Abstract

Quality features, including firmness, oil content and colour (chroma, hue), of two olive (*Olea europaea* L.) varieties ('Ayvalik' and 'Gemlik') were predicted using Fourier transform near infrared (FT-NIR) spectroscopy. Spectral measurements of the intact olives were performed for the wavelength range of 780–2500 nm in reflectance and for 800–1725 nm in transmittance. Measurements of olive firmness, oil content and colour were performed, following the spectral measurements, using standard methods. Calibration models for prediction of olive quality features were developed using the partial least squares method, and they were validated by leave-one-out cross validation. Better prediction results were obtained for Magness–Taylor (MT) maximum force (firmness) for both varieties in transmission mode, with the coefficient of determination (R^2) of 0.77 and the root mean squared error of cross validation (RMSECV) of 1.36 for 'Ayvalik'. Reflectance mode, on the other hand, had a lower R^2 value of 0.65 (RMSCV = 1.82) for 'Ayvalik'. Similar results were obtained for MT maximum force prediction for 'Gemlik' olives. Oil content prediction for each olive variety was poor, due to the relatively homogenous samples. However, better oil content prediction was achieved for the pooled data with the R^2 value of 0.64 (RMSECV = 0.05) in reflectance and 0.61 (RMSECV = 0.05) in transmittance. Both FT-NIR reflectance and transmittance measurements gave good prediction of olive colour, with the R^2 values for chroma ranging between 0.83 and 0.88 in reflectance and between 0.85 and 0.92 in transmittance. Similar results for hue prediction were also obtained. These results demonstrated that FT-NIR spectroscopy is potentially useful for assessing internal and external quality attributes of olives.