Chilling injury, fruit color maturity stages, and antioxidant enzyme activities of lemon 'Baladi CV' fruits under cold storage stress

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Abstract

Lemon 'Baladi' is often harvested at different color stages (HFCS) for logistic support to market and customers. So, the evaluation of lemon fruit was harvested at three color stages (Green, G; Yellow-green, YG; Yellow, Y-stage) to determine an effect on enzymatic antioxidant activities (AEAs) and chilling injury (CI). Lemon fruits were stored at low temperature (4 ± 1 °C and relative humidity 95 ± 2%) for 60-days. The outcomes of this study provide that the G-stage fruits presented more resistance to low storage temperature stress for the long term, therefore less CI-symptoms incidence compared to other maturities (YG and Y-stage). Throughout cold storage, fruits were estimated the physical and chemical analyses every 15-days intervals. The G-stage promoted the highest activation in antioxidant enzyme activities. Consequently, the scavengers of radicals such as DPPH and ABTs test presented more quenching radicals. So, less CI symptoms incidence during 60 days of cold storage. Also, less malondialdehyde and ion leakage percentage related to other fruit color stages. These were significant impacts on CI and fruit color hue angle during storage. The G-stage revealed to be a good stage of lemon to store at low temperature due to it is tolerant to chilled temperature for long term.