

Title Predicting oleocellosis sensitivity in citrus using VNIR reflectance spectroscopy
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Abstract

Oleocellosis is a major limiting factor for citrus exports. Therefore, it is important to classify fruit that is sensitive to oleocellosis before storing and shipping the produce. The purpose of this study was to determine the significant wavelengths that could be used to classify fruits susceptible to oleocellosis using “Trovita” sweet orange (*Citrus sinensis* L.). A spectrophotometer with a wavelength range of 325–1075 nm was used to measure the spectral reflectance data of fruit peels from different harvest times, and a relationship was established between non-destructive visible/near-infrared spectroscopy (VNIRS) measurements and the rates of oleocellosis (RO) and degree of oleocellosis (DO). The data set (absorbance [$\log 1/R$]) was analyzed to build the best predictive model for these characteristics using partial least square (PLS) regression with several spectral pretreatments and multivariate calibration techniques. The RO and DO prediction models ($r = 0.9836$ and 0.9880 , respectively) and standard error of prediction (0.0079 and 0.0056 with a bias of -0.0015 and -0.0013 , respectively) resulted in excellent predictive ability. The VNIRS technique had significantly greater accuracy for determining the sensitivity of “Trovita” sweet orange to oleocellosis. These results provide fundamental and practical knowledge for the development of a non-destructive, fast, and accurate technology for classifying fruit oleocellosis based on spectral reflectance.