Development of fruit (*Musa* spp.) puree incorporated synbiotic stirred yoghurt

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Introduction

Yoghurt is one of the most nutritious fermented milk products that can be used to enhance the nutrition condition of people. It is obtained by introducing specific strains of Lactic acid bacteria. The Lactic acid micro flora reduce risk of colon cancer (Foissy, 1983 cited in Huma, 2003), reduce the serum cholesterol level (Anderson and Gilliland, 1999 cited in Huma, 2003) and also maintain the intestinal ecosystem (Saarela *et al.*, 2002 cited in Huma, 2003). Prebiotics are non-digestible food ingredients that improve the host health by selectively stimulating the growth of certain beneficial microorganisms. Fructo-oligosaccharide is prebiotic source that can be found in ripe banana around 2 mg/g. By incorporating banana with yoghurt is best way to improve the health benefits and taste of the yoghurt. Stirred type fruit yoghurt is one of the best products that can be used to gain consumer preference. Therefore, this study was conducted to develop a Banana puree incorporated symbiotic stirred yogurt.

Methodology

The current study was carried out at Ceylon Cold Stores PLC (CCS), Ranala, Kaduwela. Laboratory analysis was done at CCS and laboratories in University of Kelaniya. First, yoghurt base and the banana puree were prepared according to the predetermined recipe after various preliminary trials. For final sensory evaluation, three treatments were used with three replicates. The incorporation levels of fruit puree with yogurt base is given in table 01.

Table 01: Incorporation levels of fruit puree with yoghurt base

Treatment	Yoghurt % (w/w)	Fruit puree % (w/w)
1	86	14
2	85	15
3	84	16

Table 02: Composition of the Final stirred yogurt base

Ingredient	%	Weight (g)	Fat (g)	MSNF (g)
Raw Milk	92.67	1010.00	35.40	85.90
Fresh Cream	0.70	7.80	2.80	0.30
SMP	3.20	35.10	_	33.90
Sugar	0.40	4.40	_	_
Gelatin	3.00	32.70	_	_
Total	100.00	1090.00	38.20	120.10

Table 03: Composition of Final Fruit puree

Ingredient	Amount (w/w)
Banana ('Anamalu')	45%
Pineapple	15%
Cane sugar (white)	40%
Ascorbic acid	500 ppm

Then the best incorporation of fruit puree was determined by using five point hedonic scale with 30 sensory panel. Physicochemical and microbiological properties were observed in the selected best sample. Chemical composition (Moisture &crude fat) was tested. Titratable acidity and pH were evaluated for 14 days period and microbiological analysis was done for *E.coli* and Yeast and mould content. Also probiotic bacterial count was determined using Man Rogosa Sharp Media. In addition effectiveness of the Potassium sorbate against yeast and mould count was evaluated. The sensory data were analyzed using non-parametric procedure, according to the Friedman test using Minitab 15 software programme. The data obtained from physicochemical and microbiological tests were analyzed using analysis of variance (ANOVA) using SAS 9.0 software programme. Significant means of treatments were separated using Least Significant Difference ($P<0.05$).

Results and Discussion

The sensory evaluation with Friedman test revealed all sensory parameters were significantly difference except color ($P<0.05$). The 15% incorporation level of fruit puree was obtained higher estimated median value for taste and overall acceptability. After analysis, 15% incorporation level of banana puree was selected as the best percentage for stirred yoghurt. The composition of the final selected final stirred yogurt and composition of final fruit puree is given in table 2 and table 3; respectively.

The microbilogical analysis revealed that the *E. coli/* Coliform and yeast and mould count were in acceptable range according to the SLSI standards. Preservative treatment was significantly difference with without preservative treatment ($P<0.05$). Sorbic acid and/ or

sorbic acid salt prevent the growth of yeast by blocking their dehydrogenase system. Potassium sorbate is very effective against *Saccharomyces* spp., *Debaryomyces* spp., *Candida* spp. (Mihyar, Yamani and Al-Sa'ed, 1994 cited in Yildiz, 2010).

The probiotic activity of banana stirred yoghurt was significantly different from plain stirred yoghurt ($p<0.05$) (Figure 1). It may be due to the prebiotic (FOS) compounds that present in ripe bananas. The highest FOS content was found in ripe bananas, which contained 2.0mg/g of FOS (Environ International Corporation, 2000).

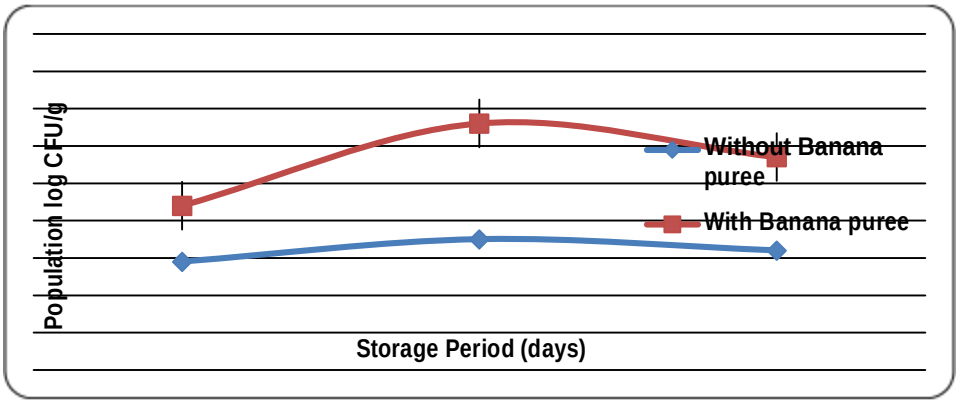

Figure 01: Viability of probiotic lactobacilli with storage life

Conclusion

The best incorporation level of fruit puree for the stirred yoghurt was 15%. Ripe banana contains prebiotic source that enhance the probiotic lactic acid bacteria. Potassium sorbate is an effective preservative against yeast and mould count.

References

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