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# Effects of preharvest application of TH 6241 and CEPA on Vitis vinifera

by

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#### Einfluß der Anwendung von TH 6241 und CEPA vor der Ernte auf Vitis vinifera

Zusammenfassung. — Reife Reben von Vitis-vinifera-Sorten (Thompson Seedless, Barbera, Cabernet Sauvignon, Ruby Cabernet, Alphonse Lavallée) wurden mit verschiedenen Konzentrationen von TH 6241 und CEPA behandelt. Die Auswirkungen der beiden Wachstumsregulatoren auf Beerengewicht, Trennkraft, Quetschfestigkeit der Beeren, Gesamtsäure und TSS wurden zum Erntezeitpunkt geprüft.

#### Introduction

Ethephon (2-Chloroethylphosphonic acid) has been successfully used in grape thinning (WEAVER and POOL 1969) and in berry abscission induction (CLORE and FAY 1969, 1970, EYNARD and CASSANO 1969, EYNARD 1970, EYNARD *et al.* 1970, CASSANO and GAY 1971). Among substituted benzothiadiazoles, TH 6241 (5-chloro-6-ethoxycarbonylmethoxy-2,1,3 benzothiadiazole), showed activity as a plant regulator inhibiting or stimulating ethylene production according to concentration and plants: for instance, on citrus it caused complete fruit abscission from 4 to 7 days after application to nearly mature fruit.

On Vitis this compound was checked by EYNARD and WEAVER (1973) on Thompson Seedless at 10—1000 ppm with the indication of phytotoxicity at higher rates while 100—500 ppm seemed to delay grape maturity.

## **Materials and Methods**

Mature vines of Thompson Seedless, Barbera, Cabernet Sauvignon, Ruby Cabernet and Alphonse Lavallée were used in an irrigated vineyard at the Kearney Horticultural Field Station at Parlier. On Thompson Seedless and Alphonse Lavallée a randomized block design with 4 replications was employed comparing the effects of control, TH 6241 at 250 ppm, Ethephon at 500 and 2000 ppm applied 10 days before harvest.

On Barbera, Cabernet Sauvignon and Ruby Cabernet only TH 6241 at 250 ppm and Ethephon at 500 ppm were compared with a control, with 3 replications (for Ruby Cabernet two replications).

At harvest (8-28-72) berry weight, removal force, rupture point, total acidity and soluble solids content were determined.

For Thompson Seedless percent of loose berries and percent of berries without pedicels were determined also.

<sup>&</sup>lt;sup>1</sup>) Research conducted during the period June 1972—Sept. 1972 as a Visiting Professor in the Department of Viticulture and Enology, Univ. of Calif., Davis, under a Senior NATO Fellowship.

and in the plants treated with TH 6241; with CEPA at 500 ppm the percent reached of 7% in control

Results

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## Table 1

Effects at harvest time of TH 6241 and CEPA treatments on Thompson Seedless and Alphonse Lavallée Einfluß von Behandlungen mit TH 6241 und CEPA auf Thompson Seedless und Alphonse Lavallée zur Erntezeit

	Concentration ppm	Berry removal force g	Soluble solids ^0/0	Total acidity (as tartaric) g/100 ml	100 berry weight g	Berry rupture point g	Berries without pedicels <sup>0</sup> /0	Loose berries %
Thompson Se	edl ess							
TH 6241	250	265 a	22.2 a	0.58 a	180 a	1279 a	3.8 a	7.9 a
Control	0	234 b	23.0 b	0.53 b	186 a	1020 b	3.5 a	7.3 a
CEPA	500	189 c	23.0 b	0.49 c	193 a	687 c	23.7 b	31.2 b
CEPA	2000	-	24.3 c	0.45 d	182 a	631 c	78.5 c	87.8 c
F calculated value		93.67**	27.89**	55.0**	0.54	14.94**	133.56**	103.03**
Alphonse Lav	allée							
TH 6241	250	<b>754</b> a	14.5 a	0.47 a	902 a	1822 a		
Control	0	622 b	15.0 b	0.45 b	899 a	1790 a		
CEPA	500	546 c	16.0 c	0.41 c	916 ab	1738 a		
CEPA	2000	498 d	16.8 d	0.38 d	946 b	1411 b		
F calculated value		317.14**	63.37**	82.74**	2.65	17.28**		

Means not followed by same letter are significantly different at the 5% level by DUNCAN'S Multiple Range Test.

		Berry removal force	Soluble solids1)	Total acidity (as tartaric)	Berry rupture	
		g	°/0	g/100 ml	g	
TH 6241						
Thompson	Seedless					
	Control	234	22.8	0.54	1082	
	TH 6241	268	22.2	0.59	1246	
	Difference %	+ 14.5	— 2.8	+9.3	+ 15.2	
Barbera						
	Control	188	23.3	0.90	1355	
	TH 6241	254	22.7	0.96	1232	
	Difference %	+ 35.1	— 2.7	+6.7	- 9.1	
Cabernet S	Sauvignon					
	Control	203	19.8	0.79	1109	
	TH 6241	232	19.0	0.80	1143	
	Difference $\%$	+ 14.3	— 3.9	+1.3	+ 3.1	
Alphonse 1	Lavallée					
	Control	623	15.0	0.45	1736	
	TH 6241	756	14.6	0.48	1782	
	Difference %	+ 21.3	— 2.9	+6.7	+ 2.6	
F calculat	ed value	376.74**	21.70**	9.45*	0.40	
СЕРА						
Thompson	Seedless					
	Control	234	22.8	0.54	1082	
	CEPA	188	23.1	0.48	794	
	Difference %	— 19.7	+ 1.0		— 26.6	
Barbera						
	Control	197	21.5	1.00	1027	
	CEPA	68	22.0	0.95	955	
	Difference $\%$	— 65.5	+ 2.2	5.0	- 7.0	
Cabernet S	Sauvignon					
	Control	211	18.6	0.87	1248	
	CEPA	130	19.6	0.80	964	
	Difference %	— 38.4	+ 5.4	8.0	— 22.8	
Alphonse I	Lavallée					
	Control	623	15.0	0.45	1736	
	CEPA	542	16.0	0.41	1695	
	Difference %	— 13.0	+ 6.6	8.9	— 2.4	
F calculat	ed value	309.83**	51.78**	35.63**	6.27	

T a b l e 2 Responses of four varieties to TH 6241 and CEPA treatments Reaktion von vier Rebsorten auf Behandlungen mit TH 6241 und CEPA

<sup>1</sup>) Soluble solids by hand refractometer.

31% and 88% with 2000 ppm). For the control and TH, the number of the berries detached without pedicels was 3.5 and 3.8%. In the plants treated with CEPA at 500 and 2000, it was respectively 23.7 and 78.5%.

Soluble solids content was increased by CEPA 2000 ppm treatments, while it was reduced by TH 6241. — Berry rupture point and total acidity were higher with TH, lower with CEPA.

## Alphonse Lavallée

TH 6241 treatments significantly increased berry removal force, rupture point and total acidity, but reduced soluble solids content. CEPA treatments reduced berry removal force, total acidity and berry rupture point, but this data reaches high significance level only with 2000 ppm concentration.

Both CEPA treatments increased soluble solids content.

A split-plot calculation was also made in order to check the general reactions to the two growth regulators.

## TH 6241

The effect of TH on berry removal force seems to be constant for the four varieties, inducing an increase ranging from 14.5 to 35.1%. The soluble solids content in all cases was reduced. The increase of total acidity is especially high in Thompson Seedless and in Barbera.

The berry rupture point is increased by TH in Thompson Seedless and, to lesser extent, in Cabernet Sauvignon and Alphonse Lavallée, but not in Barbera.

### C E P A

The berry removal force is significantly reduced in all varieties. The effect seems to be higher in Barbera. Soluble solids content increased especially in Cabernet Sauvignon and Alphonse Lavallée. Total acidity has been significantly reduced in all varieties (9.1—13%), except in Ruby Cabernet.

#### Summary

Mature vines of the Vitis vinifera cultivars Thompson Seedless, Barbera, Cabernet-Sauvignon, Ruby Cabernet, and Alphonse Lavallée were treated with TH 6241 and CEPA at various concentrations. The effects at harvest time of the two growth regulators on berry weight, removal force, rupture point, total acidity, and soluble solids content were checked.

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