

Title Hot water and elevated CO₂ effects on proline and other compositional changes in relation to postharvest chilling injury of 'Marsh' grapefruit.

Authors Ezz, T. M., M.A. Ritenour, and J.K. Brecht.

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Abstract

Heat treatments and exposure to elevated CO₂ are known to reduce the incidence of chilling injury in grapefruit. In the current study, grapefruit (cv. Marsh) were harvested on 17 January or 22 March 1996 and exposed to hot water (HW) dips (48 deg C for 120 minutes) or exposed to controlled atmosphere (CA) of 10 or 16% CO₂ during the first 3 weeks of an 8-week cold storage period (4.5 deg C) to test their effects on the development of peel pitting (i.e. chilling injury) and on the content of proline and other compositions of the peel and juice. All HW and CA treatments from both harvests greatly reduced the development of peel pitting compared to the control. These treatments were also associated with lower average proline levels in the flavedo during storage. This suggests that HW and elevated CO₂ may reduce chilling-induced peel pitting by facilitating proline metabolism in grapefruit flavedo tissue. HW and CA treatments resulted in higher peel total soluble and nonreducing sugar levels, but effects on peel reducing sugar and free amino acid concentrations were not consistent. In the juice, HW reduced titratable acidity (TA) concentrations, while CA tended to increase both TA and ascorbic acid concentrations. Compared to the control, CA resulted in a slight decrease in total soluble solids during storage, while the effect of HW was inconsistent.