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Development of cow milk yoghurt fortified with banan and pistachio

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Abstract

With the current upward trend in nutritional and health awareness the consumers demands for high quality probiotic product with acceptable sensory characteristics. The main purpose of this research was to observe the influence of different levels of banana pulp (5gm 10gm and 15gm) and 2gm pistachio on cow milk yoghurt and effect on viability of microflora of yoghurt chemical, microbial and sensory characteristics banana pulp and pistachio set yoghurt mix was standardized 3.5% fat and 8.5% solid not fat inoculated with 2% culture a different level (5gm 10gm 15gm) of banana pulp and 2gm pistachio add to yoghurt the sample of different treatments was analyzed for fat, protein, carbohydrate, moisture, acidity, ash, viability on selective media and sensory characteristics (flavor and taste, color and appearance, body and texture and overall acceptability) the data obtained on various parameters were statistically analyzed.

Keywords: Banana, Pistachio, Sensory Acceptability

1. Introduction

Yoghurt is a fermented dairy product obtained through anaerobic fermentation of lactose in milk by relevant microorganism most of which are classified as pro-biotic (Tull, 1996), lactose in whole milk, skimmed milk or fresh cow's milk is converted into lactic acid by a symbiotic bacterial culture of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* growing at temperatures in the range of 40-50 °C. The milk is first heated to about 80 °C to kill any desirable bacteria and to denature milk proteins so that they set together rather than from curds. The milk is then cooled to about 45 °C (Wood, 1985). The bacteria culture is added, and the temperature is maintained for 4-7 hours to allow fermentation. Yoghurt's nutritional profile has a similar composition to the milk from which it is made but will vary somewhat if fruit, cereal or other components are added. Yogurt is an excellent source of protein, calcium, phosphorus, Vitamin B₂, Vitamin B₁ and Vitamin B₁₂, and a valuable source of folate, niacin, magnesium and zinc. The protein it provides is of high biological value, and the vitamins and minerals found in milk and dairy foods including yoghurt are favorable. Eating dairy products, such as yoghurt, helps to improve the overall quality of the diet and increase the increase the chances of achieving nutritional recommendations (Mckinley 2005).

The increase in the per capita annual consumption of yoghurt in the majority of the countries has been attributed to both the ever-increasing availability of fruit or flavoured yoghurt and to the diversity of presentation of the product. A variety of different flavoring ingredients (fruits, natural flavors or synthetic flavors) are currently added to yoghurt. The types of flavoring material used in the yoghurt industry are fruits, fruits preserves, canned fruit, frozen fruits and miscellaneous fruit products. Yoghurt plays a significant role in acceptability of fruit added yoghurt (Tamime and Robinson, 1988). Several yoghurt-based products are marketed with the addition of either fruit or vegetables rich in bioactive food ingredients or edible fibres claimed to have beneficial effects on human health (Deeth and Tamime, 1981) [3]. The flavoring and their dosage are usually regulated according to the regulation identified say by each country. The FAO/WHO recommendation for fruit yoghurt are a fruit content between 5 and 15%. In addition, fruit content suggested for fruit yoghurt according to Turkish food codex (for fermented milk) was 6% (Anonymous, 2001). If fruit and herb are added to it, yoghurt is more nutritious and functional.

Bananas are an excellent source of Vitamin-B₆ and contain moderate amounts of Vitamin-C, Manganese and dietary fibre. They contain several essential nutrients and have benefits for digestion, heart health and weight loss. Each banana contains only about 105 calories and consist almost exclusively of water and carbs

Bananas contain very little protein and almost no fat. The pistachio (*Pistacia vera*), a member of the cashew family, is a small tree originating from Central Asia and Middle East. The tree produces seeds that are widely consumed as food. Several mechanism for pistachios is that it has antihypertensive property. These mechanism includes pistachios high levels of the amino acid arginine (a precursor of the blood vessel dilating compound nitric oxide), high levels of phytosterols and monounsaturated fatty acid and improvement of endothelial cell functions through multiple mechanism including reductions in circulating levels of oxidized low density lepo-protein cholesterol and pro-Material and Methods

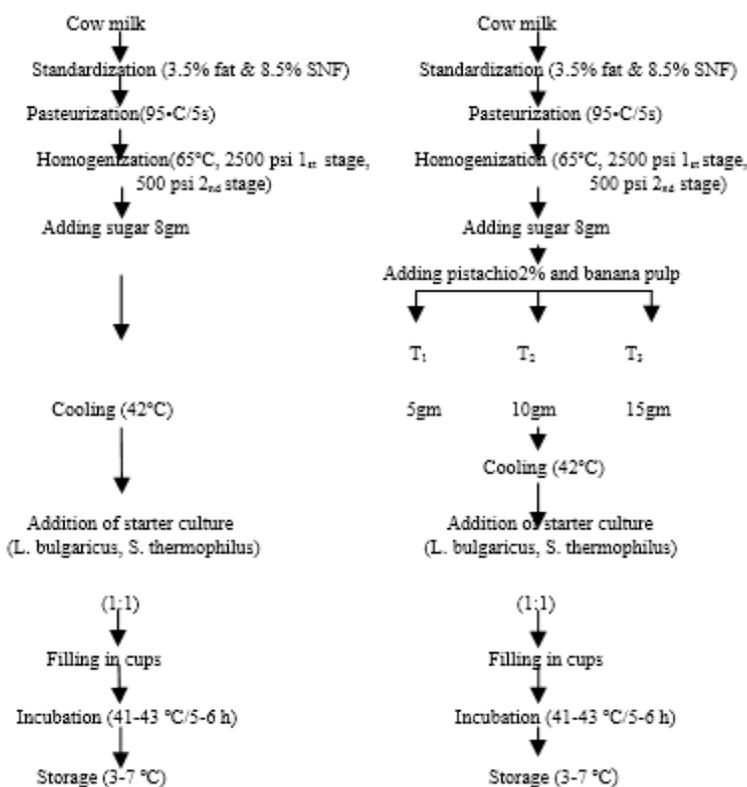
The experimental work was carried out in the research laboratory of department of Dairy, Technology, Warner college of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. Cow milk, pistachio, banana and sugar were obtained from

the local market of Allahabad city. Yoghurt culture-mixed yoghurt culture was obtained from National Collection of Dairy Culture, Dairy Microbiology Division, NDRI, Karnal, Haryana-India. Yoghurt prepared by using banana, pistachio and sugar. There were total four combinations. Each was prepared in five replications. The different treatment combinations used in the experimental are as follows:

- T0= cow milk 100gm+pistachio 0gm+ banana 0gm
- T1= cow milk 93gm+ pistachio 2gm+ banana 5gm
- T2= cow milk 88gm+ pistachio 2gm+ banana 10gm
- T3= cow milk 83gm+ pistachio 2gm+ banana 15gm

Flowchart for the preparation of yoghurt:

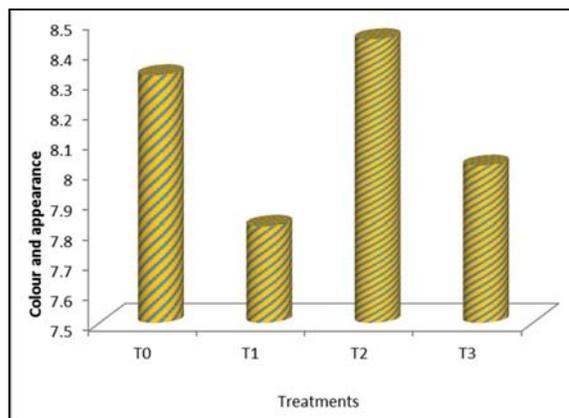
For control



Results and Discussions

Sensory analysis: It was found that the highest score was observed in treatment T₂ in which yoghurt prepared by using banana and pistachio (10gm & 2gm) i. e.(treatment T₂) was found more acceptable in terms of sensory quality.

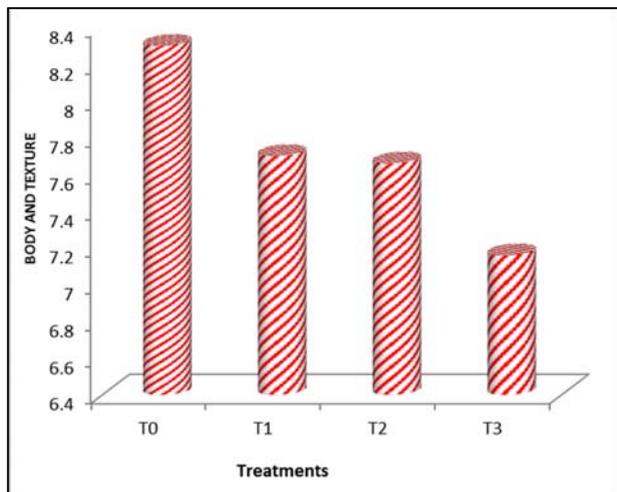
Colour and appearance: The sensory score of color and appearance of the formulated product clearly indicated that treatment which had combination of cow milk 88gm, pistachio 2gm and banana 10gm had the significantly highest score followed by T₂ (8.44) and T₀ (8.32) and T₃ (8.02), T₁ (7.86).Thus making it quite obvious that the addition of banana and pistachio increased the color and acceptability of yoghurt. A numerical hedonic scale ranging from 1 to 9 (1 is very bad and 10 for excellent) was used for sensory evaluation. Ten experienced judges participated in the test.



Average Color and Appearance Percent in Control and Experimental yoghurt.

Body and texture

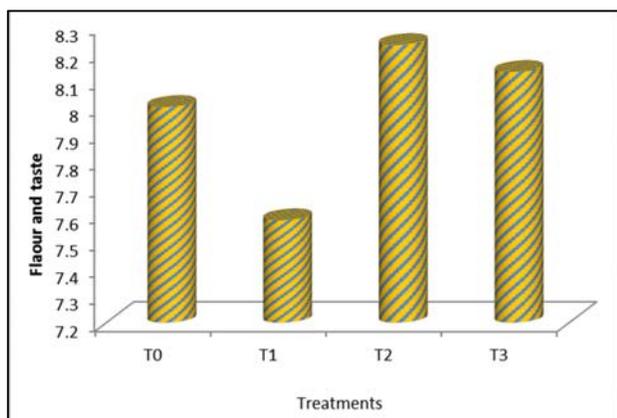
Average sensory scores of body and texture of the formulated product cleaning indicated that treatment T0 yoghurt prepared from only using cow milk had the highest score followed by T0 (8.30), T1 (7.70) and T2 (7.66) and T3 (7.16).



Average Body and Texture Percent in Control and Experimental yoghurt

Flavour and taste

The treatment T2 (8.23) which had combination of cow milk 88gm banana 10gm and pistachio 2 had a highest scored followed by T2 (8.23) and T3 (8.13) T0 (8.00) T1 (7.58). thus making it quite obvious that the addition of banana and pistachio (10gm & 2gm) improve the taste and flavor of yoghurt, the variation in flavor and taste was probably due to the effect of some development of chemical.



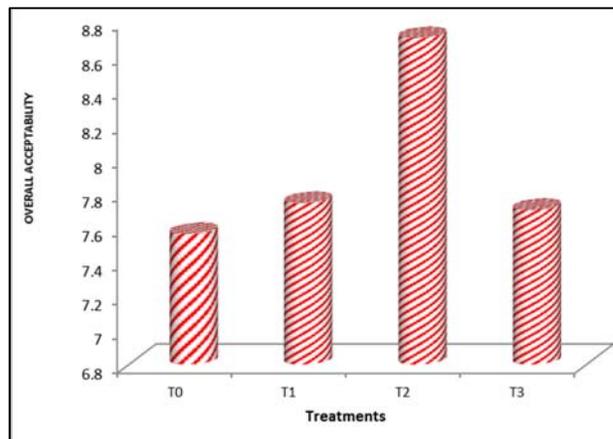
Average Flavor and Taste Percent in Control and Experimental yoghurt

Table 1: Sensory characteristics of cow milk yoghurt with 100gm, 93gm, 88gm, 83gm cow milk, 5gm, 10gm, 15gm banana and 2gm pistachio

Treatments	Color and Appearance	Body and Texture	Flavor and Taste	Overall Acceptability
T0	8.32	8.33	8.00	7.56
T1	7.82	7.70	7.58	7.74
T2	8.44	7.66	8.23	8.70
T3	8.02	7.16	8.13	7.70

Overall acceptability

The average sensory score of overall acceptability of formulated product clearly indicated that treatment T2 combination of 88gm milk, 10gm banana and 2gm pistachio had the highest score T2 (8.70) and T3 (7.70) T1 (7.74) and T0 (7.56). This making it quite obvious that the addition of banana and pistachio improves the overall acceptability of yoghurt.



Average overall acceptability Percent in Control and Experimental yoghurt

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