

**Title** Salicylic acid activates phenylalanine ammonia-lyase in grape berry in response to high temperature stress

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### **Abstract**

Our previous work has indicated that salicylic acid (SA) is involved in the development of pea plant thermotolerance and induces the gene expression of phenylalanine ammonia-lyase (PAL; EC 4.3.1.5), a key enzyme in phenylpropanoid metabolism of grape berry. However, the relationship between SA and PAL during high temperature stress remains obscure. The present experiment, using the technique of in vivo incubation of the grape berry (*Vitis vinifera* L. cv. Cabernet Sauvignon) tissue in the SA-contained medium, the effects of exogenous SA on the gene expression of PAL and the accumulation of polyphenols during high temperature stress were investigated. The results showed that SA could induce the accumulation of *PAL* mRNA and the synthesis of new PAL protein, and increase the activity under high temperature stress. A significant accumulation of phenolics was also observed in the SA-treated berries. But, the activation of PAL by SA could be blocked by the pretreatments of berry tissues with the protein synthesis inhibitor cycloheximide, and mRNA transcription inhibitor, actinomycin D, respectively. It is thus speculated that SA may induce the activation of PAL and the accumulation of phenolics leading to the development of thermotolerance.

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