Hyperspectral fluorescence imaging for shelf life evaluation of fresh-cut Bell and Jalapeno Pepper

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Abstract

Unlike many of the fresh-cut popular leafy vegetables whose deterioration becomes apparent in wilting and browning, fresh-cut pepper (*Capsicum* spp.) undergoes subtler visible changes. The current study investigated hyperspectral fluorescence imaging as an alternative to monitor the physical changes to sliced pepper rings in cold storage (4 °C, 0–21 d). Five accessions of bell-type pepper and an equal number of jalapeno-type pepper accessions were prepared by routine fresh-cut operation and placed in cold storage. At weekly intervals, pepper samples were scanned by UV-excited (365 nm) hyperspectral fluorescence imaging (464–799 nm response range), whereupon quantitative and qualitative modeling was performed in trials to respectively a) model electrolyte leakage percentage by partial least squares regression, and b) compare storage days by linear discriminant analysis (LDA). LDA classification models were moderately successful at distinguishing post-cut storage times 0, 7, 14, and 21 d. As with previous studies on the physiological effects of slicing peppers, the fluorescence response was variable across accessions within pepper type and between the two pepper types studied, which is attributed to the complicating effects of fluorescence reabsorption and cell injury response and genotypic differences that influence suitability for fresh-cut applications among the accessions evaluated.