Optimization of time-electric field combination for PPO inactivation in sugarcane juice by ohmic heating and its shelf life assessment

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Abstract
The effect of ohmic heat (OH) treatment was measured on polyphenol oxidase (PPO) activity in sugarcane juice under different electric field strengths (24, 32 and 48 V/cm) and holding times (0.25, 0.50, 0.75, 1.0, 1.25 min) at a temperature of 80 ± 2 °C, optimized by conventional thermal (CT) treatment. The optimum temperature of PPO inactivation for CT-treatment was determined in a parallel study. The processing condition of 32 V/cm and 1 min holding time was found optimum and was analyzed for titrable acidity (TA), reducing sugars (RS), ascorbic acid (AA) and microbial load for 10 and 30 days at room and refrigeration temperatures respectively. During refrigerated storage, TA and RS remained significantly (p < 0.01) unchanged and the AA degradation was more pronounced at room temperature. Both treatments resulted in significant microbial reductions but growth resurfaced after 5th and 25th day of room and refrigeration storage respectively. No yeast and mold growth was witnessed after OH-treatment. Overall, the OH-treatment was found to inhibit PPO enzyme activity in a shorter processing time than CT, while maintaining the potential quality attributes of the juice.

Keywords
Sugarcane juice; PPO activity; Ohmic heating; Optimization; Leuconostoc mesenteroides

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