Abstract

We have recently characterized 'Pinalate' (*Citrus sinensis* L. Osbeck), a yellow abscisic acid (ABA)-deficient mutant derived from the orange 'Navelate'. In this study we have compared the postharvest performance of fruit of both cultivars stored at 2 and 12 °C to further understand mechanisms underlying chilling injury (CI) and non-chilling peel pitting disorders and whether deficiency in ABA may affect other quality and physiological processes in citrus fruit. The rate of dehydration in ABA-deficient fruit was higher than in its wild type 'Navelate'. ABA levels in the flavedo of the mutant were about six-fold lower than in its parental. No changes in ABA were observed in fruit of the mutant stored at both 2 and 12 °C, while ABA increased during holding of 'Navelate' fruit at 12 °C and decreased at the temperature causing CI. Water, osmotic and turgor potential in the flavedo of freshly harvested fruit of both cultivars were similar and changed differentially in response to storage at 2 and 12 °C. Turgor potential was higher in 'Pinalate' than in 'Navelate' fruit held at 2 °C, probably by impaired osmotic adjustment. At 12 °C, both water and osmotic potential were lower in the ABA-deficient mutant and as a result, turgor remained constant and similar to that of 'Navelate' fruit. The most relevant differential feature associated with fruit quality was the higher susceptibility of 'Pinalate' fruit to decay and its higher loss of peel firmness during storage at 12 °C. Interestingly, fruit of the ABA-deficient mutant were more prone to develop peel pitting at non-chilling temperatures than 'Navelate', but more resistant to CI, which was manifested as brown non-depressed areas. A transient increase in ethylene production was observed before the appearance of both chilling and non-chilling peel pitting symptoms, suggesting that ethylene may be an indicator of the initial cell damage occurring in both citrus cultivars under postharvest conditions inducing different peel disorders. Under high rates of water loss, ethylene production was markedly enhanced in the ABA-deficient mutant, but not in 'Navelate' fruit, indicating that in citrus fruit, ABA may be a negative regulator of water stress-induced ethylene synthesis.