

Title Improvement of cold tolerance in Tahiti lime through heat treatment

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Abstract

The influence of heat treatments on the induction of cold tolerance in 'Tahiti' lime and their effects on ethylene biosynthesis and antioxidant enzymes were evaluated. Hot water dip (HWD) of fruit at 42°C for 15 min, delayed the onset of chilling injury (CI) symptoms in approximately 20 days at 1°C. Prestorage conditioning of fruit at 37°C for 10 h, HWD at 53°C for 2 min and HWD at 42°C for 15 min reduced the CI index, as compared with untreated fruit after 15 and 30 days at 1°C (plus 3 days of shelf life at 20°C). The ACC oxidase activity had similar trend of increasing as compared to CI index observed in conditioning and untreated fruit. In contrast, HWD at 53°C for 2 min remain in an intermediate level. Conversely, the ACC oxidase activity in fruit treated with HWD at 42°C for 15 min was lower in all the assessments remaining almost the same over the storage period. There was a great increase in catalase (CAT) activity in all the fruits following 15+3 days. Afterwards, a rapid decline in CAT activity occurred, and it was associated with increased chilling injury. On the other hand, ascorbate peroxidase (APX) activity had a linear increase during storage in fruit treated with HWD at 53°C for 2 min, while the other heat treated fruit (42°C for 15 min) showed a slight increase in APX activity after 15+3 days, remaining constant along the storage period. According to our results, the reduction in activity of ACC oxidase, caused by HWD treatments enhanced the resistance of fruit to CI development.