

Title Nondestructive olive quality detection using FT-NIR spectroscopy in reflectance mode
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Abstract

Quality features including firmness, oil content, and color (chroma, hue) of two olive (*Olea europaea* L.) varieties ('Ayvalik' and 'Gemlik') were predicted using FT-NIR spectroscopy. Reflectance measurements of intact olives were performed using a bifurcated fiber optic probe. Measurements of firmness, oil content, and color values were done following the spectral measurements using standard methods. Calibration methods were developed using the partial least squares method. Good correlations were obtained in calibration and validation for Magness-Taylor (MT) maximum force, which was used as a measure of firmness, for both 'Ayvalik' and 'Gemlik' varieties; the coefficient of determination (R^2) for 'Gemlik' olives was 0.74 (SEC = 1.27) in calibration and 0.67 (SEP = 1.37) in validation. Better oil content prediction of olive fruits was obtained for the pooled data of 'Ayvalik' and 'Gemlik' varieties with the R^2 value of 0.64 (SEP = 0.05) in validation. Higher correlations were obtained for color predictions with $R^2 = 0.88$ and SEP = 12.9 for chroma and $R^2 = 0.86$ and SEP = 0.10 for hue for 'Gemlik'. Similar color prediction results were obtained for the 'Ayvalik' variety.