

Title Effect of salicylic acid on phenylpropanoids and phenylalanine ammonia-lyase in harvested grape berries

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Abstract

Current research indicates that both salicylic acid (SA), a likely signal in the response of plants to stress, and phenylalanine ammonia-lyase (PAL; EC 4.3.1.5), a key enzyme in phenylpropanoid metabolism, perform defense-related functions within plants. However, very little is yet known about the role SA might play in regulating PAL expression and phenylpropanoid biosynthesis. The present experiment was performed using *in vivo* infiltration of 150 μ M salicylic acid into entire postharvest grape berries (*Vitis vinifera* L. cv. Cabernet Sauvignon). The results indicated that SA activated PAL by enhancing the accumulation of *PAL* mRNA, as well as enhancing the synthesis of a new PAL protein and enzyme activity. Further, the activation was found to be time course-dependent. A significant accumulation of phenylpropanoids was also observed in the SA-treated berries. However, the induction of PAL expression and the accumulation of phenylpropanoids could be blocked by pretreatment with the protein synthesis inhibitor cycloheximide, mRNA transcription inhibitor actinomycin D, and PAL inhibitor 2-amino-2-indanophonic acid (AIP), respectively. These results further indicated that SA could induce *PAL* mRNA accumulation and as a result, enhance PAL protein amounts and activity as well as enhancing the accumulation of phenylpropanoids such as phenolic acids.