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Effect of electric field strength, applied temperature and frequency on vitamin C and PME activity of Ohmic heated peach pulp

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The present investigation was carried out for processing of peach fruit by Ohmic heating and this study was designed to determine the effects of electric field strength, temperature and frequency on vitamin C content and Pectin methyl esterase (PME) activity of Ohmic heated peach pulp. Peach pulp was prepared by removal of peel from the fruit followed by proper grinding and mixing. Ohmic heating was carried out using a lab scale Ohmic heating assembly. Electric field strength (4.7, 7.35 and 10 V/cm), frequency (40, 50 and 60 Hz) and temperature (60, 75 and 90°C) were used in different combinations according to Box-Behnken design. 17 heating experiments were performed by taking 250 ml pulp and the process was carried out till the attainment of desired temperature. Electrical conductivity of pulp was found linearly increasing with applied temperature and frequency. The results indicated maximum retention of vitamin C content (7.85 mg/100 g) at highest level of electric field (10 V/cm) and lowest level of temperature (60°C) and applied frequency (40 Hz). Lowest vitamin C (2.07 mg/100 g) was obtained at highest level of temperature (90°C) and lowest level electric field strength and frequency i.e., 4.7 V/cm & 40 Hz, respectively. There was significant effect of frequency and temperature on vitamin C content of peach pulp. Both temperature and electric field strength has shown higher losses in PME. With increasing field strength, loss in PME activity of peach pulp was found increasing from (75.05 to 109.41%) and (42.64 to 83.23%) at highest level of both temperature and frequency and maximum frequency and minimum temperature, respectively. Results were concluded using multivariate analysis of data and it may be summarized that electrical conductivity (2.10 S/m), heating rate (11.30°C/min), vitamin C content (7.17 mg/100 g) and loss in PME activity (72%) were the optimized results of this study.

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