

Abstract

A new non-destructive optical method for the determination of anthocyanins (Anths) on fruit surfaces has been developed. It is based on the measurement of chlorophyll (Chl) fluorescence (F) excitation spectra. The technique was tested on olive (*Olea europaea*L.) fruits at different degrees of pigmentation from green to green/red, reddish-purple and purple. Comparison of the ChlF excitation spectra from two different coloured olive zones provided the absorption spectrum of the Anths. The *in vivo* absorption spectrum of Anths with peak at about 550 nm obtained by comparison of red to green olives was quite similar to that of cyanidin-3-O-rutinosid, the most abundant olive Anth (peak at 535 nm in solution). The bathochromic shift in the peak wavelength from *in vitro* to *in vivo* is probably due to co pigmentation and/or pH effects. Anths absorbance increased going from less mature to more mature olives, and it was higher in the sun-exposed part with respect to the sun-shaded one on the same olive. By using ChlF intensities at two specific excitation wavelengths, 550 and 625 nm, quantitative values of Anths content for each olive sample could be calculated. These were fairly well correlated to Anths concentration derived from olive skin extracts. New portable optoelectronic devices for non-destructive monitoring of fruit maturation, based on these findings, are under development. They will provide information on pigment concentrations that will be complementary to the quality parameters deduced from other non-invasive techniques.