

Response Surface Methodology for Thermal Degradation Study of Carotenoids, Antioxidants and Flavonoids in Papaya (*Carica Papaya*) Pulp

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Abstract The focus of the study was to investigate the level of different parameters such as temperature, time and pH for the minimum thermal degradation of carotenoids, antioxidant activity and flavonoids in papaya pulp. The central composite design was used with three independent variables temperature (43.18, 50, 60, 70, 76.82°C), time (39.54, 60, 90, 120, 140.46 min) and pH (2.32, 3, 4, 5, 5.68) to study the degradation of carotenoids content, antioxidant activity and flavonoid content of fresh papaya pulp. The experimental values of carotenoid content, antioxidant activity and flavonoid content ranged from 1.48-2.86 mg/100g, 19.97-58.86 % and 0.42-1.11 mg/g respectively. Second order model obtained for carotenoid content, antioxidant activity and flavonoid content revealed a coefficient of determination (R^2) 96.5, 97.9 and 94.98% respectively. Maximum retention of carotenoid content was obtained at 60°C temperature, pH 2.32 at 90 min treatment time i.e. 3.189 mg/100g. Maximum retention of antioxidant activity was obtained at 60°C temperature, pH 4 at 90 min treatment time i.e. 58.86%. Maximum retention of flavonoid content was obtained at 43.18°C temperature, pH 4 at 90 min treatment time i.e. 1.11 mg/g. The results revealed that with the increase in temperature, time and pH, the carotenoid content and flavonoid content in papaya pulp decreased significantly ($p \leq 0.05$). The surface graphs showed the antioxidant activity decreased with increased in temperature but it significantly ($p \leq 0.05$) increased with increase in heating time and pH of papaya pulp.

Keywords: Papaya pulp, response surface methodology, carotenoid content, antioxidant activity, flavonoid content and thermal degradation.