

EFFECTS OF ABSCISIC ACID TREATMENT ON VITIS VINIFERA L. SAVVATIANO AND MOUCHTARO GRAPES AND WINE CHARACTERISTICS

Authors: Dimitrios-Evangelos MILLIORDOS¹, Evaggelia NANOU¹, Nikolaos KONTOUDAKIS¹, Yorgos KOTSERIDIS¹

¹Agricultural University of Athens, Department of Food Science and Human Nutrition, Oenology Laboratory.

Corresponding author: dim.miliordos@gmail.com

Abstract:

Context and purpose of the Study- Grapes development is determined by grape cultivar and vineyard climatic conditions and consequently affecting the phenolic and aroma on grapes and wines. Absciscic Acid (ABA) plays a key role in the promotion of fruit ripening and fruit anthocyanin content. Herein, we report the impact of ABA to grape ripening and wine quality.

Material and Methods - Experiments were conducted during 2018 on *Vitis vinifera* L. Mouchtaro and Savvatiano grapevines at the Muses Estate winery (Muses Valley). All treatments were applied in triplicate in a randomized complete block design, with 25 vines for each replicate. Vines were sprayed with 0, 400 or 800 mg/L ABA aqueous solution at véraison, 3 and 6 days after the first application. Grapes were harvested at optimum sugar maturity and classical red and white winemaking procedures were followed. Standard analytical methods recommended by O.I.V. were used for grapes and wines (pH, alcoholic degree, total acidity, volatile acidity). Also, colour intensity, total phenolic compounds, tannin determination (Habertson et al., 2002; Sarneckis et al., 2006), browning test (Sioumis et al., 2006), and sensory analysis were performed.

Results- In both varieties, harvest was delayed in grapevines treated with ABA which is a highly promising result. According to the browning test, the lower value ($k = 0.0024$) for the color change factor of Savvatiano wines was observed at 400 mg/L ABA. Higher k values, of 0.0031 and 0.0037, were recorded at control wine and at 800 mg/L ABA, respectively. Consequently, it seems that wines produced by grapes treated with 400 mg/L of ABA would develop brown color later than the other samples examined in this study.

Mouchtaro wines recorded the highest concentration of total anthocyanins (666- mg/L) for the wines produced by grapes treated with the highest ABA concentration. At the lower ABA concentration and the control the anthocyanins concentration was 640 and 568 mg/L, respectively. Wines were assayed for tannins according to BSA and MCP methods. Following the same trend, highest tannin concentration was observed at the highest ABA treatment (BSA: 9,40 mg/ L, and MCP :831 mg/L). Lower values of tannin concentration were recorded at the control wine (BSA: 6,98 & MCP :494 mg/L) and at the lowest ABA treatment (BSA: 6,42 & MCP: 609 mg/L). Highest value of color intensity were scored by the wines receiving the highest ABA treatment (13,3) whereas, control and lower ABA concentration wines scored lower values (10,8 and 11,1). These preliminary results provide an insight into the effect of ABA on wine grapes, which is useful for grape quality.

Key words: Absisic Acid, *Vitis vinifera*, Mouchtaro, Savvatiano

1. Introduction.



Effects Absciscic Acid on Vitis vinifera L. Savvatiano and Mouchtaro grapes and Wine Characteristics

Miliordos Dimitrios-Evangelos¹; Nanou Evangelia¹; Kontoudakis Nikolaos¹; Kotseridis Yorgos¹

¹ Agricultural University of Athens, Department of Food Science and Human Nutrition, Laboratory of Enology and Alcoholic Drinks.



Introduction

Premium wines quality highly depends on grapes berries maturation, size and heterogeneity. ABA is a key plant hormone in the regulation of fruit ripening (Li et al., 2011) as well as one of the major hormones that promote ripening of grapes (Koyama et al., 2018) and can interact with sugar to enhance the expression of genes related to anthocyanin synthesis (Loreti et al., 2008). In this study, we aimed to determine the effect of ABA to grape ripening and wine quality.

Results

For both varieties, harvest was delayed in grapevines treated with ABA (Fig 1 & 2). Savvatiano wines recorded the lowest colour change when treated with 400 mg/L ABA treatment according to the browning test (Fig 3). Mouchtaro wines produced by grapes treated with the highest ABA concentration presented higher values of Total Anthocyanin (Fig 4). Concerning the tannin assays (Fig 5 & 6) higher tannin concentration was also recorded at the highest ABA treatment.



Fig 1: Sugar measurement expressed in Brix in Savvatiano variety over the ripening period.



Fig 2: Sugar measurement expressed in Brix in Mouchtaro variety over the ripening period.



Fig 3: Browning test.

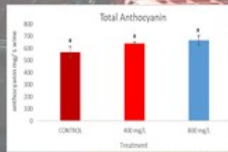


Fig 4: Total Anthocyanin in Mouchtaro var. expressed in mg/L of wine.

Savvatiano	pH	Tot. Acid (Tart. Ac. g/L)	Alc. % v.v
Control	3.36±0.01a	4.2±0.04a	12.8±0.02a
400 mg/L ABA	3.36±0.04a	4.5±0.08b	12.1±0.02b
800 mg/L ABA	3.45±0.09a	4.2±0.01a	12.8±0.07ab

Table 1: Savvatiano Conventional parameters (mean ± st. er.)

Mouchtaro	pH	Tot. Acid (Tart. Ac. g/L)	Alc. % V.V
Control	3.71±0.02a	5.89±0.05a	11.5±0.20a
400 mg/L ABA	3.56±0.02b	6.49±0.06a	12.3±0.05b
800 mg/L ABA	3.57±0.05b	6.11±1.04a	11.4±0.24a

Table 2: Mouchtaro Conventional parameters (mean ± st. er.)

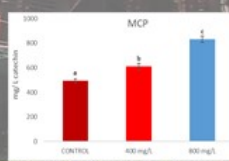


Fig 5: Tannin determination according to the MCP assay.

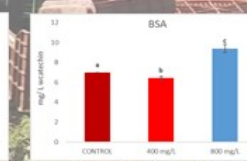


Fig 6: Tannin determination according to the BSA assay.

Discussion

The preliminary results provide an insight into the effect of ABA on wine grapes, which attributes to grape quality. The aim of the research project is the development and production of high quality wine from the wide spread Greek variety Savvatiano and the highlighting of the indigenous grapevine var. Mouchtaro by introducing new age viticultural techniques, through application of phytohormones onto the grapes.

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