

Development of soursop pulp (*Annonamuricata*) incorporated fermented sweet cream buttermilk beverage

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Introduction

In Sri Lankan context buttermilk removed from the dairy processing plants considered as a dairy waste and utilization of dairy by product is considerably low compared to other countries. Sri Lankan market is still having a market gap for locally produce fermented flavored milk base beverages. Buttermilk could be used to produce fermented milk beverages replacing milk which would result in differentiated products. Buttermilk is also considered a nutritious dairy ingredient that is saturated in milk fat globule membrane (MFGM) components (Sodini *et al.*, 2006). Addition of fruit juices or pulps is an attractive avenue for the utilization of buttermilk. Soursop is one of the fruit spp. which can be incorporated to manufacture beverages with good consumer demand. The fruit is rich in vitamin B, potassium, fructose and vitamin C (Pamplona-Roger, 2005 cited in Ekaluo *et al.*, 2013). Soursop fruit is a proven cancer remedy for cancers of all types and broad spectrum antimicrobial agent for both bacterial and fungal infections, antiparasitic activity, lower high blood pressure and is used for depression and stress (Camiel *et al.*, 2008).

Methodology

The current study was carried out at Pelwatte Dairy Industries Limited, Pelwette and laboratory analysis was done at Pelwatte Dairy Industries Limited and Uva Wellassa University laboratories. Soursop pulp was prepared by flowing method. Fresh fully ripped Soursop fruit was washed by chlorinated water and disinfected by using 70% of ethanol. Then fruit was cut it to halves by using a sharp knife and seeds and blemishes were removed. After that, flesh was scooped out using a clean stainless steel spoon and blended it using an electric blender. Initially incubation time was standardized for the buttermilk base by incorporating different levels of Skim Milk Powder. Several preliminary studies were done to select the best

Soursop pulp and Sugar incorporation level for the final product. Sensory evaluation was done using 30 untrained panelists for the final three treatments (12%, 13% and 14% of Soursop). The pH value and acidity were evaluated in one day intervals for thirteen days in both Potassium Sorbate added sample and without preservative sample and microbiological analysis was done for *Escherichia coli*, Coliform and Yeast and Molds. The sensory data was analyzed using non- parametric procedure, according to the Friedman test with 0.05 levels of significance in Minitab 16 software package. Complete Randomized Design (CRD) was conducted and data obtained from chemical and microbiological testes were analyzed using analysis of variance (ANOVA) using the General Linear Model (GLM) procedure of SAS software.

Results and Discussion

Skim Milk Powder was added to buttermilk to increase the total solid content. The increase of total solid content has reduced the incubation time by influencing the growth and activity of starter culture (Figure 01). Incubation time was reduced to 4 hours by adjusting Skim Milk Powder level to 6 grams/100 mL. Eight grams of Skim Milk Powder addition level was not selected as it can increase the cost of production.

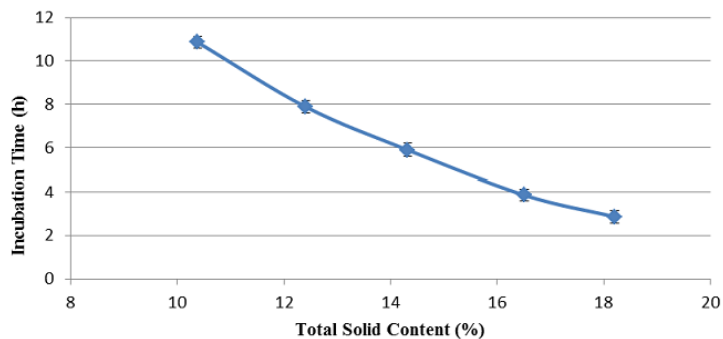


Figure 01: Incubation Time variations with the Total Solid Content

According to the sensory evaluation, formulation with 13% Soursop incorporation level has shown higher preference than the other formulated treatments (Figure 2). According to above results mouth feel and taste were overlapped in all three treatments. 13% Soursop level was not significantly masking the milky flavor of the beverage this might be a reason for higher preference.

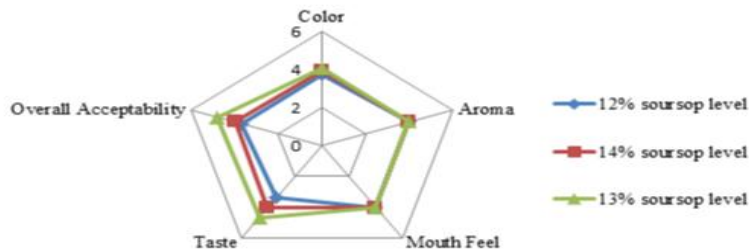


Figure 02: Sensory attributes of the different Soursop incorporation levels

Titrateable acidity of the Soursop incorporated sweet cream buttermilk beverage has increased while the pH of the beverage was decrease with the days of storage. The decrease of pH during the storage is common in fermented dairy foods and can be attributed to the growth of bacteria and lactic acid production (Lucey, 2004). The pH reduction in the beverage with preservatives was in a higher pH range than beverage without preservatives. Buttermilk beverage without preservatives was having a significantly higher mean acidity than the buttermilk beverage with preservatives ($P < 0.05$). Fermentable sugars in the product produces lactic acid this lactic acid may increase with storage time period. It may lead to increase the acidity of the product.

Negative results for *E. coli*/Coliform could be a result of good hygienic practices conducted during processing of beverage. Beverage without preservatives was positive for yeast and mold count after the 5th day of storage and beverage with preservatives was negative for yeast and mold count during 13 days of storage. Thus Potassium sorbate is an effective preservative for the beverage.

Conclusions

Starter culture multiplication was not harmed by use of sweet cream buttermilk for the production of fermented beverage. Further, incubation time was reduced to favorable level with increase of total solid content in sweet cream buttermilk base. 13% Soursop incorporation level and 12% sugar incorporation level were selected as the best incorporation level according to the sensory attributes. Potassium sorbate can be used as a preservative for the Soursop incorporated sweet cream buttermilk beverage. The crude protein level of the most preferred sample was 3.6% while its ash content was 0.8%. Its also had a fat content of

0.6%. Further studies should be done on the shelf stability of the Soursop incorporated sweet cream buttermilk beverage.

References

- Camiel, L.D. and Whelan, J.S. (2008). Tropical American plants in treatment of infectious diseases. *Journal of Dietary Supplements*, 5(4), 349-72.
- Ekaluo, U.B., Ikpeme, E.V., Ibiang, Y.B. and Omordia, F.O. (2013). Effect of Soursop (*Annona muricata* L.) Fruit Extract on Sperm Toxicity Induced by Caffeine in Albino Rats. *Journal of Medical Sciences*, 13, 67-71.
- Lucey JA. 2004. Cultured dairy products: An overview of their gelation and texture properties. *International Journal of Dairy Technology*, 57, 77-84.
- Sodini I., Morin P., Olabi A. and Jimenez-Flores, R. (2006). Compositional and functional properties of buttermilk: a comparison between sweet, sour and whey buttermilk. *Journal of Dairy Science*, 89, 525–536.