

Incorporation of Palmyrah (*Borassus flabellifer*) Tuber Flour in Developing a Soft Serve Ice Cream Dry Premix: Assessment of its Physical, Chemical, and Microbiological Properties

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Ice cream, a popular frozen dairy dessert, now includes dry premixes for convenience. However, current versions often lack optimal taste, texture, and stability. There is a need for an improved soft-serve dry premix offering better flavor, consistency, shelf-life, and affordability to meet consumer and food service demands more effectively. This study developed a soft-serve ice cream dry premix aligned with Sri Lanka Standards Institution (SLSI) guidelines, aimed at providing a convenient, cost-effective, and shelf-stable product for consumers and manufacturers. The formulation included milk powder, sugar, stabilizers, emulsifiers (Distilled Monoglyceride, Glycerol monostearate) and flavoring agents to ensure a creamy texture, pleasant flavor, and extended shelf life. Novel to this formulation was the addition of Palmyrah tuber flour, rich in dietary fiber, to enhance the premix's nutritional profile. Substituting milk powder with Palmyrah flour at inclusion levels of 10%, 15%, and 20% demonstrated nutritional enhancement. The treatment combination with the highest overall acceptability was selected through sensory analysis. Data collected by sensory were analyzed by Friedman non-parametric test with a 95% confidence interval. Physiochemical parameters were tested for the control and three levels of Palmyrah flour substitution, and the best one among them was selected. Microbiological analyses confirmed the premix's and microbial safety over a 28-days. Key findings indicate that the formulation containing 12% fat with 100% DMG emulsifier (control) has the highest sensory appeal, but 20% of Palmyrah Substituted sample resulted in high dry matter, crude fat, fibre and protein, energy and ash. Although the inclusion of Palmyrah tuber flour improved the nutritional profile, higher replacement levels negatively impacted taste and texture, leading to lower acceptability in sensory evaluations. The study successfully developed a soft-serve ice cream dry premix that aligns with Sri Lanka Standards Institution (SLSI) guidelines, offering a convenient, cost-effective, and shelf-stable product, and the formulation achieved a desirable creamy texture and flavor profile while enhancing nutritional value.

Keywords: Ice cream dry premix, Palmyrah (*Borassus flabellifer*) tuber flour, Soft serve ice cream