Title Hyperspectral imaging for nondestructive determination of some quality attributes for strawberry

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Abstract

Hyperspectral imaging in the visible and near-infrared (400–1000 nm) regions was tested for nondestructive determination of moisture content (MC), total soluble solids (TSS), and acidity (expressed as pH) in strawberry. The spectral data were analyzed using the partial least squares (PLS) analysis, a multivariate calibration technique. The correlation coefficients (r) with the whole spectral range (400–1000 nm) for predicting MC, TSS, and pH were 0.90, 0.80, and 0.87 with SEC of 6.085, 0.233, and 0.105 and SEP of 3.874, 0.184, and 0.129, respectively. Optimal wavelengths were selected using β-coefficients from PLS models. Multiple linear regression (MLR) models were established using only the optimal wavelengths to predict the quality attributes. The correlation coefficients (r) for predicting MC, TSS, and pH using MLR models were 0.87, 0.80, and 0.92 with SEC of 6.72, 0.220, and 0.084 and SEP of 5.786, 0.211, and 0.091, respectively. Moreover, for classifying strawberry based on ripeness stage, a texture analysis was conducted on the images based on grey-level co-occurrence matrix (GLCM). The higher classification accuracy of 89.61% was achieved using the GLCM parameters at horizontal direction at angle of 0°.