

**Title** Visible/near infrared spectrometric technique for nondestructive assessment of tomato 'Heatwave' (*Lycopersicum esculentum*) quality characteristics

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### Abstract

Nondestructive optical methods based on visible and near infrared reflectance spectroscopy (Vis/NIRS) have been used for estimation of physiological properties of batches of fruit and vegetable products. The objectives of this study were to evaluate the application of Vis/NIRS in measuring the quality characteristics of tomato 'Heatwave' (*Lycopersicum esculentum*), including fruit firmness (indicated by compression force ( $F_c$ ) and puncture force ( $F_p$ )), soluble solids content (SSC) and acidity (pH). Reflectance ( $R$ ) determinations in the 350–2500 nm range were done on 200 tomato samples separated randomly into two groups: 170 fruit for method calibration and the remaining 30 for predictions of quality. The best calibration model for each characteristic was obtained by principal component regression (PCR) and partial least square regression (PLS) analysis. Excellent prediction performance was achieved for each tomato quality characteristic. The correlation coefficient and standard error of prediction to soluble solids content were 0.90 and 0.19°Brix, respectively. The corresponding values for pH,  $F_c$  and  $F_p$  were 0.83 and 0.09, 0.81 and 16.017 N, and 0.83 and 1.18 N, respectively. Comparatively, the model had significantly greater accuracy in determining SSC. These results suggest that Vis/NIRS measurements in the full spectral range (400–2350 nm) could be used to assess certain tomato quality, which can support further investigation into developing wider calibration from more varied growing condition or wider range of varieties.