

TERPENE PATHWAYS IN DIFFERENT ORGANS OF *VITIS VINIFERA* AND INDUCTION BY JASMONATES

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Jasmonate treatments induce the production of proanthocyanidins, stilbene and volatile organic compounds (VOCs) biosynthesis in berry cell suspension which are important in determining the quality and nutraceutical properties of grapes and wines, and the mechanism by which jasmonates induced secondary metabolite production in grapes varied depending on the pathway.

Given that some of the most prevalent grape aroma constituents are terpenoids, it was analysed VOCs content and expression of 23 terpene synthase (TPS) genes in different organs: mature leaves, young leaves, stems, young stems, roots, rachis, tendrils, peduncles, bud flowers, flowers and berries. VOCs clearly separated all the vegetative organs from flowers and berries, then the roots and rachis from other vegetative organs. The majority of TPS genes analysed exhibited detectable transcripts in all the organs investigated, and some were found to be expressed specifically in one or just a few organs. Particularly, in flower and developing berries all investigated genes belonging to the TPS-a and TPS-b subfamilies reached the highest expression in accordance with the peak of accumulation of the respective compounds. In the TPS-g subfamily, only one of the genes characterised for linalool synthases showed major transcript abundance in ripening berries, whereas the only geraniol synthase had a peak of expression in green berries and at the beginning of ripening, when geraniol concentration started to increase.

Methyl jasmonate (MeJA) application in vineyard on leaves and grape clusters led to a significant increase in terpenes concentration, and the expression of all the TPS genes analysed was higher in MeJA treated samples. TPS genes expression appeared more influenced than early pathway genes (DXS, DXR, HDR).

The positive effect of MeJA indicated that such treatment could improve grape quality and be useful for studies on berry aroma.