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Sensory evaluation of low fat cereal and fruit based fermented milk beverage

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Abstract

In the new millennium we are witnessing the upward trend in nutritional and health awareness which has increased the consumer demand for functional foods. Milk Beverage is gaining more popularity in modern societies of the developing countries. This study was conducted for the development of low fat cereal and fruit based fermented milk beverage by incorporating fruit pulp, cereal flour and whey protein concentrate (WPC). The basic aim of study was to find out the sensory parameter of Milk beverage prepared with corn flour, whey protein concentrate, banana pulp and sugar with different combination in order to assess the suitable level of addition with maximum acceptability. The data collected on different aspects were tabulated and analyzed statistically using the methods of analysis of variance and critical difference. Organoleptic characteristics (flavour and taste, body and texture, colour and appearance, overall acceptability) were analyzed using 9 point hedonic scale. On the basis of findings, it was concluded that T₃ with 1 per cent corn flour, 1 per cent WPC, 15 per cent banana pulp and 8 per cent sugar combination was found to be highly acceptable among the other combinations by sensory evaluation. Thus, as per acceptability of the product judged by organoleptic evaluation and therapeutic value, the treatment can be rated as T₃>T₂>T₁>T₀. The cost of product of one litre milk beverage of treatment T₀, T₁, T₂, T₃ was Rs. 31.33, 33.97, 35.89 and 37.65 respectively

Keywords: Skim milk, corn flour, whey protein concentrate, fruit pulp

1. Introduction

For the development of new value added products that are manufactured for health conscious consumers the nutritional and potentially therapeutic value of food is the main characteristic. Fermented foods and beverages are of great importance because they provide and sustain tremendous quantities of nutritious foods in a wide diversity of aroma, flavour and texture, which enrich the human diet. Apart from providing variety of foods, fermented foods have the advantage of extended shelf life due to organic acids such as acetic acid, lactic acid and other acids produced during fermentation which lowers the pH thus inhibiting the growth of spoilage microorganisms.

Fruits are rich source of various important phytonutrients namely minerals, vitamins, antioxidants and of dietary fibers and cereals are rich in soluble fibers. The association of fruits with dairy products has endorsed health perception in consumers mind, as consumer connect both these foods with health and wellness. Fortification of cow/buffalo milk with fruit pulp improves the nutritional as well as therapeutic values.

Whey proteins have good nutritional properties and enhance the textural properties of food when they are used as ingredients. WPC is used in preparation of milk beverage for manufacturing of desirable, soft, smooth and highly proteinaceous product.

Corn contains the best amino acid composition profile among all the cereal grains in addition to overall high protein content and soluble fibre. Corn flour is cholesterol free and a source of the phytonutrients.

Banana is one of the fruits which contain high levels of B-vitamins, potassium and magnesium and low in salt. Rich in pectin, banana aid digestion and gently chelate toxins and heavy metals from the body. Banana is natural antacid and helps in production of white blood cells.

Consumers are many and varied. Thus, in the dairy market of the future, some will demand low-priced products, while others will pay a premium for quality and uniqueness.

The challenge for the dairy industry is to identify which markets it can profitably supply and to focus its efforts on meeting the needs of consumers in these markets. Fortification of fermented milk products with fruit pulp has been shown to improve their acceptability to a considerable extent. It has helped in improving the nutritional quality and market value of the products.

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Materials and Methods

Low Fat Cereal & Fruit Based Milk Beverage was prepared by adding corn flour and whey protein at the rate of 1 per cent each before heating of milk. It was mixed thoroughly and heated at 95 °C for 15 minute. Two percent direct vat set culture containing *Streptococcus thermophilus* and *Lactobacillus bulgaricus* was used and inoculated at 40 °C and incubated at 42°C/4 hours until firm curd was obtained. It was used to prepare four different low fat cereal and fruit based milk beverage by incorporating sugar at the rate of 8

per cent and banana fruit pulp at the rate of 5 per cent, 10 per cent and 15 per cent respectively. The milk beverage prepared by incorporating fruit pulp, cereal flour and whey protein concentrate (WPC) were subjected to sensory evaluation for colour and appearance, flavour and taste, body and texture and overall acceptability. The results obtained during the course of investigation were subjected to statistical analysis by using Completely Randomized Design (CRD) as described by Panse and Sukhatme (1967) [6].

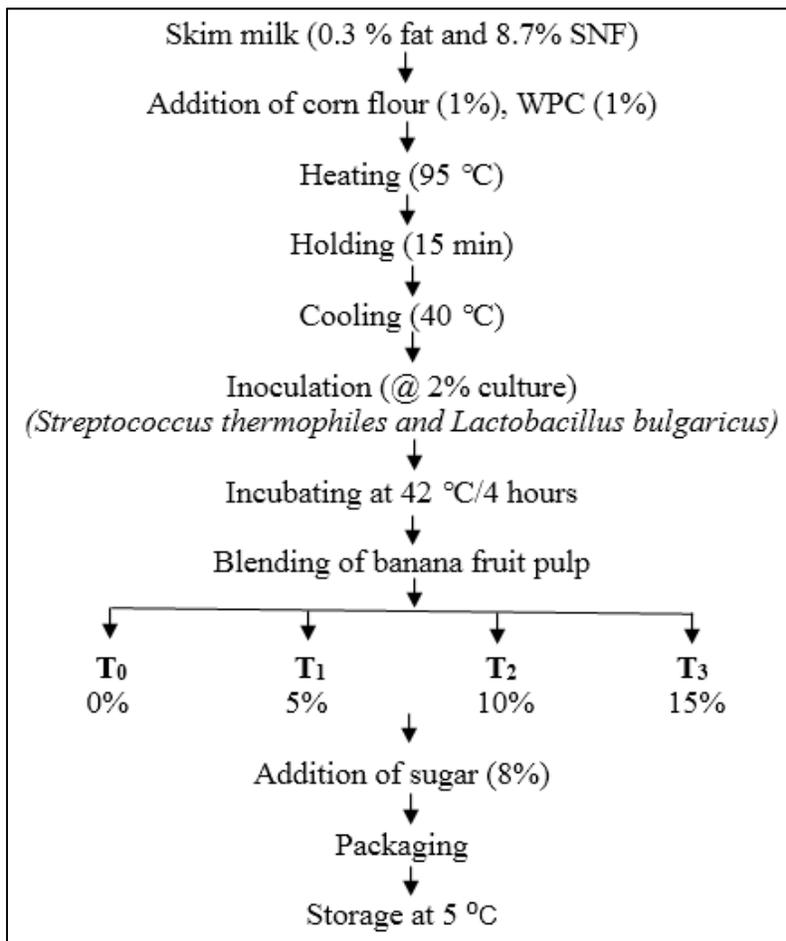


Fig 1: Flow diagram for manufacturing of low fat cereal and fruit based milk beverage.

Details of Treatment combination

- T₀:- Control Beverage
- T₁:- Beverage prepared with addition of 5% banana pulp.
- T₂:- Beverage prepared with addition of 10% banana pulp.
- T₃:- Beverage prepared with addition of 15% banana pulp.

Results and Discussion

Organoleptic attributes and Overall acceptability of control and Low Fat Cereal and Fruit based Milk Beverage

Table 1 shows organoleptic attributes of control and Low Fat Cereal and Fruit based Milk Beverage.

Colour & Appearance

The highest mean of colour & appearance score was recorded in the control and Low Fat Cereal and Fruit based Milk Beverage of T₃ (8.56) followed by T₂ (7.86), T₁ (7.56) & T₀ (7.12).

Body & Texture

The highest mean of body & texture score was recorded in the control and Low Fat Cereal and Fruit based Milk Beverage of T₃ (8.38) followed by T₂ (8.10), T₁ (8.08) and T₀ (8.01)

Flavour & Taste

The highest mean of flavour & taste score was recorded in the control and Low Fat Cereal and Fruit based Milk Beverage of T₃ (8.12) followed by T₂ (8.02), T₁ (7.90) and T₀ (7.48).

Overall Acceptability

The highest mean of the overall acceptability was recorded in the control and Low Fat Cereal and Fruit based Milk Beverage of T₃ (8.48) followed by T₂ (8.38), T₁ (8.28) and T₀ (7.70).

Table 1: Summary of the results of organoleptic attributes and Overall acceptability of different Milk Beverage samples (Mean ±SE)*.

Parameters	Types of Milk Beverage			
	T ₀	T ₁	T ₂	T ₃
Colour & Appearance	7.12±0.049	7.56±0.036	7.86±0.021	8.56±0.016
Body & Texture	8.01±0.043	8.08±0.034	8.10±0.014	8.38±0.047
Flavour & Taste	7.48±0.035	7.90±0.059	8.02±0.016	8.12±0.029
Overall Acceptability	7.70±0.027	8.28±0.031	8.38±0.042	8.48±0.027

*Average of five trials.

Mean value bearing different super scripts in a row differ significantly (*P*<0.05);

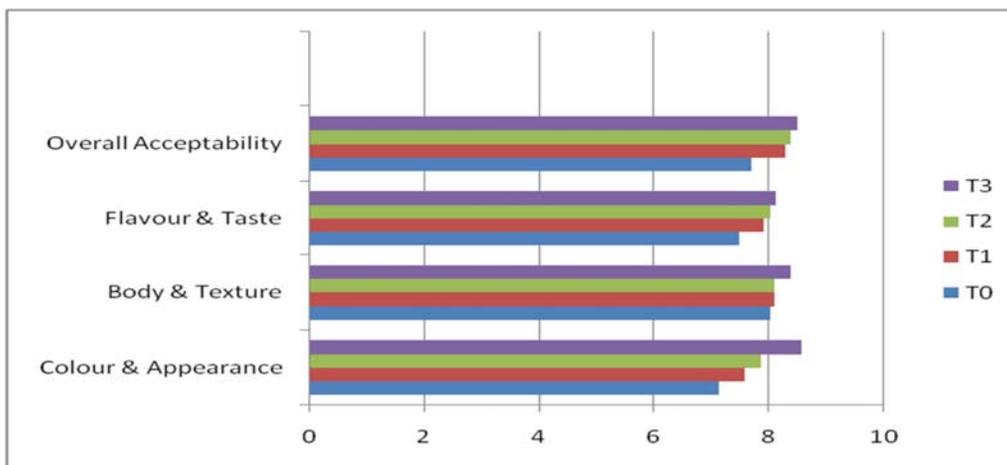


Fig 2: Organoleptic attributes of different Milk Beverage samples

Cost Analysis

The cost of product of one litre milk beverage of treatment T₀,

T₁, T₂, T₃ was Rs. 31.33, 33.97, 35.89 and 37.65 respectively.

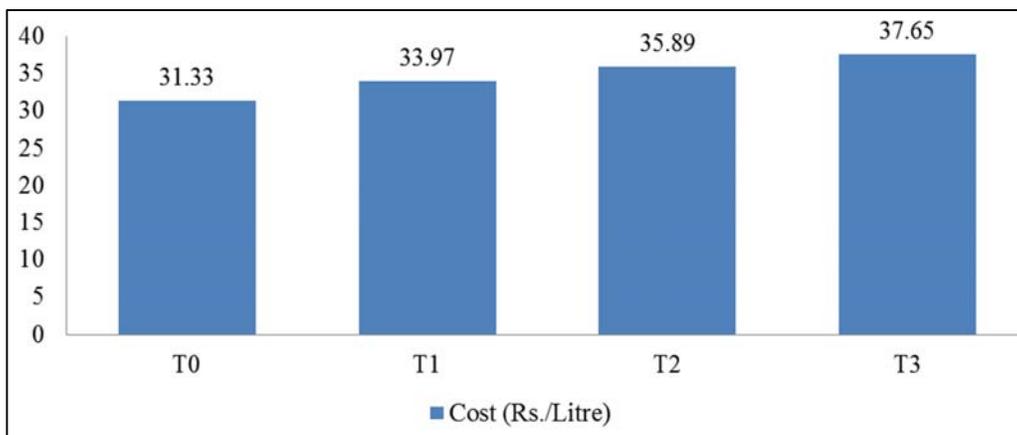


Fig 3: Cost analysis of different Milk Beverage Samples

Conclusion

The results obtained from the statistical analysis revealed that the Low fat cereal and fruit based fermented milk beverage was found to be highly acceptable by sensory evaluation for all the sensory parameters studied. Value addition also improved firmness and flavour of milk beverage. As per experimental Milk Beverage, T₃ was found to be best among the other treatments. Skim milk can be better utilized for value addition using corn flour, WPC and suitable fruit pulps as it enhances the qualities of milk beverage like flavor, taste and nutritional values. It has also greater acceptability and suitable among all groups of consumers.

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