

Chlorophyll fluorescence imaging as a tool to evaluate calyx senescence during the ripening of persimmon fruit treated with gibberellic acid

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Abstract

The effect of gibberellic acid (GA) on retarding loss of persimmon firmness and fruit coloration has been previously reported. Nevertheless, information about the effect of this treatment on calyx senescence is lacking. In this study, chlorophyll fluorescence imaging (CFI) was used to evaluate calyx senescence in persimmon fruit treated with GA. At three harvest times, physico-chemical parameters measured on persimmon fruit and CFI parameters (F_o , F_m and F_v/F_m) on calyx sepals were evaluated on the fruit treated once or twice with GA, and also on untreated fruit (CTL). A decline in the chlorophyll fluorescence parameters correlated with calyx senescence and progressed during fruit ripening. Spatial images heterogeneity in the F_m/F_v measurements illustrates senescence and necrosis dynamics, which began in the apical area of sepals and progressed to the basal area. Besides retarding fruit ripening, GA treatments delayed the calyx senescence process, and hence improved external fruit quality maintenance. The CFI parameters measured on the calyx correlated with both external color evolution and firmness loss during fruit ripening. Consequently, these chlorophyll fluorescence parameters could act as a potential non-intrusive tool to determine persimmon harvesting time.