

Non-destructive measurement of internal browning in mangoes using visible and near-infrared spectroscopy supported by artificial neural network analysis

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Abstract

Visible and near infrared spectroscopy (VNIRS) (400–1000 nm) is a key emerging non-destructive technique for fruit quality assessment. This, because it is a unique method which allows rapid access to fruit pigments and chemical properties linked to fruit quality. In the present work, VNIRS has been used to predict the internal browning in ‘Keitt’ mangoes halves. The reference analysis was performed by cutting individual mango into halves and quantifying the extent of internal browning with a standardized color imaging (CI) cabinet as a browning index (BI). The CI provided a value for the “browning index” for each mango reflecting the presence and severity of internal browning. The data modelling involved both regression and classification analysis. The regression was performed to link the VNIR spectra with the BI values obtained from the internal color analysis. The classification analysis was performed for binary classification of mango into healthy or brown. Two different analysis techniques i.e. artificial neural network (ANN) and partial least square (PLS) were utilized. The study shows that VNIRS combined with ANN can classify mangoes as healthy or having internal brown with an accuracy of over 80 %. A robust and reliable classification system can potentially improve quality decisions through the mango supply chain, thereby reducing post-harvest losses.