



## Application of abscisic acid rapidly upregulated UFGT gene expression and improved color of grape berries

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- These authors observed that the application of abscisic acid (ABA) to Crimson Seedless grapes was able to improve color within a week of treatment. So they decided to see whether ABA affected the expression of an important gene involved in anthocyanin biosynthesis (UDP-glucose flavonoid glucosyltransferase, or UFGT).
- The authors treated 9 homogeneous clusters (3 per treatment) at veraison with 1) 150 mg/L of ABA, 2) 300 mg/L of ABA, or 3) left them untreated (control). Then, at 0, 1, 7, 21, and 63 days after treatment, they sampled the berries from each treatment and extracted their RNA. By isolating the messenger RNA (mRNA) corresponding to the UFGT gene (see text for details), they were able to quantify how much of the UFGT gene involved in anthocyanin formation was being expressed at each point in time. The authors also measured the color parameters and the composition of the juice from each treatment at each sample date.
- **Results**. 1) As soon as one week after treatment, the clusters treated with 150 mg/l ABA had **mRNA** levels of the UFGT gene 3X higher than the control, and those treated with 300 mg/L ABA 6X higher. These levels declined and became similar to those of the control 21 days after treatment. 2) Within one week of ABA treatment, **color** lightness ( $L^*$ ) was lower (darker fruit), and hue (h) was lower (redder fruit) than the control. This effect was still true at the end of the experiment (Day 63). 3) ABA application advanced **maturity** slightly (higher Brix and lower TA) but the change was not large enough to affect expected harvest date. The ABA berries also showed higher skin weights compared to the control.

The authors showed that ABA treatment at veraison of Crimson Seedless increased fruit color by causing an increased expression –upregulation– of one of the main genes involved in anthocyanin biosynthesis. ABA did not affect the composition of the berry flesh, and so the authors concluded that its effects are limited to the berry skins. The ability of different cultivars to respond to ABA varies, and Crimsom Seedless seems particularly responsive.

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