

## Use of Ozone in 'Niagara' Grapes for Quality Maintenance After Harvest

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### Abstract

'Niagara' grape plays an important role in the Brazilian economy and the state of São Paulo stands out as the largest producer of this table grape variety. The large consumption of the product in natura and the search for more healthy and free of pesticides fruits and vegetables has grown. Therefore the aim of this study was to analyze the effect of ozone as a sanitizer, seeking to reduce the losses in post-harvest while maintaining the essential characteristics and attributes of fruit for consumption and reducing surface microbiological activity. For the experiments four ozone concentrations, 0, 1, 2 and 4 ppm, were used. The results showed that the use of ozone as a sanitizing agent does not affect the product quality during storage when used in appropriate concentrations. It is concluded that ozone is an alternative in maintaining the quality of the grapes after harvest.

### Key words:

Ozone, quality, *Vitis labrusca*.

### Introduction

Currently consumers have pursued quality and safe food in relation to health and environmental protection. The use of an ozone gaseous mixture as a sanitizer in fruits and vegetables is an alternative because of its strong oxidizing property and as a biocide. The challenge is to apply adequate concentrations so to maintaining the characteristics of the targeted market products. The 'Niagara' grape (*Vitis labrusca*) originating in the United States, is one of the main grapes consumed in Brazil, having high quality for fresh consumption, as well as the low cost of production<sup>1</sup>. Thus the main objective of this study was to analyze the ozone potential in keeping quality of the grapes after harvest by investigating the effect of applications of ozone mixture at several concentration levels.

### Results and Discussion

For the experiments, 'Niagara' grapes were used, acquired in Campinas Supply Center (CEASA). They were transported to the Postharvest Technology Laboratory (FEAGRI / UNICAMP), where they were selected from absence of mechanical damage and arranged in 4 sample sets and exposed to ozone concentrations of 0, 1, 2 and 4 ppm. The 0 ppm concentration sample was taken as the control.

After treatments, the grapes were stored in a chamber at 5°C for a period of 14 days. Quality assessments were performed periodically on days 0, 3, 7, 10 and 14, for physical and chemical parameters such as titratable acidity (TA), pH, soluble solids (SS), vitamin C and anthocyanins and loss weight (MW). Analysis were also performed on appearance of based on wilting and damaged berries.

At the end of the storage period, significant changes were observed in acidity levels only, in all treatments. Specially for grapes exposed to a 2 ppm concentration, a sharp decrease was observed (Table 1). However, no changes in Vitamin C and pH values were observed (Table 2).

Table 1. Quality features in 'Niagara' grape.

Trat.	Parameters					
	TA (%)		SS (°Brix)		"Ratio"	
	I	F	I	F	I	F
Control	0.53 Aa	0.47 Ab	16.17 Aa	15.36 Aa	30.53 Aa	22.37 Ab
1 ppm	0.53 Aa	0.47 Ab	16.17 Aa	15.43 Ab	30.53 Aa	20.15 ABb
2 ppm	0.53 Aa	0.39 Cb	16.17 Aa	14.93 Ab	30.53 Aa	20.86 Ab
4 ppm	0.53 Aa	0.43 Bb	16.17 Aa	15.52 Aa	30.53 Aa	17.85 Bb
CV (%)	-	1.98	-	4.02	-	5.38

Means followed by the same letter, uppercase and lowercase vertically horizontally do not differ by Tukey test ( $p > 0.05$ ).

Table 2. Physicochemical features in 'Niagara' grape.

Trat.	Parameters					
	pH		Vitamin C		MW	
	I	F	I	F	I	F
Control	3.21 Ab	3.44 Aa	8.56 Aa	8.56 Aa	0.00 Ab	1.95 Aa
1 ppm	3.21 Ab	3.33 Aa	8.56 Aa	6.36 Aa	0.00 Ab	1.76 Aa
2 ppm	3.21 Ab	3.32 Aa	8.56 Aa	6.49 Aa	0.00 Ab	1.95 Aa
4 ppm	3.21 Ab	3.37 Aa	8.56 Aa	6.61 Aa	0.00 Ab	2.05 Aa
CV (%)	-	1.32	-	23.64	-	25.68

Means followed by the same letter, uppercase and lowercase vertically horizontally do not differ by Tukey test ( $p > 0.05$ ).

As the appearance features, bunches exposed to 4 ppm of ozone showed greater threshing and most withering when compared with the other treatment

### Conclusion

It was concluded that the use of ozone is a viable option for the maintenance of the quality characteristics of grapes 'Niagara' as long as suitable concentrations are used.

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<sup>1</sup>DETONI, A.M.; CLEMENTE, E.; BRAGA, G.C.; HERZOG, N.F.M. Uva "Niágara Rosada" cultivada no sistema orgânico e armazenada em diferentes temperaturas. *Ciênc. Tecnol. Aliment.* v.25 n.3 Campinas, 2005.