

Title Influence of the stage of ripeness on phenolic metabolism and antioxidant activity in table grapes exposed to different CO₂ treatments

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Citation Postharvest Biology and Technology, Volume 54, Issue 2, November 2009, Pages 118-121

Keywords Table grapes; Carbon dioxide; Low temperature; Anthocyanins; Antioxidant capacity; PAL expression; Total phenolics; Ripeness

Abstract

We have analyzed the influence of the stage of ripeness on L-phenylalanine ammonia-lyase (PAL) gene expression, accumulation of anthocyanins and total phenolics, and on antioxidant activity in the skin of table grapes treated with 20% CO₂ + 20% O₂ + 60 % N₂ for 3 or 6 d at low temperature (0 °C). The residual effect of high CO₂ treatment after transfer to air was also studied. In early harvested grapes, neither the anthocyanin content nor the accumulation of *VcPAL* mRNA was affected by any of the CO₂ treatments applied. However, in late harvested grapes, the duration of high CO₂ treatment determined its effect and a 6 d treatment with CO₂ sustained higher levels of total phenolics and anthocyanin accumulation, and *VcPAL* expression than observed in untreated late harvested grapes. The increased antioxidant capacity was correlated with the total amount of phenolics and anthocyanins. Conversely, in grapes treated for 3 d with CO₂ the phenylpropanoid pathway did not appear to be induced and a relationship between antioxidant activity and anthocyanins was not observed. Thus, further studies are needed to identify the most important antioxidants in these treated fruit.