

Relationship between anthocyanins and skin color of table grapes treated with abscisic acid at different stages of berry ripening

Muhammad Shahab, Sergio Ruffo Roberto, Saeed Ahmed, Ronan Carlos Colombo, João Pedro Silvestre, Renata Koyama and Reginaldo Teodorode Souza

Scientia Horticulturae 259: 108859. (2020)

Abstract

Grapes grown under warm climate conditions tend to show less color development, and this phenomenon is attributed to low anthocyanin accumulation in berry skin in response to high temperature during ripening. ‘Benitaka’ (*Vitis vinifera* L.) is a table grape that shows poor color development when grown under a subtropical condition, and the exogenous application of (*S*)-*cis*-abscisic acid (*S*-ABA) is a recently developed technique used to overcome this difficulty. Trials were conducted during two crop seasons in a commercial vineyard containing 11-year-old ‘Benitaka’ vines grafted onto ‘IAC 766 Campinas’ rootstocks in Marialva, State of Parana (PR), Brazil. The vines were trained on an overhead trellis system, covered with a black plastic mash, and spaced 3.0 × 6.0 m apart. A randomized block design was used and treatments included the application of 400 mg L⁻¹ of *S*-ABA at different stages of ripening, as follows: Control (no application); At pre-veraison (PRV) (7 days before veraison); At veraison (V); and At post-veraison (POV) (7 days after V). A second application was performed for all treatments, 10 days after the first application, except for the control. The analysis of berries included, total and daily anthocyanins accumulation, the color index of red grapes (CIRG), daily CIRG development, lightness (*L**), chroma (*C**), hue angle (*h*°), mass, length, width, firmness, total soluble solids (TSS), titratable acidity (TA), the index of maturation (TSS/TA), and total polyphenols of berries. The exogenous application of *S*-ABA from PRV to POV significantly enhanced the contents and rates of total anthocyanins accumulation and the CIRG of ‘Benitaka’ table grape; however, the application at PRV and V provided a higher response. A stronger correlation exists between anthocyanin concentration and the color index of berry skin, however, the main physicochemical characteristics of berries are not significantly affected by the use of *S*-ABA. Berry firmness varies in response to *S*-ABA application, but not to an extent at which it compromises berry quality for commercial use.