63 ^c ± 0.99
SSyM ₂₀	25.11 ^c ± 0.70
F	64.34**

Table 2: Yield of total solids in soy enriched enzymatically modified probiotic shrikhand

Curd samples	Percent Yield of Total solids
Control	61.57 ^a ± 0.16
SSyM ₁₀	59.56 ^b ± 0.19
SSyM ₁₅	57.88 ^c ± 0.42
SSyM ₂₀	54.38 ^d ± 0.68
F	42.88**

#Percentages (Mean ± SE). Average of six trials. Mean values bearing different superscripts in a column differ significantly ** ($P < 0.01$)

Control Shrikhand from Synbiotic milk, 1.5% starter culture

SSyM₁₀ Shrikhand prepared from Synbiotic Milk by substitution of enzymatically modified soymilk to bifidogenic milk at 10 per cent level, 1.5% starter culture

SSyM₁₅ Shrikhand prepared from Synbiotic Milk by substitution of enzymatically modified soymilk to bifidogenic milk at 15 per cent level, 1.5% starter culture

SSyM₂₀ Shrikhand prepared from Synbiotic Milk by substitution of enzymatically modified soymilk to bifidogenic milk at 20 per cent level, 1.5% starter culture

Table 1 and Table 2 gives the yield of chakka and TS total solids values respectively as mean ± SE of six trials obtained from 2 per cent fat enzymatically modified soy substituted synbiotic milk at three different levels that is 10%, 15% and 20% cultured with *Bifidobacterium longum*. The percentage of yield of chakka from control, SSyM₁₀, SSyM₁₅, SSyM₂₀ were 22.32, 23.01, 24.63 and 25.11 respectively. The percentage of total solids in control, SSyM₁₀, SSyM₁₅ and SSyM₂₀ were 61.57, 59.56, 57.88 and 54.38 respectively.

Discussion

In the experiments conducted it was found that the yield of chakka from SyM₁₅ is 24.63 ± 0.99 and there is significant increase in yield of chakka with addition of neutrase in soy enriched enzymatically modified probiotic shrikhand. The amount of coagulable proteins present in milk and soy milk likely be raised due to addition of neutrase. Neutrase is a bacterial protease produced by a selected strain of *Bacillus amyloliquefaciens*. Neutrase will break down proteins to peptides. The addition of neutrase results in proteolytic breakdown of milk proteins and soy proteins which results in higher proportion of peptides in shrikhand and hence resulted in higher yield of chakka. (Pokora, 2013) [5].

Total solids recovery obtained from SSyM₁₅ sample is 57.88 ± 0.42. There was significant decrease in total solids recovery with increasing substitution of Neutrase at SSyM₁₀, SSyM₁₅ and SSyM₂₀. (Patel *et al*, 1985) [4].

Very high hydrolytic and mild lipolytic activity of enzyme neutrase may result in loss of proteins and lipids bringing in lower total solids recovery in enzymatically modified soy milk substituted probiotic shrikhand. (Singh *et al*, 2014) [6]. The enzyme supplementation had accelerated the activity of proteolysis and lipolysis. (Keqin *et al*, 2010) [7].

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