

Title Chlorophyll fluorescence as a tool to evaluate senescence of longan (*Dimocarpus longan* Lour.) fruit

Authors H.X. Qu, C. Yi, J. Li, X.W. Duan, Y.B. Li, Y.M. Jiang

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Abstract

Longan (*Dimocarpus longan* Lour.) fruit are very susceptible to pericarp browning and aril breakdown. However, it is difficult to distinguish between the mature stage and senescence of harvested longan fruit just from peel appearance. The objective of this study was to test whether chlorophyll fluorescence can be used to evaluate senescence of longan fruit. Longan fruit were treated with fungicide, then packed and stored for 8 days at $25\pm 1^{\circ}\text{C}$ and 90-100% relative humidity. Chlorophyll fluorescence was evaluated using a pulse-amplitude modulation (PAM) fluorometer while senescence-related parameters (aril breakdown index, browning index and membrane permeability) were measured. The minimal (F_0) and steady-state fluorescence (F_t) increased by 16.09 and 19.36%, while the variable: maximal (F_v/F_m) and quantum yield of PS II (Yield) remained stable until 6 days and then declined markedly. Browning index, aril breakdown index and membrane permeability increased gradually within the first 6 days of storage and rose sharply by the end of storage. F_v/F_m and Yield showed the highest negative correlation with the increase in membrane permeability and the decrease in proportion of edible fruit. A significant negative correlation between Yield value and browning index of the inner pericarp was also observed. This study suggests a relationship between fluorescence and level of senescence of longan fruit.