

Title Detecting internal physiological disorders in stored plums (*Prunus domestica* L.) by time-resolved reflectance spectroscopy

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Abstract

During cold storage plums (*Prunus domestica* L.) are susceptible to developing internal disorders, such as jellying and internal browning. Time-resolved reflectance spectroscopy (TRS) is a promising method to detect internal disorders in fruit non-destructively. Experiments were performed with plums ('Jubileum') stored at 1 and 4°C for three weeks. Samples of 30 plums of uniform ripeness were measured during a 5 day shelf life period without storage or after 3 weeks of storage. In addition to TRS measurements (absorption coefficients and scattering coefficients at 670 and 780 nm) standard quality factors including colour, firmness, soluble solids content and titratable acidity were analyzed. The plums were cut in halves and the amount of internal disorders was evaluated from scale 0 (healthy) to 10 (all surface affected). The correlation between internal disorders and quality factors like firmness, soluble solids content and acidity indicated that more ripe plums were more susceptible to internal disorders. Colour parameters (L^* , a^* b^*) showed significant and negative correlations with internal disorders. The absorption coefficients measured at 670 and 780 nm increased with the development of jellying and browning, which allowed distinguishing healthy fruit from those affected by internal disorders and the slightly browned fruit from those with medium and severe browning. Scattering coefficients were not influenced by chilling injury development.