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Non-destructive measurement of mandarin orange quality parameters with Visible -Near Infrared Spectroscopy

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The development of sensors to measure fruit internal quality variables is one of the challenges of post-harvest technology. Visible-near infrared spectroscopy (Vis/NIRS) has been a promise technique for nondestructive fruit quality assessment. This study was focused to evaluate the use of Vis/NIRS in measuring the quality parameters of intact mandarin orange fruit (*Citrus clementina*). The parameters studied were: firmness, color (CIE Lab), peel thickness, soluble solids content (SSC), pH and total acidity (TA).

A total of 120 mandarin fruit with different maturation were sampled. Reflectance NIR spectra were collected in four points of each fruit and the fruits were posteriorly analyzed for the physico-chemical parameters.

Prediction models were selected based on the highest r^2, lowest standard error of calibration (RMSEC) and lower number of factors used in the calculation. For color parameters (L*, a* and b*) model had a mean square error of calibration (RMSEC) of 0.877, 1.780 and 1.589 and coefficient determination (r^2) of 0.923, 0.963 and 0.852, respectively. The proposed model for the SSC had a RMSEC of 0.314 and r^2 of 0.749.

The results indicate that Vis/NIRS technique could provide an accurate, reliable and nondestructive method for assessing the internal quality indices.