

Title Non-destructive internal quality assessment of “Hayward” kiwifruit by waveguide spectroscopy

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Citation Journal of Food Engineering, Volume 109, Issue 1, March 2012, Pages 32-37

Keywords Kiwifruit; Dielectric spectroscopy; Maturity indices; Partial least squares regression (PLS)

Abstract

Soluble solids content (SSC) and Magness–Taylor flesh firmness (MTf) of “Hayward” kiwifruits were non-destructively assessed by means of a waveguide, that houses the fruit, connected to a sweeper oscillator and a spectrum analyzer. A preliminary test was conducted with a plastic fruit filled with solutions with different SSC values in the frequency range from 2 to 20 GHz (with a step of 1 GHz). The best linear correlations (R^2 up to 0.987) between electric signals and SSC solutions in the above described test were found in the 2–3 GHz and 15–16 GHz steps. These steps were used for the dielectric measurements on kiwifruit samples during storage of 28 days at 14 °C. Partial least squares (PLS) regression were then used to predict SSC and MTf from these acquired spectra. In “test set” validation, PLS models showed R^2 values up to 0.804 (RMSE = 0.98 °Brix) and 0.806 (RMSE = 8.9 N) for the prediction of SSC and MTf, respectively.