

**Title** Impact of abscisic acid on the metabolism of phenolic compounds in grape skins: modulation of anthocyanin and yannin accumulation throughout growth

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### **Abstract**

Tannins and anthocyanins are crucial compounds for grape and wine quality. The understanding of their biosynthesis is still in progress and the elucidation of the mechanisms controlling their metabolism would be a determining tool for improving grape maturation. To date, the involvement of abscisic acid (ABA) in anthocyanin accumulation has been widely described, but little is known about the impact of this growth regulator on tannins. Our work aimed to assess the impact of ABA on tannins and anthocyanins accumulated in grape skin, following a precocious treatment of grape with ABA. The skin contents in free ABA and phenolic compounds were measured, which made it possible to validate the hormonal changes induced by the treatment and to show a change in the time-course of accumulation of both tannins and anthocyanins. We then focused on the synthesis of these compounds via expression and enzymatic studies and demonstrated that ABA affected tannin and anthocyanin in a opposite pattern, in accordance with the change in contents: ABA tended to decrease gene expression of structural genes and genes coding transcription factors as well as enzyme activity related to tannin production during the first growth period, while it increased gene expression and enzyme activity related to anthocyanin at the time of colour-change. These results confirmed the involvement of ABA in the control of polyphenol synthesis in grape skin and showed an opposite effect of this growth regulator on the accumulation of both tannins and anthocyanins.