

DEVELOPMENT OF A SOY (*GLYCINE MAX*) MILK TONED SET YOGHURT

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Introduction

Yoghurt is an increasingly popular cultured dairy product in most countries. This is partly because of an increased awareness of the consumers regarding possible health benefits of yoghurt. In Sri Lanka, current self-sufficiency of milk is about 15 – 20%, the rest been mostly achieved with use of imported milk powder (Ranaweera, 2007). Soymilk rich in protein and it is also a source of carbohydrate, lipid, fibre, vitamins, and minerals. Therefore, it can be meaningfully blended with milk in order to be transformed into many low cost and nutritious dairy products easily. On this background experiments were conducted in Department of Animal Science with the following objectives:

- Find out suitable percentage of soy milk to be incorporated.
- Development of low cost and nutrient rich set type yoghurt

Methodology

Soymilk was prepared using the method described by Rehman *et al.*, (2007). In accordance with the procedure by Sri Lankan Standard (SLS 824: 1980), yoghurt was prepared. Soy yoghurt was prepared with different percentage of soy milk (5%, 10%, 15%, 20%, and 25% (v/v) and cow milk combinations and prepared samples were subjected to a sensory panel of 30 untrained members for sensory evaluation. Selected yoghurt sample from sensory evaluation and normal yoghurt as control were subjected to chemical compositional analysis, *Coliform* test and shelf life evaluation. Total solids, fat, protein, sugar, fibre, ash, pH, and titratable acidity of the samples were measured by the methods described in AOAC (1995) for three triplicates. The method described by Wu *et al.*, (2001) was used to measure the syneresis of yogurt samples. The method described by Weerasekara *et al.*, (2010) was used to measure the *Escherichia coli* count. Cost of production was evaluated for each treatment separately. Friedman non parametric statistical method was used to analyze the sensory data and proximate data were analyzed in Completely Randomized Design (CRD) using SAS statistical software package.

Summary and Conclusion

Sensory scores of yoghurt samples toned with 5%, 10%, 15%, 20% and 25% level (V/V) of soy milk (SY).

Median values of various physical scores for different attributes of different treatments are given in table 3.1. Yoghurt prepared with 10% of soy milk showed the highest median value for overall acceptability followed by yoghurt samples containing 15%, 5%, 20%, and 25% of soy milk, respectively. The present result agrees with the results of Tamime & Robinson (2008). They stated that the addition of soy milk to cow milk or buffalo milk should not exceed 10% because the starter culture counts decreases with increasing soy milk concentration and the acceptability of the product decreased owing to the detection of beany aroma.

Table 3.1 Median values for sensory scores in yoghurt samples toned with different percentage of soy milk (SY)

Attributes	5% soy milk	10% soy milk	15% soy milk	20% soy milk	25% soy milk
Appearance	4.40 ^a	5.00 ^a	4.70 ^a	4.40 ^b	4.00 ^b
Colour	4.00 ^a	4.10 ^a	4.00 ^{ab}	4.00 ^{ab}	3.90 ^b
Aroma	4.80 ^a	5.00 ^a	4.80 ^a	4.90 ^a	4.00 ^b
Texture	4.95 ^a	4.95 ^a	4.85 ^a	4.05 ^b	3.95 ^b
Taste	4.20 ^b	4.80 ^a	4.00 ^b	4.00 ^b	4.00 ^b
Mouth feel	4.80 ^b	5.00 ^a	4.20 ^{bc}	4.10 ^c	3.90 ^d
Overall acceptability	4.50 ^{bc}	5.00 ^a	4.70 ^{ab}	3.60 ^c	3.20 ^d

^{a-d} values in the same row with the same letter of alphabet do not differ significantly ($p > 0.05$)

Proximate analysis of the formulated yoghurt preparations

The data for average chemical composition of normal yoghurt, and soy yoghurt are shown in Table 3.2. The SNF (Solid Non Fat) (Normal yoghurt-15.73 ± 0.06%, Soy yoghurt 15.42 ± 0.04%) was in agreement with the standard (SLS 824:1989). Soy milk contains lower fat than the cow milk and for this reason toning of soy milk causing a noticeable decrease in fat content of yoghurt samples. A perusal data from Table 3.2 revealed that there was a significant difference observed in protein content and fibre content of soy yoghurt sample.

Fig 3.1, 3.2, and 3.3 shows the changes of pH, titratable acidity and syneresis respectively. Based on the results shelf life of the products were determined as 15 days. Normally shelf life of the yoghurt is 2 to 4 weeks.

Microbial analysis - Coliform screening test

No growth of *Coliform* organism detected in all samples at 10⁻¹ dilution.

Cost of production

Table 3.3 showed the cost of production of various types of yoghurts produced from 10 Litres of milk. The cost of producing 1 Litre of soy yoghurt was least (Rs127.29), while the cost of producing 1 Litre of normal yoghurt was highest (Rs132.16).

Table 3.2 Means and Standard Deviation of compositional contents of selected samples of yoghurt

Components	TRT - 1 (NY)	Trt-2 (SY)
	Median ± SD	Median ± SD
Water	80.27 ± 0.12 ^a	80.74 ± 0.08 ^b
Total solids	19.73 ± 0.12 ^b	19.26 ± 0.81 ^b
Fat	4.00 ± 0.06 ^a	3.84 ± 0.08 ^b
Protein	3.30 ± 0.02 ^b	3.34 ± 0.01 ^{ab}
Sugar	11.91 ± 0.04 ^b	11.44 ± 0.048 ^b
Fiber	0.00 ± 0.00 ^b	0.14 ± 0.01 ^a
Ash	0.52 ± 0.02 ^a	0.49 ± 0.01 ^b

^{a-b} values in the same row with same letter of alphabet do not differ significant ($p > 0.05$). Trt - 1, Normal Yoghurt; Trt -2, Soy (10% w/v) yoghurt

Figure 3.1 Changes in pH of yoghurt samples during storage time

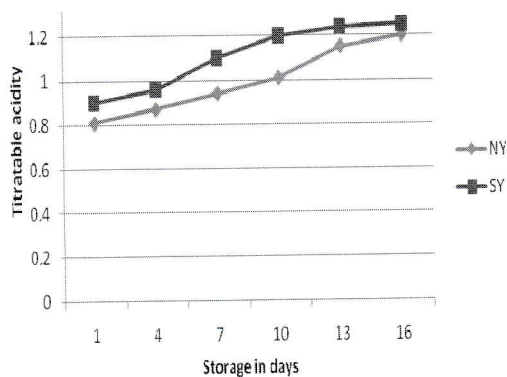


Figure 3.2 Changes in titratable acidity of yoghurt samples during storage time

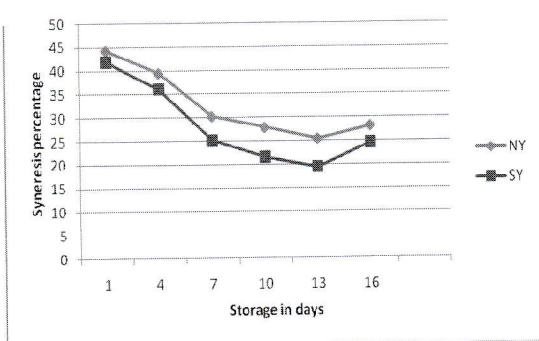


Figure 3.3 Changes in syneresis of yoghurt samples during storage time

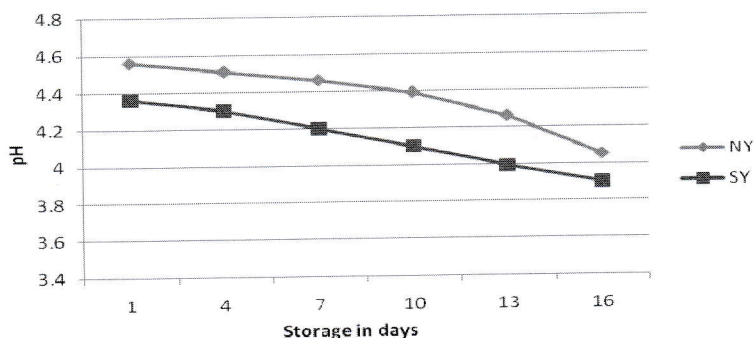


Table 3.3 Cost of production for various types of yoghurts (Cost/10 litre)

Ingredients	Unit price	NY	SY
Cow milk	50.00 (1 Litre)	500.00	450.00
Soy milk	12.50 (1 Litre)	-	12.50
Jack fruit	150.00 (1 kg)	-	-
Sugar	100.00 (1 kg)	100.00	100.00
Gelatin	80.00 (30 g box)	186.66	186.66
Culture	50.00	50.00	50.00
Yoghurt cups	2.00 (1 cup)	180.00	180.00
Other costs	30% of costs of		
	Ingredients	305.00	293.75
Total cost (for 10 Litres)	1321.67	1272.91	

Conclusion

Yoghurt processed from 10% (v/v) of soymilk and cow milk is better than the yoghurt processed from cow milk in terms of nutrient composition and sensory attributes. Addition of soy milk improved the texture of yoghurt and also supplemented the milk with fiber, in which dairy yoghurt is totally deficient.

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