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Development and Formulation for the Manufacturing of Coconut Milk Shrikhand

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ABSTRACT
Shrikhand is an indigenous, traditional and fermented dairy dessert of India. The present investigation was carried out to optimize the process of manufacturing coconut milk shrikhand by using coconut milk, cane sugar, and yogurt culture (Lactobacillus delbrueckii subsp. bulgaricus and Streptococcus thermophilus) were the variables studied by employing the 3- factors Central Composite Rotatable Design. The formulation with coconut milk shrikhand, was found highly suitable. The desirability index of optimized coconut milk shrikhand.
Keywords: Coconut milk, shrikhand, yogurt culture.

1.Introduction

The rapid growing population in the developing countries is facing acute shortage of protein in diet, which inadvertently has led to an increase in the instances of malnutrition (Ur-Rehman et al., 2007). Park et al. (2012) reported that the demand to develop alternative products from milk is increasing due to its short availability, problems with allergenicity and desire for vegetarian alternatives. However, in order to meet the protein demands in developing countries, where animal protein is also grossly inadequate and relatively expensive, research effort has been geared towards finding alternative sources of protein from the legume seeds (Kolapo and Olubamiwa, 2012).

Coconut (Glycine max L.), an oilseed, an excellent source of protein can furnish dietary protein supply to bridge up the protein deficiency gap at low-cost than any other crop (Amanze and Amanze, 2011; Hajirostamloo, 2009; Ikya et al., 2013; Singh and Singh, 2013; Ur-Rehman et al., 2007). Coconut is intended for consumption by population who cannot digest milk for reasons like lactose intolerance, allergy to milk proteins, or vegetarian way of diet (Božanić et al., 2011). Lactic acid fermentation may be used as a means to reduce beany flavours (Wang et al., 2006) and antinutritional factors (i.e. phytic acid) in soybean products (Donkor et al., 2007). Among fermented soymilk products, soy yoghurt is gaining much popularity in the developing countries (Ghorbani et al., 2012). Shrikhand is an indigenous, semi-soft, sweetish-sour, whole milk delicious and healthful dessert particularly in western part of India and prepared from lactic acid fermentation (Nigam et al., 2009). The yoghurt or curd (dahi) is a basic material for the preparation of shrikhand. Shrikhand is made with chakka (strained yoghurt/ curd) which is finely mixed with sugar and /or flavouring agents. It is popular because of its characteristic flavour, taste, palatable nature and possible therapeutic value (Nigam et al., 2009; Singh and Singh, 2014). Patel and Chakraborty (1985) suggested that yoghurt is preferred for manufacture of shrikhand than curd (dahi) because curd takes longer time to form coagulum than yoghurt. In view of the above, an attempt was made to develop a process for manufacturing shrikhand with the incorporation of soymilk so that it could be a new value added and convenient product for dairy and food industry. It could prove to be a convenient and nutritionally superior health food for the consumers and at the same time offer the same delicacy as a traditional conventional product.

2. Materials or Methodology

Coconut milk is used to designate the liquid obtained by the manual or mechanical extraction of grated coconut meat with or without added water. Coconut milk is generally produced from mature

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nuts of 12 months in age. At this stage, the meat is hard and thick, with a typical composition of as follows: 50% moisture, 34% oil, 3.5% protein, 3% fiber, 2.2% ash and 7.3% carbohydrates.

A sweet material that consists essentially of sucrose obtained from sugarcane or sugar beets, is typically colorless or white when pure, and is commonly used to sweeten foods and beverages. Any of numerous soluble and usually sweet carbohydrates (as glucose or sucrose) that occur naturally especially in plants

Yogurt is made by commercial fermentation of milk by ingesting a particular type of bacteria strain. Yogurts can be rich in protein, calcium, vitamins, culture or probiotics which can enhances the gut microbiota. Low fat yogurt can be useful sources of protein on a weight loss diet. Probiotics may boost the immune system. Yogurt is produced using a culture of Lactobacillus delbrueckii subsp.bulgaricus and Streptococcus thermophiles bacteria.

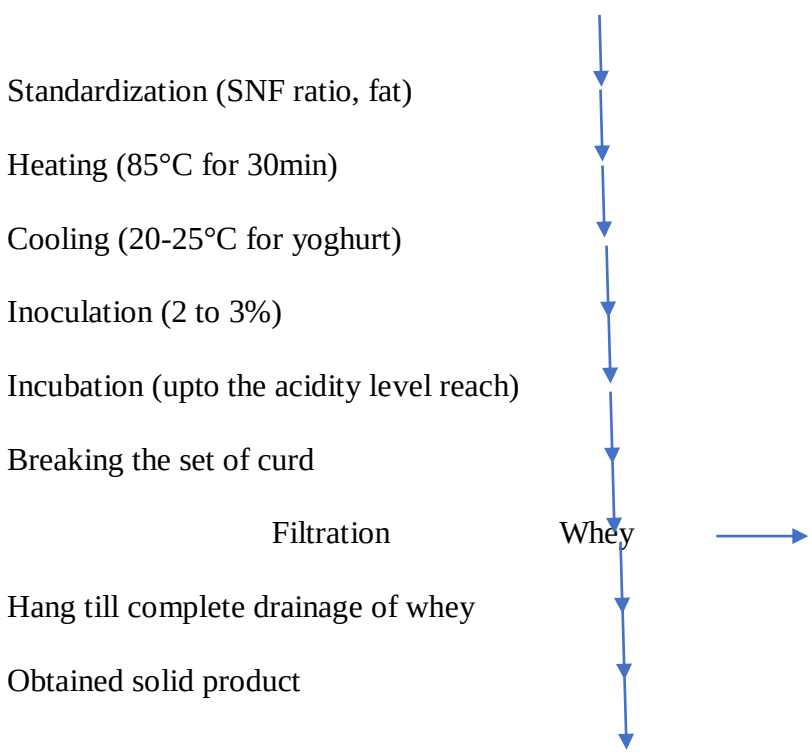
2.1 Preparation of Coconut milk

The coconut was de-husked. The de-husked nut was cracked open into halves. The split nuts were de-shelled to separate the coconut meat (kernel). Coconut meat was washed and comminuted using an electric blender with water. This was then pressed through a muslin cloth and strained to obtain coconut milk.

2.2 Preparation of coconut milk shrikhand

First take the fresh coconut milk for preparing the coconut milk shrikhand. After that, the standardization process involves in that we have to analyze the SNF (Solid non fat) and fat ratio. After standardization process, we have to heat with 85° C for 30 min. After the heated coconut milk was cooled to 20-25° C at room temperature. After cooling inoculation process involves, Inoculation is nothing adding a culture at a rate of 2-3%. After inoculation, we have to do incubation process upto the acidity level reached and was kept for 16 hrs. After incubation process we have to break the set of curd for the filtering. While filtering the solid particles and whey particles are obtain. For making a coconut milk shrikhand we need a solid particles. After filtering the solid particles, we have to add the desired level of sugar as 30-40%. After adding the sugar, mix it well. Now the prepared coconut milk shrikhand was cooled and stored in the refrigerator.

2.3 Flow chart for the preparation of coconut milk shrikhand



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Sugar as desired level (30-40%)

↓

Mixing

↓

Coconut milk shrikhand

3. Results and Discussion

3.1 Aroma

Aroma of coconut milk shrikhand, the analysis shows that the mean sensory score for sample A, B, C, D, and E were found to be 7.57 , 7.57 , 7.14 , 6.71 and 6.71 respectively. Statistical analysis shows that effect of different coconut milk portion on aroma of the product was not significantly different at 5% level of significance.

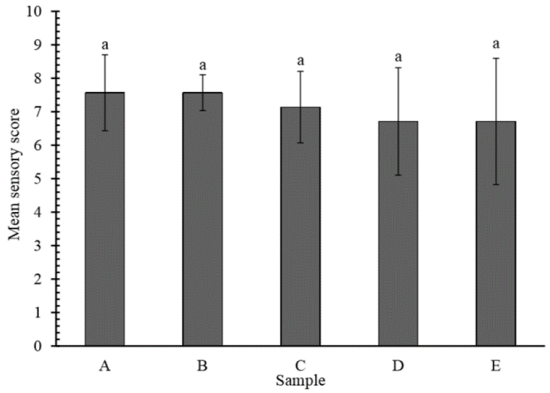

Fig 3.1 represent the sensory scores for aroma of coconut milk shrikhand. Values on the top of the bars bearing similar superscript are not significantly different at 5% level of significance. Vertical error bar represent ±standard deviation of scores given by panelist.

3.2 Color

Color of coconut milk shrikhand, the analysis shows that the mean sensory score for sample A, B, C, D, and E were found to be 8.143 , 7.571 , 6.571 , 6.429 and 6.286 respectively. Statistical analysis shows that effect of different coconut milk portion on color of the product was significant ($p<0.05$). LSD shows that sample A and B, A and C, B and C, A and D, B and D, A and E, B and E were significantly different but there was no significant difference between samples C, D and E. Among five samples, sample A got the high mean score, due to optimum acceptance of panelist.

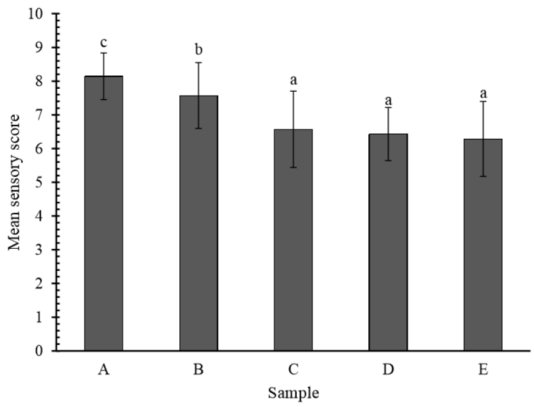

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Fig 4.2 represents the mean sensory scores for color of coconut milk shrikhand. Values on the top of the bars bearing similar superscript are not significantly different at 5% level of significance. Vertical error bar represent ±standard deviation of scores given by panelist.

3.3 Taste

Taste of coconut milk shrikhand, the analysis shows that the mean sensory score for sample A, B, C, D, and E were found to be 8 , 7.571 , 6.857 , 6.143 and 5.857 respectively. Statistical analysis shows that effect of different coconut milk portion on taste of the product was significant ($p<0.05$). LSD shows that sample A and C, A and D, A and E, B and C, B and D, B and E were significantly different but there was no significant difference between samples A and B and C and D. Among five samples, sample A and B got the high mean score, due to optimum acceptance of panelist.

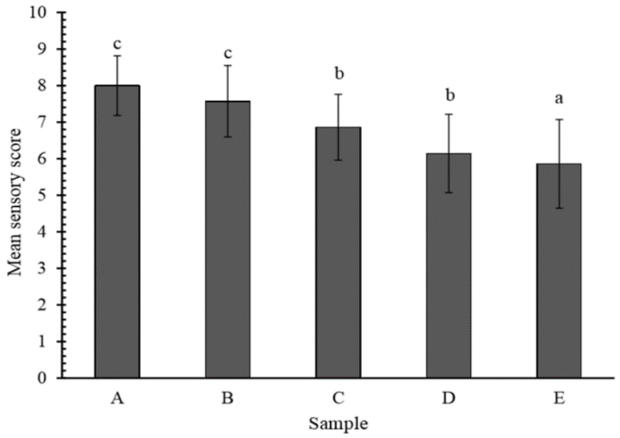

Fig 4.3 represents the mean sensory scores for taste of coconut milk shrikhand. Values on the top of the bars bearing similar superscript are not significantly different at 5% level of significance. Vertical error bar represent ±standard deviation of scores given by panelist.

3.4 Texture

Texture of coconut milk shrikhand, the analysis shows that the mean sensory score for sample A, B, C, D, and E were found to be 8.29 , 7.57, 6.42 , 5.71 and 5.14 respectively. Statistical analysis shows that effect of different coconut milk portion on texture of the product was significant ($p<0.05$). LSD shows that sample A and B, A and C, A and D, A and E, B and C, B and D, B and E were significantly different but there was no significant difference between samples D and E. Among five samples, sample A got the high mean score, due to optimum acceptance of panelist.

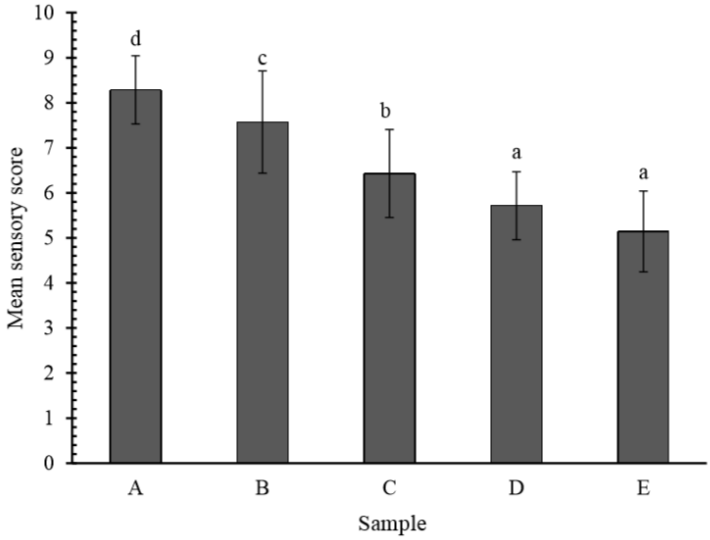

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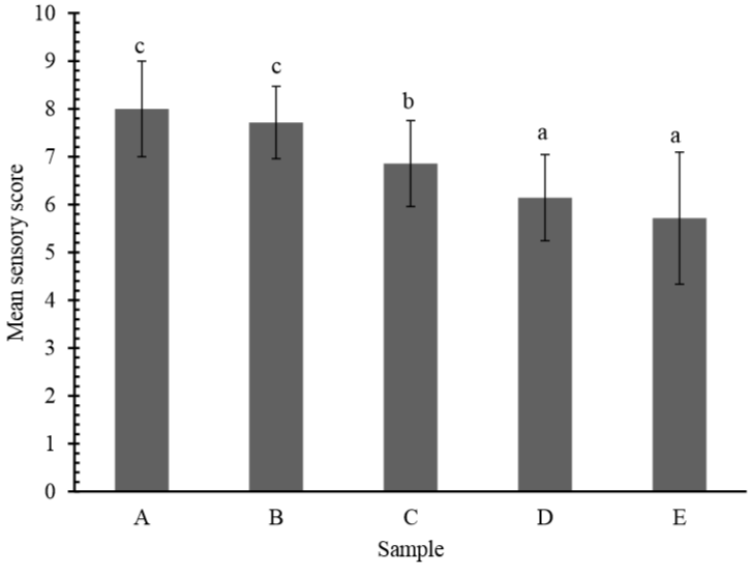
Fig 4.4 represents the mean sensory scores for texture of coconut milk shrikhand. Values on the top of the bars bearing similar superscript are not significantly different at 5% level of significance. Vertical error bar represent ±standard deviation of scores given by panelist.

3.5 Overall acceptability

Regarding overall acceptability of coconut milk shrikhand, the analysis shows that the mean sensory score for sample A, B, C, D, and E were found to be 8, 7.71, 6.85 , 6.14 and 5.71 respectively. Statistical analysis shows that effect of different coconut milk portion on overall acceptability of the product was significant ($p<0.05$). LSD shows that sample A and C, A and D, A and E, B and C, B and D, B and E, C and D, C and E were significantly different but there was no significant difference between samples A and B and D and E. Among five samples, sample A and B got the high mean score, due to optimum acceptance. As the proportion of cow milk was decreased the overall acceptability preference became decrease. It may be due to addition of coconut milk. Similar results were reported by Biswas (2013).



4.5 represents the mean sensory scores for overall acceptability of coconut milk shrikhand. Values on the top of the bars bearing similar superscript are not significantly different at 5% level of significance. Vertical error bar represent ±standard deviation of scores given by panelist.

Nutrition Value of Coconut Milk

Parameters	**Values**
Calories	552
Fat	57g
Saturated fat	51g
Carbohydrates	13g
Sugar	8g
Protein	0g
Dietary fibre	2.3g
Iron	8%

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Nutrition Value of Coconut Milk Shrikhand

Parameters	Value
Energy	552
Total fat	55g
Saturated fat	4.8g
Carbohydrates	40g
Total sugar	35g
Added sugar	45g
Protein	45g
Cholesterol	9.5g
Magnesium	2.2g
Iron	2.2%

4. Conclusion

The optimised levels of coconut milk, cane sugar and yoghurt culture for the manufacturing of coconut milk shrikhand were predicted based on sensory. Hence, the formulation with coconut milk (24.5%), cane sugar (30.0%) and yoghurt culture (3.0%) was considered most suitable formulation for manufacturing coconut milk shrikhand. This could also lead to product development leading to diverse use of coconut milk.

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