STANDARDISATION AND EVALUATION OF THERMAL AND NON-THERMAL PROCESSING OF RIPE JACKFRUIT

by

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ABSTRACT OF THE THESIS

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ABSTRACT

This study aims to standardize protocols for varikka variety ripe jackfruit (bulb and pulp), using retort pouches, HPP, and PL, focusing on enhancing safety, quality, and shelf life. Retort pouch processing involved pasteurisation at 75-95°C for 5-15 minutes and sterilisation at 105-121°C for 5-15 minutes. High-pressure processing applied pressure ranging from 300 to 600 MPa for 5-20 minutes, maintaining the fresh-like qualities of the fruit while enhancing bioactive compound retention. PL used a voltage range of 1-2.5 kV with 50-200 pulses and a lamp to sample distance of 4-10 cm, effectively decontaminating the pulp and maintaining biochemical integrity.

The results showed that retort pouch processing extended the shelf life of processed jackfruit to over 150 days, reducing microbial growth but causing thermal softening and pigment loss at higher temperatures. Pasteurisation at 99°C/15 minutes led to a 33.72% reduction in ascorbic acid (AA) and minor losses in total phenolic (TPC) and flavonoid content (TFC), while lower temperatures (71°C/15 minutes) better-preserved antioxidant activity and firmness. The highest bacterial reduction occurred at 99°C/15 minutes, with optimal conditions for RJB at 80°C/5 min (desirability 0.917) and for RJP at 80°C/12 min (desirability 0.812). Sterilisation resulted in higher AA losses (up to 42%) in sterilised RJB, with optimal conditions 106°C/7min, and for sterilised RJP at 106°C/5 min, yielding desirability of 0.956. HPP, particularly at 600 MPa, significantly improved shelf life (40 days) and bioactive compound release, extending freshness by threefold to that of fresh samples. Optimized pulsed light processing at 1.50 kV, 200 pulses, and a distance of 4.00 cm effectively preserved biochemical compounds and ensured microbial safety, allowing PL-treated samples to maintain quality for over 30 days. The study suggests that retort pouches, HPP, and PL, enhanced the safety, quality, and shelf life of RJB and RJP. Non-thermal techniques have been shown to better preserve product quality compared to retort processing. Retort pouch processing remains the best option for safety and shelf life, making it more commercially viable.