

Early discrimination of mature-and immature-green tomatoes (*Solanum lycopersicum* L.) using fluorescence imaging method

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Abstract

Detecting mature-green and immature-green tomatoes using non-destructive approaches is a challenge for the fresh produce industry. Hyperspectral fluorescence imaging technique with excitation wavelength at 365 nm and UV-vis CCD camera was used for early non-destructive detection of mature-green and immature-green fruit from 200 randomly harvested green tomatoes. Conventional destructive analysis regarding locule gel development and seed texture were assessed to assign the maturity stage of the fruit. In addition soluble solid content (SSC), pH, total acidity (TA), and color were measured, on the training set and on the prediction set, in this case also after 10 d of storage. Fluorescence intensity at the surface of immature-green fruit was higher in the red region (690 nm) than that of mature-green fruit, suggesting that hyperspectral fluorescence imaging can be an effective classification tool. A univariate classification method was used to distinguish mature-green and immature-green tomatoes based on the grey scale values extracted from fluorescence imaging, with a non-error rate of 96 % in calibration and 100 % in external prediction. Hence, a non-destructive method for the early distinction of mature-green from immature-green tomatoes is available.