

**Title**  $\beta$ -1,3-Glucanase gene expression as a molecular marker for postharvest physiological disorders in citrus fruit and its hormonal regulation

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**Citation** Postharvest Biology and Technology, Volume 48, Issue 1, April 2008, Pages 146-149

**Keywords** Abscisic acid;  $\beta$ -1,3-Glucanase; Chilling; Citrus fruit; Low temperature; Ethylene; Non-chilling peel pitting; Rind staining; Water stress

### Abstract

The aim of this work was to understand whether a *CrGlcQ* gene, encoding an acidic class III  $\beta$ -1,3-glucanase isolated from citrus flavedo, may serve as a biochemical marker for the development of postharvest physiological disorders; and whether this gene is regulated by ethylene and abscisic acid (ABA). We have examined the changes in the accumulation of the *CrGlcQ* mRNA in the flavedo of 'Navelate' oranges, a variety prone to develop brown non-depressed areas in response to chilling, and in the flavedo of its ABA-deficient mutant 'Pinalate', a variety tolerant to chilling but very susceptible to non-chilling peel pitting, during fruit storage at chilling (2 °C) and non-chilling temperatures (12 °C). The levels of the *CrGlcQ* transcript increased transiently in fruit exposed to postharvest conditions favoring both chilling and non-chilling peel disorders, such an increase being evident even in the fruit of the ABA-deficient mutant 'Pinalate' in which ABA does not increase in response to stress conditions. Such increases paralleled those in ethylene production and preceded the appearance of visible symptoms of damage. Moreover, we examined changes in gene expression in 'Fortune' mandarins held under water stress conditions (20 °C and 55–60% RH) that did not cause any peel damage, and found that the increase in ABA was not mirrored by the changes in *CrGlcQ* mRNA accumulation. The results revealed that changes in *CrGlcQ* gene expression are linked to the development of postharvest peel disorder, in spite of being induced by different environmental conditions, and indicated that this gene might be regulated by ethylene but not by the ABA.