

ABSCISIC ACID: A POTENTIAL TOOL FOR IMPROVING THE COLOR OF TABLE GRAPES

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ABSTRACT

In warm climates, inadequate color is a common problem that decreases the production efficiency and value of red and black-fruited table grapes. The inhibitory effect of high temperatures on the concentration of anthocyanins in grape berry skins is related to a deficiency in endogenous abscisic acid (ABA). Preliminary work showed that exogenous application of ABA can increase anthocyanin concentrations in grape berry skins, but currently available ABA formulations are extremely expensive so commercial applications for viticulture have not been developed. Recently, a lower-cost ABA production method was discovered that may enable its use on table grapes. Therefore, we evaluated the effect of ABA (0, 75, 150, or 300 ppm) or ethephon (250 ppm) applied at veraison (mid-July), one month post-veraison, or two months post veraison, on ‘Crimson Seedless’ grapes (*Vitis vinifera* L.) harvested between August and October. Application time and plant growth regulator (PGR) treatments interacted to affect color and firmness but had few other effects. Applied at veraison, ABA and Ethrel treatments increased red skin color (decreased berry skin hue angle) compared to the non-treated fruit; 150 and 300 ppm ABA were equally effective and both were better than Ethrel (Table 1). Applied a month after veraison, 150 and 300 ppm ABA still improved color but neither treatment was superior to Ethrel. Applied two months after veraison, neither PGR was effective. The PGR treatments that enhanced color also decreased berry puncture resistance (Table 2), which is undesirable. Further research is needed to determine whether the superior color achieved by treating fruits with ABA, instead of ethephon, offsets the softer texture that ABA treated fruits may have.

Table 1. Effect of different ABA and ethephon application times and concentrations on berry hue

Application time	Berry skin hue angle				
	Abscisic Acid				Ethephon
	Concentration (mg/L)				
0	75	150	300	250	
Veraison	63.5 a ^z	33.5 b	24.1 c	18.3 c	35.0 b
Post-veraison I	54.7 a	47.7 ab	38.8 b	35.3 b	39.7 b
Post-veraison II	62.2	55.9	51.1	51.5	52.2
LSD (0.05)	11.2	13.5	13.8	14.0	14.8

^zValues are treatments means, n=18. Means followed by a different letter within rows are significantly different according to Duncan’s Multiple Range Test, $\alpha = 0.05$. Means within columns are significantly different according to LSD.

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Table 2. Effect of different ABA and ethephon application times and concentrations on berry puncture resistance

Application time	Berry Puncture resistance (g)				
	0	Abscisic Acid Concentration (mg/L)			Ethephon 250
		75	150	300	
Veraison	532.3 a ^z	485.7 bc	467.4 c	404.4 d	502.5 b
Post-veraison I	544.9 a	519.6 b	501.8 b	478.1 b	496.0 b
Post-veraison II	534.2	552.9	515.9	524.7	530.1
LSD (0.05)	28.9 ^y	35.8	41.5	43.5	40.9

^zValues are treatments means, n=18. Means followed by a different letter within rows are significantly different according to Duncan's Multiple Range Test, $\alpha = 0.05$. Means within columns are significantly different according to LSD.