

Analyzing the physical and biochemical changes in strawberries during storage at different temperatures and the development of kinetic models

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Abstract

Freshly harvested strawberries were stored at 5 °C, 10 °C, 20 °C, 26 °C, and 32 °C, and assessed for physical and biochemical changes during storage. The results showed an increase in weight loss, pH, and reducing sugars, while a consistent reduction in axial diameter, radial diameter, brightness (L^*), redness (a^*), yellowness (b^*), titratable acidity, total phenolics, ascorbic acid and antioxidant activities with increased temperature and prolonged storage period. Kinetic models were developed for biochemical as well as physical parameters and verified using Coefficient of determination (R^2), Root mean square error and Akaike information criterion. The biochemical parameters followed either zero or first order with $R^2 > 0.95$, whereas physical parameters followed zero order with $R^2 > 0.85$. Activation energy values for change in biochemical parameters were found to be in the range of 20–50 kJ/mol. A significant correlation was observed between the physical and biochemical parameters of strawberries. A correlation equation between total colour loss and biochemical parameters was developed with R^2 in the range 0.76–0.96, which can be used as a rapid and non-destructive method for the detection of the quality of strawberries.