DEVELOPING A COST-EFFECTIVE AND INDUSTRIALLY FEASIBLE METHOD FOR FORMULATING FROZEN DESERT ENRICHED WITH OIL-SOLUBLE CAROTENOIDS FROM PALMYRAH FRUIT

By

Y.Jenanan

Department of Biosystems Technology

Faculty of Technology

Eastern University, Sri Lanka

Chenkalady

2025

ABSTRACT

This research developed a cost-effective and industrially feasible method for formulating frozen desserts enriched with oil-soluble carotenoids extracted from Palmyra fruit (*Borassus flabellifer* L.). The study optimised carotenoid extraction using food-grade coconut oil and stabilized the pigments with natural antioxidants (tocopherols and ascorbic acid). Four dessert formulations (T1–T4) were evaluated for their nutritional, sensory, and microbial properties, with T1 (containing 10 g of oil-soluble carotenoids and 1 g of turmeric powder) emerging as the superior sample. Key findings included a pH range of 7.10–7.22, fat content of 0.70–0.85 g/100g, and high consumer acceptability in sensory evaluations (8.3/9 overall liking for T1). The product demonstrated microbial safety (1.5×10^4 CFU/g aerobic plate count, no E. coli) and moderate phenolic content (0.788 mg GAE/100g). The study highlights Palmyra carotenoids as a sustainable alternative to synthetic colorants, offering nutritional benefits (provitamin A) while aligning with clean-label trends. The optimized process supports scalable production, leveraging Sri Lanka's abundant Palmyra resources to enhance rural livelihoods and reduce reliance on imported additives.

Keywords: Palmyra carotenoids, frozen dessert, Natural food coloring, Cost-effective formulation, Sensory evaluation

TABLE OF CONTENTS