

Improvement of Product Formulation of Palmyrah Fruit Cordial available in the Market

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The tropical palm Palmyrah (*Borassus flabellifer* L.) is commonly found in north-east of Sri Lanka. Fully ripen fruits of the palm are extracted and bottled during the peak harvesting season from August to October every year. Palmyrah fruit cordial, produced by Palmyrah Development Board of Sri Lanka, is readily available at its sales centres but the quality of the existing product needs to be improved to attract the national and international markets. Therefore, a research study was carried out to improve the product formulation according to the recommendations of the Sri Lanka Standards Institute (SLS 214: 2010). Ingredients of Palmyrah fruit pulp, cane sugar, tartaric acid or citric acid, pectin and sodium metabisulphate were used and all ingredients were added as fruit pulp, sweetener, acidulant, stabilizer and preservative respectively. Product development was performed by changing one ingredient at different percentages while maintaining others at a constant level in each production step. However, firstly, fruit pulp and cane sugar were changed as combination since pulp had bitterness. Amount of pulp and cane sugar combinations used for optimization were 25, 30 and 35% of fruit pulp each with 40, 45 and 50% of cane sugar. In the following steps as optimizing amount of pectin from the percentages of 0.025, 0.05, 0.075 and 1 %, best amount of citric acid and tartaric acid among percentages of 0.2, 0.4, 0.6, 0.8 and 1% and proper amount sodium meta bisulphate among 50, 100, 150 and 200 ppm, optimized amount of ingredient in former step was added to the mix. A sensory evaluation was conducted after dilution of cordial to four times. It was performed with 30 untrained panelists using a 5-point hedonic scale and the results were analyzed by Minitab 16.0 software. The Friedman non-parametric test was used to select the best product and the mean separation was performed by Tukey's Test at $p=0.05$. Formulated and improved product contained cane sugar, palmyrah fruit pulp, water, pectin, citric acid and sodium metabisulphate at concentrations of 40%, 30%, 29.15%, 0.05%, 0.80% and 200 ppm respectively on weight basis (w/w). Acidity as citric acid percentage and the brix value were also determined as 0.38% and 13.21°, respectively. These values complied with the SLS 214:2010 standards showing that reconstituted product contain both values below 1% and 16°, respectively. The shelf-life of the product was determined to be for six months in different heat treatments of temperature and time combinations of 70° C, 80° C and 90° C for 10 and 20 min for each step. Acidity, pH and brix values ranged between 0.3- 0.4%, 3.0- 3.3 and 12.8- 14.3 during six months of storage period for all the heat treatments applied. Microbial test results had stated that 80°C for 20 min could be selected as heat treatment for bottling to keep the product for six months without deteriorating its quality.

Keywords: Cordial, Palmyrah fruit pulp, Shelf life, Sri Lanka Standards