

Abstract

Total soluble solids content (TSS, °Brix), sucrose, glucose and fructose are important quality attributes of mango fruit and have been shown to be useful for determining fruit maturity. The approach to develop a rapid, reliable, nondestructive method for quality evaluation of mangoes is very important and critical to the mango industry and international trade. Near-infrared (NIR) spectroscopy, which is a nondestructive method for the fruit quality evaluation, has become a very popular technique. The objective of this study was to assess the potentiality of using NIR spectroscopy in predicting total soluble solids content and individual concentrations (mg/g) of sucrose, glucose and fructose nondestructively in mango fruits (*Mangifera indica*, var 'Ataulfo').

Ninety-three intact mangoes stored at two different temperatures (15°C and 20°C) were measured by NIR interactance (400-1098 nm) over a period of 11 days, starting when the fruit were under-ripe and extending to a few days past optimal ripeness on average. Separate spectral, TSS and simple sugar measurements were collected on opposite sides of each mango. Spectral preprocessing consisted of second derivative (11 point Savitzky-Golay), followed by truncation of the wavelength region to 750-1098 nm. Partial least squares (PLS) regression, with leave-one-out cross validation, was used to develop models for TSS, individual sugar and the sum of the three sugars. Such analyses yielded calibration equations with $R^2 = 0.83, 0.76, 0.67, 0.64$ and 0.83 ; standard error of calibration (SEC) = 0.80, 10.05, 0.93, 4.86 and 10.35; and standard error of cross validation (SECV) = 1.05, 13.70, 1.37, 6.43 and 15.19 for TSS, sucrose, glucose, fructose and the sum of the three sugars, respectively. These calibrations were sufficiently precise for determining TSS and the sum of the three sugars. Only slight improvements in modeling occurred when the storage temperatures were considered separately. These results indicate that NIR technology offers the possibility to assess fruit quality and maturity in intact mangoes and may be useful for grading.