The Future of Horticulture

FSA

Article

Effect of Spraying Organic Acids on Growth and Fruiting of Crimson Seedless Grapevines Grown in Sandy Soil

Farouk H. Abd El-Aziz and Ahmed M. El. M. Rashwan*

Hort. Dept. Fac. of Agric. Minia Univ., Egypt.

*Corresponding author: ahmedrashwan004@gmail.com

Abstract: This study was conducted through 2023 and 2024 seasons on Crimson seedless grapevines grown in a private vineyard located at west El-Kossia district, Assiut Governorate, Egypt to investigate the effects of three organic acids (citric, ascorbic and salicylic acids) each at 0.05 to 0.1% on vegetative growth, vine nutritional status, the yield per vine, percentage berry colouration and fruit quality. Treated vines any one of three organic acids namely citric ascorbic or salicylic acids were very effective in enhancing some growth aspects, vine nutritional status, yield, colouration % and quality of berries compared to the control treatment. The promotion was related to the application of salicylic acid, ascorbic and citric acids in descending order. Conclusively: treating Crimson seedless grapevines three times (at growth start, just after berry setting and at three weeks later) with salicylic acid at 0.1% is the best treatment yield, improved percentage berries colouration and gave height fruit quality under the circumstances of this region.

Key words: Crimson seedless grapevines, organic acids, citric, ascorbic, salicylic acid, yield, berry quality.

Future Science Association

Available online free at
www.futurejournals.org

Print ISSN: 2692-5826

Online ISSN: 2692-5834

DOI:
10.37229/fsa.fjh.2024.12.13

Received: 25 October 2024
Accepted: 1 December 2024
Published: 13 December 2024

Publisher's Note: FA stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Copyright: © 2022 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

Grape berry has many therapeutic benefits the important of which are some sugars (fructose and glucose) some vitamins, organic acids, enzymes and some mineral salts. Grapes are used for drugs for cuffing of gastrointestinal; urinary, diseases, respiratory diseases and cancer (**Passingham, 2004**). Crimson seedless grapevines cultivar in considered a prime and popular grapevines cvs, successfully grown under Upper Egypt conditions such cultivar ripens in the second week of Sep. under sandy soil conditions. The high temperature of Assiut region causing some problems in grape production and berry quality. Therefore, grape producers in such region using various some horticultural practices to avoid these problems. Many trials were conducted of improving some physical and chemical characteristics of Crimson seedless grapevines by using some organic acids (citric, ascorbic and salicylic acids) instead of using synthetic auxins for protecting environment from pollution.

Antioxidants (some organic acids) with their protectant properties play an important role in plant defense against oxidative stress, the biosynthesis of most organic foods and activation of cells division process (**Oretili, 1987**). Recently, public health and environmental safety encourage the use of some organic acids for improving some growth aspects, vine nutritional status and productivity. The higher own content of these organic acids (antioxidants) from some nutrients, some vitamins, hormones, the biosynthesis of GA_3, indoles, total carbohydrates, free water and some organic foods and reducing total phenols (**Kubta *et al.*, 2000**).

Recently, many attempts were carried out for using different some antioxidants (citric, ascorbic and salicylic acids) improving the yield and quality of Crimson seedless grapes.

Application of some organic acids (citric, ascorbic or salicylic acids) as previously mentioned by (**Ahmed and Seleem – Basma, 2008; Abada and Abd El-Hameed, 2010; Bondok- Sawsan *et al.*, 2011; Ahmed *et al.*, 2011; Ahmed *et al.*, 2012; Abada, 2014; Ali *et al.*, 2016; El- Salhy *et al.*, 2021; Al- Sagheer, 202 and Abd El- Hakim, 2023**) was essential for stimulating some growth traits and the yield as well as some physical and chemical characteristics of the berries in different grapevines cvs.

The recent study aimed to throw some lights on effects of different concentrations of some organic acids on some growth characters, vine nutritional status, yield and quality of Crimson seedless grapes.

2. Materials and Methods

The present study was carried out through two seasons 2023 and 2024 on Forty–two in vigour 5-years old Crimson seedless grapevines (grafted on freedom rootstock) grown in private vineyard situated West El- Kossie district, Assiut Governorate, Egypt. Soil of the vineyard is sandy texture and well drained and water table is not less than two meters deep. Vines are spaced at 2.0 x 3.0 meters apart. The selected vines (42 vines) were chosen as uniform in vigour as possible and devoted to achieve this study. The chosen vines were trained by Cane pruning system leaving 92 eyes/ vine (ten fruiting canes/ 8 eyes plus six renewal spurs x two eyes). In each season, the selected vines were pruned at the second week of January by using cane pruning method with Gable shape supporting system. Drip irrigation system was followed using well water. All fertilizers were added with irrigation water (Fertilization). Table (1) Shows the results of soil analysis (**Wilde *et al.*, 1985**)

Table (1). Analysis of the tested soil

Physical properties	Values	Chemical properties	Values
Sand %	84.0	pH	8.01
Silt %	11.5	$CaCO_3$%	13.2
Clay %	4.5	O.M. %	0.1
Texture grade	Sandy	Total N %	0.02
		Available P (ppm)	7.1
		Exchange K	1.5 mg/ 1kg soil

The experiment included the following seven treatments from various organic acids concentrations.

T_1- Control treatment (sprayed with water).

T_2- Spraying the vines with citric acid at 0.05 %.

T_3- Spraying the vines with citric acid at 0.1 %.

T_4- Spraying the vines with ascorbic acid at 0.05 %.

T_5- Spraying the vines with ascorbic acid at 0.1 %.

T_6- Spraying the vines with salicylic acid at 0.05%.

T_7- Spraying the vines with salicylic acid at 0.1 %.

Each treatment replicated three times, two vines per each. Therefore, this experiment contained 42 vines crimson seedless grapevines. Some organic acids namely citric, ascorbic and salicylic acids sprayed three times on growth start (1st week of April), just after berry setting (2nd week of May) and at three weeks later (first week of June). Triton B as a wetting agent was added to tanks before spraying at 0.5 ml/L spraying was done till runoff (two liters per vine).

During 2023 and 2024 seasons the following measurements were recorded:

- Leaf area $(cm)^2$ (**Ahmed and Morsy, 1999**).

- Shoot length (cm)

- Wood ripening coefficient (**Bouard, 1966**)

- Some leaf pigments, (chlorophyll a, b, total chlorophylls and total carotenoids (mg/ g F.W./) (**Von-Wettstein, 1957**).

- Content of some nutrients in the leaves namely N, P and K (as %) and Zn, Fe and Mn (as ppm) (**Summer, 1985 and Chapman and Pratt, 1987**).

- Yield expressed in number of clusters per vine and weight (kg.) per vine

- Cluster weight (g.) and cluster dimensions (cm.)

- Percent of berries colouration in cluster.

- Berry weight (g.) and berry dimensions (cm.)

- Chemical characteristics of the berries namely TSS %; reducing sugars % (**Lane and Eynon, 1965**), total acidity as a tartaric acid/ 100 mL Juice (**A.O.A.C., 2000**)

All the obtained data were tabulated and statistically analyzed according to (**Mead *et al.*, 199**3). Using a new L.S.P at 5% level of significance for made comparisons among different treatment

3. Results and Discussion

3.1. Some vegetative growth characters

It is clear from the obtained data Table (2) that varying some organic acids had significant effect on leaf area, main shoot length and wood ripening coefficient. Spraying the three organic acids namely citric, ascorbic and salicylic acids each at 0.05 to 0.1% were significantly increased the leaf area, main shoot length and wood ripening coefficient of Crimsons seedless grapevines compared to the control treatment. There was an unsignificant effect on such three vegetative growth aspects between the two concentration of organic acids in both seasons. Spraying of citric, ascorbic or salicylic acids in ascending order was very significantly effective in enhancing leaf area, main shoot length and wood ripening coefficient. The maximum values of leaf area (114.0 and 115.5 cm^2), main shoot length (129.0 and 130.0 cm) and wood ripening coefficient (0.91 and 0.92) were recorded on the vines that sprayed three times with salicylic acid at 0.1% during 2023 and 2024 seasons, respectively. Untreated vines produced the minimum values. These results were true during both seasons.

Table (2). Effect of some organic acids on some vegetative growth aspects on Crimson seedless grapevines during 2023 and 2024 seasons

Organic acids treatments	Leaf area(cm^2)		Main shoot length (cm)		Wood ripening coefficient	
	2023	2024	2023	2024	2023	2024
T_1- Control	101.5	102.0	115.0	117.0	0.71	0.72
T_2- Citric acid at 0.05%	105.0	106.0	118.5	119.5	0.75	0.76
T_3- Citric acid at 0.1 %	108.5	109.0	122.0	123.0	0.81	0.82
T_4- Ascorbic acid at 0.05%	108.0	108.5	121.0	122.5	0.80	0.81
T_5- Ascorbic acid at 0.1 %	111.5	112.0	124.5	126.0	0.86	0.87
T_6- Salicylic acid at 0.05%	110.0	111.0	124.0	125.0	0.85	0.86
T_7- Salicylic acid at 0.1 %	114.0	115.5	129.0	130.0	0.91	0.92
New L.S.D. at 5%	0.8	0.9	1.1	1.3	0.04	0.06

3.2. Leaf chemical composition

It is evident from the obtained data in Tables (3 and 4) that treating Crimson seedless grapevines here times with any one of the three organic acids (citric, ascorbic and salicylic acids) each at 0.05 to 0.1% was significantly stimulated N, P, K, Zn, Fe and Mn as well as some plant pigments namely chlorophyll a, b, total chlorophylls and total carotenoids relative to the check treatment. Significant differences on each leaf chemical component were observed among some organic acids. Leaf chemical components highest values of these were observed on the vine that received citric or ascorbic or salicylic acids, in ascending order. The highest values of N (2.01 and 2.05 %), P (0.31 and 0.33%), K (1.33 and 1.35 %), Zn (66.5 and 68.0 ppm), Fe (64.0 and 65.0 ppm); Mn (60.0, 61.5 ppm), chlorophyll a (4.00 and 4.11 mg/ g F.W.), chlorophyll b (1.77 and 1.88 mg/ g F.W.), total chlorophylls (5.77 and 5.99 mg/ g F.W.) and total carotenoids (1.41 and 1.45 mg/ g F.W.) were recorded on the vines that received salicylic acid at 0.1% during 2023 and 2024 seasons, respectively. While untreated vines produced the minimum values. Similar trend was noticed during both seasons.

Table (3). Effect of some organic acids on some leaf pigments (mg/ g F.W.) on Crimson seedless grapevines during 2023 and 2024 seasons

Organic acids treatments	Chlorophyll a (mg/ g F.W.)		Chlorophyll b (mg/ g F.W.)		Total chlorophyll (mg/ g F.W.)		Total carotenoids (mg/ g F.W.)	
	2023	2024	2023	2024	2023	2024	2023	2024
T_1- Control	3.15	3.20	1.18	1.20	4.33	4.40	1.00	1.01
T_2- Citric acid at 0.05%	3.25	3.33	1.31	1.34	4.56	4.67	1.09	1.11
T_3- Citric acid at 0.1 %	3.41	3.45	1.44	1.46	4.85	4.91	1.16	1.18
T_4- Ascorbic acid at 0.05%	3.40	3.42	1.42	1.43	4.82	4.85	1.15	1.16
T_5- Ascorbic acid at 0.1 %	3.68	3.81	1.60	1.66	5.28	5.47	1.21	1.30
T_6- Salicylic acid at 0.05%	3.65	3.80	1.58	1.63	5.23	5.43	1.20	1.28
T_7- Salicylic acid at 0.1 %	4.00	4.11	1.77	1.88	5.77	5.99	1.41	1.45
New L.S.D. at 5%	0.08	0.11	0.04	0.05	0.11	0.14	0.03	0.04

Table (4). Effect of some organic acids on some nutrients in the leaves on Crimson seedless grapevines during 2023 and 2024 seasons

Organic acids treatments	Leaf N%		Leaf P%		Leaf K%		Leaf Zn ppm		Leaf Fe ppm		Leaf Mn ppm	
	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024
T_1- Control	1.68	1.71	0.14	0.15	1.13	1.15	53.0	54.5	51.5	52.0	46.5	47.0
T_2- Citric acid at 0.05%	1.74	1.76	0.18	0.19	1.17	1.18	56.5	57.0	55.0	56.0	50.0	51.0
T_3- Citric acid at 0.1 %	1.81	1.82	0.21	0.23	1.21	1.22	59.5	60.0	58.0	59.0	53.0	53.5
T_4- Ascorbic acid at 0.05%	1.80	1.81	0.20	0.21	1.20	1.21	59.0	59.5	57.0	58.0	52.5	53.0
T_5- Ascorbic acid at 0.1 %	1.89	1.91	0.26	0.28	1.28	1.29	63.0	63.5	60.0	60.5	57.0	58.5
T_6- Salicylic acid at 0.05%	1.88	1.90	0.24	0.26	1.27	1.28	62.0	63.0	60.0	60.0	56.5	57.0
T_7- Salicylic acid at 0.1 %	2.01	2.05	0.31	0.33	1.33	1.35	66.5	68.0	64.0	65.0	60.0	61.5
New L.S.D. at 5%	0.06	0.07	0.03	0.03	0.04	0.05	1.7	1.9	1.5	1.6	1.1	1.3

3.3. The yield and cluster aspects

It is clear from the obtained data in Table (5) that spraying Crimson seedless grapevines with any one of the three organic acids at 0.05 or 0.1% was significantly improved the yield, number of cluster per vine as well as cluster weight and dimensions compared to the check treatment. Significant differences on each parameter was observed among all organic acids. In this respect the best organic acids salicylic, ascorbic and citric acids, in descending order. Economical point of view from three sprays of salicylic acid at 0.1% was responsible which produced the maximum values number of clusters per vines (27.0 and 33.0 cluster), yield/ vine (11.07 and 13.79 kg), cluster weight (410.0 and 718.0 g), cluster length (28.5 and 30.0 cm) and cluster shoulder (19.5 and 20.2 cm) during both seasons, respectively. The untreated vines produced the lowest values of yield (9.00 and 9.44 kg.) in the first and second seasons, respectively. The percentage of increment on the yield due to spraying salicylic acid at 0.1% above the check treatment reached 23.0 and 46.1 % during 2023 and 2024 seasons, respectively. While number of clusters per vine the first season of study was significantly unaffected by the three organic acids.

3.4. Percentage of berries colouration in cluster

It is noticed from the obtained data in Table (6) that the percentage of berries colouration in cluster was significantly affected by varying organic acids application. It was significantly improved with using any one of the three organic acids (citric, ascorbic and salicylic acids) each at 0.05 to 0.1% over the control treatment. The best organic acids in enhancing berries colouration % in cluster were citric, ascorbic and salicylic acids in ascending order. The highest values of the berry clourations % (91.5 and 93.0 %) was recorded on the vines that received salicylic acid at 0.1% during both seasons, respectively. While percentage of berries colouration % in cluster reached 72.0 and 73.5 % in the untreated vines during both seasons, respectively. Similar trend was noticed during both seasons.

Table (5). Effect of some organic acids on the yield /vine, averages cluster weight and dimensions on Crimson seedless grapevines during 2023 and 2024 seasons

Organic acids treatments	No. of cluster per vine		Yield/ vine (kg.)		Av. Cluster weight (g.)		av. Cluster length (cm)		Av. Cluster shoulder (cm.)	
	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024
T_1- Control	25.0	26.0	9.00	9.44	360.0	363.0	16.0	16.5	9.5	10.0
T_2- Citric acid at 0.05%	26.0	28.0	9.67	10.64	372.0	380.0	18.8	19.0	11.0	11.5
T_3- Citric acid at 0.1 %	26.0	29.0	10.01	11.31	385.0	390.0	21.0	22.0	13.5	15.0
T_4- Ascorbic acid at 0.05%	26.0	29.0	9.88	11.18	380.0	385.5	20.0	21.0	13.0	14.5
T_5- Ascorbic acid at 0.1 %	26.0	31.0	10.28	12.40	395.5	400.0	23.5	25.0	16.5	17.5
T_6- Salicylic acid at 0.05%	26.0	30.0	10.14	11.97	390.0	399.0	23.0	26.0	18.0	19.0
T_7- Salicylic acid at 0.1 %	27.0	33.0	11.07	13.97	410.0	418.0	28.5	30.0	19.5	20.0
New L.S.D. at 5%	NS	1.6	0.7	0.9	8.5	9.5	0.9	1.1	0.7	0.8

3.5. Some physical and chemical characteristics of the berries of Crimson seedless grapevines

It is reveal from the obtained data in (Tables 7) that using any one of the three organic acids (citric, ascorbic and salicylic acids) each at 0.05 to 0.1% had significant promotion on quality of the berry in terms of increasing berry weight, berry longitudinal, berry equatorial, TSS%, reducing sugars % and TSS/ acid ratio and same time decreasing total acidity relative to the control treatment. The promotion was significant associated with using citric, ascorbic and salicylic acids in ascending order. Spraying crimson seedless grapevines three times with salicylic acid at 0.1% gave the best results with regard to the quality of the berries. Unfavourable effects on the quality of the berries were attributed to the neglection of organic acids application. These results were true during 2023 and 2024 seasons.

Table (6). Effect of some organic acids on berries colouration and some physical characteristics of the berries on Crimson seedless grapevines during 2023 and 2024 seasons

Organic acids treatments	Berries colouration %		Berry weight (g.)		Berry longitudinal (cm.)		Berry equatorial (cm.)	
	2023	2024	2023	2024	2023	2024	2023	2024
T_1- Control	72.0	73.5	2.60	2.66	1.7	1.7	1.3	1.4
T_2- Citric acid at 0.05%	76.0	77.5	2.71	2.75	1.9	2.0	1.5	1.6
T_3- Citric acid at 0.1 %	81.0	82.0	2.85	2.90	2.1	2.2	1.7	1.8
T_4- Ascorbic acid at 0.05%	80.0	80.5	2.82	2.88	2.0	2.1	1.6	1.7
T_5- Ascorbic acid at 0.1 %	86.5	88.0	2.96	3.00	2.3	2.4	1.9	2.0
T_6- Salicylic acid at 0.05%	85.6	87.8	2.94	2.96	2.2	2.3	1.8	2.0
T_7- Salicylic acid at 0.1 %	91.5	93.0	3.06	3.11	2.6	2.7	2.0	2.1
New L.S.D. at 5%	0.7	0.8	0.11	0.16	0.4	0.5	0.3	0.4

Table (7). Effect of some organic acids on some chemical characteristics of the berries on Crimson seedless grapevines during 2023 and 2024 seasons

Organic acids treatments	TSS%		Total acidity %		TSS/ acid		Reducing sugars %	
	2023	2024	2023	2024	2023	2024	2023	2024
T_1- Control	17.5	17.8	0.700	0.700	25.0	25.4	14.9	15.2
T_2- Citric acid at 0.05%	18.8	19.0	0.670	0.660	28.0	28.8	15.3	15.5
T_3- Citric acid at 0.1 %	19.5	19.7	0.630	0.620	30.9	31.7	15.9	16.1
T_4- Ascorbic acid at 0.05%	19.3	19.5	0.640	0.630	30.1	30.9	15.7	16.0
T_5- Ascorbic acid at 0.1 %	20.1	20.4	0.600	0.590	33.5	34.6	16.3	16.5
T_6- Salicylic acid at 0.05%	20.0	20.2	0.610	0.600	32.8	33.7	16.1	16.3
T_7- Salicylic acid at 0.1 %	21.2	21.5	0.560	0.550	37.9	39.0	16.6	16.8
New L.S.D. at 5%	0.6	0.7	0.018	0.022	0.8	0.9	0.7	0.9

4. Discussion

Antioxidants (organic acids) play an important role in plant defense against oxidative stress and biosynthesis of most organic foods and activation of cells division process.

Ascorbic acid in currently considered to be a regular on the plant the growth and development owing to their effect on cell division and differentiation, it is involved in the wide range of important functions as organic acids defense, photo protection and the growth (**Blokhina *et al.*, 2003**).

The positive action of some organic acids (antioxidants) in catching or chelating the free radicals which could result in extending the shelf life of the plant cells and stimulating some growth characters is reported (**Rao *et al.*, 2003**).

In the meantime, ascorbic acid is considered a regulator of plant growth. Also citric acid is play an essential role in single transduction system, membrane, stability, functions, activity transduction, enzymes metabolism and translocation carbohydrates (**Smirnoff, 1996**).

The beneficial the effects of citric acid on enhancing the uptake and translocation on some nutrients could results in enhancing these elements in the leaves of the plants (**Raskin, 1992**). The positive action of salicylic acid (SA) is plant hormone that pays ion essential role in various plant development and the growth aspects. The main role of (SA) is it effect on inducing the plant defense against different biotic and abiotic stresses (**Garcia- Paster *et al.*, 2020**).

Salicylic acid (SA) has been reported to induce various positive changes in treated grapevines cv. some vegetative growth characters the yield and berries quality as well as resistance to various stress conditions.

Some organic acids (antioxidants) spraying had a significant effect on leaf area (some growth characters), the yield, cluster weight and berry weight, juice weight as well as recoded the lowest the acidity % in the juice. These results of the present investigation agree with those of (**Farahat, 2008; Abada and Abd El- Hameed, 2010; El-Hanafy, 2011; El- Kady- Hanaa, 2011; Bondok- Sawsan *et al.*, 2011; Abdelaal and Aly, 2014; Gad El- Kareem and Abd El- Rahman, 2013; Abada, 2014; Ebrahiem, 2015; Mohamed- Attiat, 2016; Gomaa- Marwa, 2018; Loay and El- Boray, 2018; Abd El-aal, 2019; Mohamed- Attiat, 2021; Al- Sagheer, 2023 and Abd El- Hakim, 2023).**

They found that some organic acids (Ascorbic, citric and salicylic acids) significantly stimulated some vegetative growth aspects, increased the yield as well as cluster weight and improved the berries quality of grapes.

References

Abada, M.A.M. (2014). A comparative study for the effect of green tea extract and some antioxidants on Thompson seedless grapevines. International Journal of Plant & Soil Science 3 (10): 1333-1342.

Abada, M.A.M. and Abd El- Hameed, H.M. (2010). The beneficial effects of sprayings salicylic and citric acids on Flame seedless grapevines. The sixth Inter. of Sustain Agric. and develop. Fac. of Agric. Fayoum Univ. 27-29 December pp. 153-164.

Abd El Hakim, M.H. (2023). Effect of foliar application with some natural and chemical compounds on yield quality of Ruby seedless grape cultivar Ph. D. Thesis Fac. of Agric. Assiut Univ. Egypt.

Abd Elall, E.H. (2019). Spraying of garlic extract, fructose and salicylic acid accelerates bud burst and improves productivity and fruit quality of Superior grapevines. J. Plant product, Mansour Univ., 10 (3): 257-263.

Abdelaal, A.H.M. and Aly, M.M. (2013). The synergistic effects of using turmeric with some antioxidants on growth, vine nutritional status and productivity of Ruby seedless grapevine. Hort. Science J. of Suez Canal Univ. 1: 305-308.

Ahmed, F. F and Morsy, M. H. (1999). A new method for measuring leaf area in different fruit species. Minia. J. of Agric. Res. & Dev.19: 97 - 105.

Ahmed, F. F. and Seleem- Basma, M. (2008). Trials for improving yield and quality of Thompson seedless grapes by using some antioxidants. Minia J. of Agric. Res. & Develop 28(1): 1-11.

Ahmed, F. F.; Abdel- aal, A. M. K.; Abdelaziz, F. H. and EI- Kady- Hanaa, F. M. (2011). Productive capacity of Thompson seedless grapevines as influenced by application of some antioxidants and nutrient treatments. Minia J. of Agric. Res. & Develop. 31(2): 219-232.

Ahmed, F. F.; Abdelaal, A. M. K. and Ibrahiem - Rehab, G. (2012). Benefits of using some vitamins in Thompson seedless grapevine cv. Minia J. of Agric. Res. & Develop. 32 (1): 109 - 128.

Al-Sagheer, N.R.A. (2023). Response of Thompson seedless grapevines (H4 strain) grown under Sandy soil to foliar with antioxidants and seaweed extract. Ph. D. Thesis Fac. of Agric. Al- Azhar Univ. (Assiut branch) Egypt.

Association of Official Agricultural Chemists (A.O.A.C.) (2000): Official Methods of Analysis (A.O.A.C.) 12th Ed. Benjamin Franklin Station, Washington D.C, U.S.A. pp. 490-510.

Blokhina, O.E.; Virolainen and K.V. Fagerstedt. (2003). Antioxidant, Oxidant, Oxidative damage and oxygen deprivations stress, A. Review Ann. Bot, 91: 179-194.

Bouard, J. (1966). Recherches physiologiques sur la vigne et en particulier sur laoutment des serments. Thesis Sci. Nat. Bardeux, France p. 34.

Chapman, H. D. and Pratt, P. P. (1965). Methods of Analysis for Soils, Plants and Water. Univ. of California. Division of Agric., Sci. 172-173.

Ebrahiem, M.A.A. (2015). Response of Superior grapevines to spraying some antioxidants, M. Sc. Thesis Fac. of Agric. Minia Univ. Egypt.

El- Hanafy, W.M. F. (2011). The role of some antioxidants on improving vines productivity in Red Roomy grapevine vineyard. M. Sc. Thesis Fac. of Agric. Minia Univ. Egypt.

El- Kady- Hanaa, F. M. (2011). Productive performance of Thompson seedless grapevines in relation to application of some antioxidants, magnesium and boron. M. Sc. Thesis Fac. of Agric. Minia Univ. Egypt.

Farahat, I.A.M. (2008). Effect of some antioxidant and boron treatments on growth and fruiting of Red Globe grapevines. M. Sc. Thesis Fac. of Agric. Minia, Univ., Egypt.

Gad El- Kareem, M.R. and Abd El- Rahman, M.M.A. (2013). Response of Ruby seedless grapevines to foliar application of seaweed extract, salicylic acid and Roselle extract. Hort. Sci. of Suez Canal Univ. Vol. (1): 299-303.

Garcia- Pastor, M.E. Zapata, P.J.; Castillo, S.; Martinez- Romero, D.; Guillen, F.; Valero, D. and Serrano, M. (2020). The effects of salicylic acid and its derivative on increasing pomegranate fruit quality and bioactive compounds at harvest and during storage Frontiers in plant Sci., 11: 668.

Kubota N.; Matthew, M.A.; Takahugl, T. and Kliewer, W.M. (2000). Effect of garlic preparations, calcium and thydrogen cyanamides on bud break of grapevines grown in greenhouse. American J. of Enology and viticulture (51): 409-414.

Lane, J. H. and Eynon, L. (1965). Determination of reducing sugars by means of Fehlings solution with methyiene blue as indicator. A.O.A.C Washington D.C. U.S.A.

Loay, A.A and El- Boray, M.S. (2018). Improving fruit cluster quality attributes of Flame seedless grapes using preharvest application of ascorbic and salicylic acids. Scientia Horticulurae, 233: 339-348.

Mead, R.; Currnow, R. N. and Harted, A. M. (1993). Statistical Methods in Agricultural and Experimental Biology. 2nd *Ed.* Chapman & Hall London, pp 10 - 44.

Mohamed- Attiat, A.M. (2016). Trials for alleviating the adverse effect of salinity on some grapevines cv. Transplants M. Sc. Thesis, Fac. of Agric. Minia Univ.

Mohamed- Attiat, A.M. (2021). Effect of some bio and organic fertilizers and antioxidants on growth and fruiting of Flame seedless grapevines under Upper Egypt conditions. Ph. D. Thesis, Fac. of Agric. and Natural Resources, Aswan, Univ. Egypt.

Oretili, J.J. (1987). Exogenois application of vitamins as regulators for growth and development of plants. Pfianzenrahr Bpdenk, 150: 375-391.

Passingham, J.V. (2004). On the growing of grapevines in Tropic. Acta Hort. V.II Inter. Symp. on Temperate Zone Fruits in the Tropics and Subtropics 65:39-44.

Rao, G.N. (2007). Statistics for agricultural Sciences. BS publications.

Raskin, I. (1992). Salicylate, a new plant hormone. Plant Physiol., 99: 799-803.

Smirnoff, N. (1996). The function and metabolism of ascorbic acid. Plants Ann. Bot. 87:661- 669.

Summer, M. E. (1985). Diagnosis and Recommendation Integrated System (DRIS) as a Guide to Orchard Fertilization. Hort. Abst. 55 (8): 7502.

Von-Wettstein, D. (1957). Chlorohyll-letale and der submikroskopische Formwechsel der Plastiden. Experimental Cell Research, 12(3): 427-506.

Wilde, S. A.; Corey, R. B.; Laver, J. G. and Voigt, G. K. (1985). Soil and Plant Analysis for Tree Culture. 3rd Ed, Oxford and (BH) publishing Co., New Delhi. India, pp. 1- 218.

تأثير رش الأحماض العضوية على النمو والإثمار فى كرمات العنب الكريمسون اللابذرى النامية فى التربة الرملية

فاروق حسن عبدالعزيز وأحمد محمد السيد محمد رشوان

قسم البساتين ـ كلية الزراعة ـ جامعة المنيا ـ مصر

تم اختبار تأثير ثلاثة أحماض عضوية وهى حامض الستريك وحامض الاسكوربيك وحامض السلسليك بتركيز من ٠,٠٥ الى ٠,١% لكلا منهما على النمو الخضرى والحالة الغذائية للكرمات وكمية المحصول والنسبة المئوية لتلوين الحبات وجودة حبات العنب الكريمسون عديم البذور خلال موسمى ٢٠٢٣ و ٢٠٢٤ فى مزرعة خاصة تقع غرب مركز القوصية بمحافظة أسيوط.

أدت معاملة الكرمات بأى من الأحماض العضوية الثلاثة (حامض الستريك والاسكوربيك والسلسليك) إلى تحسن واضح فى صفات النمو الخضرى والحالة الغذائية للكرمات وكمية المحصول وتلوين الحبات وكذلك خصائص الجودة للحبات بالمقارنة بمعاملة المقارنة (الكنترول) وكان التحسن متوافقا مع استخدام حامض السلسليك أو حامض الاسكوربيك أو حامض الستريك مرتبا ترتيبا تنازليا.

التوصية: من النتائج المتحصل عليها فى هذه التجربة يوصى برش كرمات العنب الكريمسون عديم البذور ثلاثة مرات خلا ل الموسم فى بداية النمو وبعد العقد مباشرا وبعد العقد بثلاثة أسابيع بالحامض العضوى السلسليك بتركيز ٠,١% حيث أعطى أعلى كمية محصول وأفضل جودة وتلوين لحبات العنب الكريمسون سيدلس تحت ظروف هذه المنطقة .

الكلمات الدالة: العنب الكريمسون اللابذرى- الستريك- الاسكوربيك- السلسليك- الاحماض العضوية- المحصول- جودة الحبات.

THE FUTURE Journals

© The Author(s). 2022 Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise