

Title Expression of class I chitinase and β -1,3-glucanase genes and postharvest fungal decay control of table grapes by high CO₂ pretreatment

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Abstract

The effect of pretreatment with 20% CO₂ plus 20% O₂ for 3 days was studied with regard to its effectiveness on natural postharvest decay control and its possible induction of specific PR genes in table grapes. Full-length cDNAs encoding a class I chitinase (*Vcchit1b*) and β -1,3-glucanase (*Vcgn1*) were isolated from table grapes (*Vitis vinifera* L. cv. 'Cardinal'). Our results indicate that this short-term high CO₂ treatment had a residual effect and significantly reduced decay incidence of table grapes during low temperature storage and upon transfer to 20 °C. Our results indicate that during low temperature storage the expression pattern differed between the two tested PR genes. So, while the abundance of *Vcgn1* transcript increased sharply at the beginning of storage at 0 °C, the increase in *Vcchit1b* mRNA levels was paralleled by the change in total decay. High CO₂ pretreatment restrained the up-regulation of *Vcgn1* gene expression and delayed the accumulation of *Vcchit1b* transcript as compared with non-treated grapes. Upon transfer to 20 °C after 33 days of cold storage, when attainment of maximum total decay was observed, there was a sharp increase in the accumulation of *Vcchit1b* mRNA in both treated and non-treated grapes, which was higher in the non-treated ones. Our results point out that the expression of class I chitinase and β -1,3-glucanase genes is not enhanced in CO₂-treated grapes which control total fungal decay. These results suggest, then, that the efficacy of high CO₂ pretreatment in reducing total fungal decay is not mediated by induction of the above-mentioned PR genes.