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High altitude solar UV-B and abscisic acid sprays increase grape berry antioxidant capacity

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It has been proposed that ultraviolet-B radiation (UV-B) activates grapevines antioxidant defense system and abscisic acid (ABA) acts downstream in the signaling pathway. Effects of solar UV-B perceived by high altitude vineyards and ABA sprays on berry quality indicators and fruit yield were studied on *Vitis vinifera* L. cv. Malbec at 5 developmental stages during three consecutive growing seasons. Grapevines were exposed to ambient solar UV-B (+UV-B) or to UV-B filtered sunlight (-UV-B) from 15 days before flowering, combined with weekly sprays of 1 mM ABA (+ABA) or H₂O (-ABA) from 27 days before veraison. Berry skin phenols (anthocyanins and total polyphenols) were increased by +UV-B and +ABA, markedly in concentration (UV-B x ABA significant interaction). The increases in antioxidant capacity, measured as oxygen antioxidant capacity (ORAC) and phenols in the berries exposed to +UV-B/+ABA combined treatment were higher compared with -UV-B/-ABA, for the same increase in sugar. Also, +UV-B and +ABA interact to reduce number of berries and bunches weight (fruit yield), without affecting sugar concentration (smaller berries) at harvest. Antioxidant compounds (protective for plants) were triggered in +UV-B/+ABA at the expenses of sugar accumulation, berry retention and growth (fruit yield). UV-B perceived by high altitude vineyards and ABA applications interact to increase red grape berry quality indicators, markedly in concentration (important from a winemaking standpoint). Also, UV-B and ABA effects on berry sugar accumulation and growth depend on the stage of development.

Biography

Federico J Berli is a researcher of CONICET (National Research Council of Argentina) and Teaching assistant of Plant Biochemistry in Facultad de Ciencias Agrarias, Universidad Nacional de Cuyo, Argentina. He is Doctor en Ciencias Biológicas (PhD equivalent) and his research interest has been focused on grapevine biochemical and physiological responses under the ultraviolet-B radiation, and the role of the phytohormone abscisic acid (ABA) as intermediate. He has published 11 papers in reputed journals.

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