

Title Preliminary results on the non-destructive determination of pear (*Pyrus communis* L.) cv. Rocha ripeness by visible/near infrared reflectance spectroscopy

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Citation ISHS Acta Horticulturae 800:1099-1106. 2008.

Keywords diffuse reflectance; integration sphere; optical methods; partial transmittance; post-harvest; ripeness parameters

Abstract

Pear (*Pyrus communis* L.), cv. Rocha was rapidly adopted by consumers due to its inherent quality and currently has great acceptance in both national and international markets, being mainly produced in the west region of Portugal. We report here a first approach to the use of the non-intrusive method of Visible/Near Infrared Reflectance Spectroscopy (Vis/NIRS) to estimate the ripeness of pear cv. Rocha. Mature unripe pears obtained from Frutoeste (Mafra, Portugal) after a six-month cold-storage, were maintained in a dark room at circa 20°C during three weeks. They were followed using the Vis/NIRS in the wavelength band between 400 and 950 nm with two different configurations for the spectra acquisition, namely the Integrating Sphere (IS) and the Partial Transmittance (PT). The diffuse reflectance spectra obtained by the two configurations were compared with the respective fruit ripening parameters (colour, firmness, soluble solids content and % dry matter), determined through the standard techniques. Concerning the rough estimation of ripening parameters, data suggested an increase in both the intensity in the green to red band and pulp %dry matter, but a decreasing firmness. All other parameters remained constant. Relatively to the optical results, we have observed that the PT spectra exhibited clearer features than the IS spectra, especially from 700 nm onwards. This is probably due to the fact that the PT configuration probes more deeply into the fruit pulp. Three peaks at 600 (circa 30%), 725 and 812 nm (both at circa 50%) and a minimum at 675 nm, were identified in both IS and PT spectra. The values of reflectance peaks were approximately constant during ripening, but they moved to slightly lower wavelengths in the second week. A significant increase (circa 3-fold) in the minimal diffuse reflectance was observed in the second week, most probably associated partially, to a decrease in the fruit peel chlorophyll content.