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RELIEFING CLUSTERS LOOSENESS AND SHOT BERRIES IN RED ROOMY GRAPEVINES BY USING SOME ANTIOXIDANTS

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ABSTRACT

This study focused on examining the effect of single or combined application of four antioxidants namely; ascorbic acid, salicylic acid, citric acid or mixture of three amino acids (tryptophane, methionene and cysteine) each at ٢٥٠ to ٥٠٠ ppm on alleviating undesirable phenomena (clusters looseness and shot berries) occurred in Red Roomy grapevine cultivar. These antioxidants were sprayed three times: at growth start, just after berry setting and at one month later.

Results showed that berry setting, yield, physical and chemical characteristics of Red Roomy grapes were positively affected by the application of these antioxidants either alone or in different combinations compared with the control treatment. In ascending order, application of ascorbic acid, salicylic acid, citric acid and the three amino acids was preferable in improving yield quantitively and qualitatively. All antioxidant treatments succeeded in producing larger and filled clusters and at the same time effectively minimized the occurrence of shot berries in the clusters.

Three sprays of a mixture of antioxidants (ascorbic acid, salicylic acid, citric acid and amino acids (tryptophane,

methionene and cysteine) each at ٢٥٠ ppm were responsible for promoting yield and quality of Red Roomy grapes.

INTRODUCTION

Recently, there have bean an increasing possibility of the application of antioxidants for controlling shot berries in the clusters and loose clusters in Red Roomy grapevine cv. They proved to be very essential in protecting the cells from senescence as well as enhancing cell division, endogenous natural hormones, nutrient uptake, photosynthesis, plant pigments and amino acids. They also play an important role in plant defense against oxidative stresses (Oertili, ١٩٨٧).

Previous studies confirmed the promotive effect of all antioxidant on yield and quality in different grapevine cvs (Madian, ٢٠٠٤; Mahran, ٢٠٠٥; Amin, ٢٠٠٧; Farahat, ٢٠٠٨; Ahmed and Seleem- Basma, ٢٠٠٨; El- Sawy, ٢٠٠٩; Ibrahiem, ٢٠٠٩; Abd El-Kariem, ٢٠٠٩; Abada and Abd El- Hameed, ٢٠٠٩ and ٢٠١٠; Ahmed *et al*., ٢٠١٠ and Fayed, ٢٠١٠).

The main objective of this study was examining the impact of some antioxidants on alleviating cluster looseness and shot berries as well as improving yield and quality of Red Roomy grapes.

MATERIALS AND METHODS

This study was carried out during ٢٠١٠ and ٢٠١١ seasons on sixty uniform in vigour ١٥-years old head trained Red Roomy grapevines grown in a private vineyard located at Samalout district, Minia Governorate. The soil is silty clay and well drained and with a water table not less than two meters deep. Winter pruning during each season was conducted on the first week of Jan. using head pruning system leaving ٧٢ eyes (١٥ fruiting spurs × four eyes plus six replacement spurs × two eyes). All selected vines had the same vine load (٧٢ eyes) and planted at ٢.٠ × ٢.٠ m apart. Surface irrigation system was followed. The vines received the usual horticultural practices that are already applied in the vineyard except those dealing with the application of any antioxidants.

Effect of antioxidants on red roomy grapevines

The present experiment involved twenty treatments from single and combined applications of the four antioxidants namely; citric acid, ascorbic acid and salicylic acids as well as a mixture of three amino acids (tryptophane, methionene and cysteine)

١- Control treatment (unsprayed vines)
٢- Spraying amino of acids (tryptophane, methionene and cysteine) at ٢٥٠ ppm.
٣- Spraying of amino acids at ٥٠٠ ppm.
٤- Spraying of citric acid at ٢٥٠ ppm.
٥- Spraying of citric acid at ٥٠٠ ppm.
٦- Spraying of salicylic acid at ٢٥٠ ppm.
٧- Spraying of salicylic acid at ٥٠٠ ppm.
٨- Spraying of ascorbic acid at ٢٥٠ ppm.
٩- Spraying of ascorbic acid at ٥٠٠ ppm.
١٠- Spraying of amino acids + citric acid each at ٢٥٠ ppm.
١١- Spraying of amino acids + salicylic acid each at ٢٥٠ ppm.
١٢- Spraying of amino acids + ascorbic acid each at ٢٥٠ ppm.
١٣- Spraying of citric acid + salicylic acid each at ٢٥٠ ppm.
١٤- Spraying of citric acid + ascorbic acid each at ٢٥٠ ppm.
١٥- Spraying of salicylic acid + ascorbic acid + each at ٢٥٠ ppm.
١٦- Spraying of citric acid + ascorbic acid + salicylic acid each at ٢٥٠ ppm.
١٧- Spraying of citric acid + ascorbic acid + amino acids each at ٢٥٠ ppm.
١٨- Spraying of citric acid + salicylic acid + amino acids each at ٢٥٠ ppm.
١٩- Spraying of ascorbic acid + salicylic acid + amino acids each at ٢٥٠ ppm.
٢٠- Spraying of all antioxidants at ٢٥٠ ppm.

Each treatment was replicated three times, one vine per each. All antioxidants were sprayed three times during each season at growth start (the second week of April), just after berry setting (the second week of June) and at one month later (the second week of July). Triton B as a wetting agent was added at ٠.٠٥٪ to all antioxidant solutions including the control. All antioxidants except salicylic acid (soluble in ethyl alcohol) were dissolved in water. Spraying was done till the vines were covered completely with solutions (٢ liters/ vine). Complete randomized block design was followed for statistical analysis of the present investigation.

Five flower clusters per each vine were caged with white paper bags before the first bloom (١st week of May). The bags were removed after completing of berry setting (٢nd week of June). Number of attached berries (number of attained berries) as well as number of dropped flowers and fruitlets were counted. Total number of flowers/ cluster was estimated by summation of attached berries + dropped fruitlets + dropped flowers. Berry set was calculated by dividing number of attached berries/ cluster by the total number of flowers per vine and multiplying the product by ١٠٠.

Harvesting took place when T.S.S./acid ratio in the berries of the check treatment reached at least ٢٥: ١ (at the middle of August in both seasons) (according to Weaver, ١٩٧٦). Yield expressed in weight (kg.) and number of clusters per vine was recorded. Five clusters/ vine were taken for determination of cluster weight (g.),berry weight (g.), shot berries %, total soluble solids, total sugars %, total acidity % (as g. tartaric acid/ ١٠٠ ml juice) and T.S.S/ acid (according to the procedures that out lined in A.O.A.C, ١٩٩٥).

Statistical analysis was conducted using new L.S.D test at ٥ % for comparisons among the investigated treatment means (Mead *et al*., ١٩٩٣).

RESULTS AND DISCUSSION

Berry set %:

Data in Table ١ reveal that all antioxidant treatments caused significant promotion on percentage of berry setting compared with the check treatment. Combined application was preferable than using each antioxidant alone in improving the percentage of berry setting. In the following ascending order, spraying ascorbic acid, salicylic acid, citric acid and the mixture of amino acids (tryptophane, methionene and cysteine) at ٢٥٠ – ٥٠٠ ppm were significantly very effective in enhancing berry set percentage. Significant differences on his character was detected among all antioxidant treatments. The maximum values (٩.٢٢ and ٩.٤١ % during both seasons) were recorded on vines sprayed three times with all antioxidants. The minimum values (٥.٢٢ and ٥.٣١ % during both seasons) were

recorded on the untreated vines. These results were true in both seasons.

Table ١: Effect of some antioxidants on the percentage of berry setting and number of clusters per vine of Red Roomy grapevines during ٢٠١٠ and ٢٠١١ seasons.

Treatments	Berry setting %		No. of clusters/ vine	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
Control.	٥.٢٢	٥.٣١	٢١.٠	٢٢.٠
Amino acids (AM) at ٢٥٠ ppm.	٦.٢٤	٦.٣٣	٢٣.٠	٢٦.٠
Amino acids (AM) at ٥٠٠ ppm.	٦.٢٥	٦.٣٥	٢٣.٠	٢٦.٠
Citric acid (CA) at ٢٥٠ ppm.	٥.٩٩	٦.٠٩	٢٢.٠	٢٦.٠
Citric acid (CA) at ٥٠٠ ppm.	٦.٠٠	٦.٠٩	٢٢.٠	٢٦.٠
Salicylic acid (SA) at ٢٥٠ ppm.	٥.٧١	٥.٨٠	٢٢.٠	٢٤.٠
Salicylic acid (SA) at ٥٠٠ ppm.	٥.٧٢	٥.٨١	٢٢.٠	٢٤.٠
Ascorbic acid (AA) at ٢٥٠ ppm.	٥.٤٦	٥.٥٥	٢٢.٠	٢٤.٠
Ascorbic acid (AA) at ٥٠٠ ppm.	٥.٤٨	٥.٥٧	٢٢.٠	٢٤.٠
AM + CA at ٢٥٠ ppm.	٧.٧٤	٧.٨٣	٢٣.٠	٢٨.٠
AM + SA at ٢٥٠ ppm.	٧.٥٠	٧.٥٩	٢٣.٠	٢٧.٠
AM + AA at ٢٥٠ ppm.	٧.٠٠	٧.٠٩	٢٣.٠	٢٧.٠
CA + SA at ٢٥٠ ppm.	٧.٢٣	٧.٣٢	٢٤.٠	٢٨.٠
CA + AA at ٢٥٠ ppm.	٦.٧٥	٧.٨٤	٢٣.٠	٢٧.٠
SA + AA at ٢٥٠ ppm.	٦.٥٠	٦.٥٩	٢٣.٠	٢٧.٠
CA + AA + SA at ٢٥٠ ppm.	٨.٠٢	٨.١١	٢٤.٠	٢٨.٠
CA + AA + AM at ٢٥٠ ppm.	٨.٥٥	٨.٦٤	٢٤.٠	٢٩.٠
CA + SA + AM at ٢٥٠ ppm.	٨.٩٢	٩.٠٠	٢٤.٠	٢٩.٠
AA + SA + AM at ٢٥٠ ppm.	٨.٢٦	٨.٣٥	٢٤.٠	٢٩.٠
All at ٢٥٠ ppm.	٩.٢٢	٩.٤١	٢٤.٠	٣٠.٠
New L.S.D at ٥.٠ %	٠.٢٢	٠.٢٤	NS	١.٦

The promoting effect of these antioxidants on stimulating growth and vine nutritional status in favour of increasing number of berries on each cluster could explained the present results. These results are in agreement with those obtained by Madian, (٢٠٠٤); Amin, (٢٠٠٧) and El- Sawy (٢٠٠٩) on Superior grapevines.

Yield/ vine and cluster weight:

It is evident from the data in Tables ١ and ٢ that single or combined application of the four antioxidants significantly was accompanied with improving yield expressed in weight (kg.) and number of clusters (especially in the second season of study) as well as cluster weight comparing with the control treatment.

Table ٢: Effect of some antioxidants on the yield per vine (kg.) and cluster weight (g.) of Red Roomy grapevines during ٢٠١٠ and ٢٠١١ seasons.

Treatments	Yield/ vine (kg.)		Cluster weight (g.)	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
Control.	٦.٣	٦.٧	٣٠١.٠	٣٠٣.٠
Amino acids (AM) at ٢٥٠ ppm.	٧.٨	٩.٠	٣٤٠.٠	٣٤٤.٠
Amino acids (AM) at ٥٠٠ ppm.	٧.٨	٩.٠	٣٤١.٠	٣٤٥.٠
Citric acid (CA) at ٢٥٠ ppm.	٧.٢	٨.٧	٣٢٨.٠	٣٣٤.٠
Citric acid (CA) at ٥٠٠ ppm.	٧.٢	٨.٧	٣٢٩.٠	٣٣٥.٠
Salicylic acid (SA) at ٢٥٠ ppm.	٧.٠	٧.٨	٣١٩.٠	٣٢٦.٠
Salicylic acid (SA) at ٥٠٠ ppm.	٧.٠	٧.٨	٣٢٠.٠	٣٢٦.٠
Ascorbic acid (AA) at ٢٥٠ ppm.	٦.٨	٧.٦	٣١٠.٠	٣١٧.٠
Ascorbic acid (AA) at ٥٠٠ ppm.	٦.٨	٧.٦	٣١١.٠	٣١٦.٠
AM + CA at ٢٥٠ ppm.	٨.٦	١٠.٦	٣٧٢.٠	٣٨٠.٠
AM + SA at ٢٥٠ ppm.	٨.٥	١٠.٢	٣٧١.٠	٣٧٩.٠
AM + AA at ٢٥٠ ppm.	٨.٣	١٠.٠	٣٦٣.٠	٣٧٠.٠
CA + SA at ٢٥٠ ppm.	٨.٩	١٠.٦	٣٧٠.٠	٣٧٧.٠
CA + AA at ٢٥٠ ppm.	٨.٢	٩.٧	٣٥٥.٠	٣٦١.٠
SA + AA at ٢٥٠ ppm.	٨.٠	٨.٥	٣٤٧.٠	٣٥٣.٠
CA + AA + SA at ٢٥٠ ppm.	٩.٠	١٠.٦	٣٧٣.٠	٣٧٩.٠
CA + AA + AM at ٢٥٠ ppm.	٩.٠	١١.٠	٣٧٥.٠	٣٨٠.٠
CA + SA + AM at ٢٥٠ ppm.	٩.٠	١١.١	٣٧٦.٠	٣٨٤.٠
AA + SA + AM at ٢٥٠ ppm.	٩.٠	١١.٠	٣٧٤.٠	٣٨٠.٠
All at ٢٥٠ ppm.	٩.٢	١١.٨	٣٨٤.٠	٣٩٣.٠
New L.S.D at ٥.٠ %	**٠.٥**	**٠.٧**	**٧.٠**	**٧.٦**

The best treatment in this respect was spraying mixture of the three amino acids (tryptophane, methionene and cysteine). Spraying

ascorbic acid and salicylic acid were the least effective in this respect. Increasing concentration of each antioxidant from ٢٥٠– ٥٠٠ ppm had no significant affect on promoting yield and cluster weight. Treating the vines three times with all studied antioxidants each at ٢٥٠ ppm almost maximized the yield (٩.٢ and ١١.٨ kg/ vine) compared with control in both seasons. The lowest yield (٦.٣ and ٦.٧ kg/ vine) in both seasons were recorded on the untreated vines. Antioxidant treatments had no significant promotion on the number of clusters in the first season of study.

The beneficial effects of antioxidants on cluster weight and yield was mainly attributed to their positive action on enhancing berry setting and berry weight. Their essential role on increasing cluster weight and number can not be neglect in this connection.

Similar results were reported by Farahat, (٢٠٠٨) on Red Globe grapevines and Abd El- Kariem (٢٠٠٩) on Crimson seedless grapevines.

Shot berries percentage :

As shown in Table ٣ single or combined applications of the four antioxidants were significantly responsible for checking the unfavorable phenomenon namely shot berries percentage compared with the control treatment. The superiority on reducing shot berries was mainly attributed to spraying of ascorbic acid, salicylic acid, citric acid and amino acids, in the ascending order. Sparing the vines with all antioxidants gave the minimum values (٣.٢ and ٢.٩ %) in the two seasons respectively compared with the highest values (٨.٢ and ٨.٠) during both seasons obtained in the untreated vines.

The beneficial effect of these antioxidants on balancing mineral and organic foods in favour of amending the vines with their requirements from these nutrients as well as their positive action on counteracting the adverse effect of different stresses occurred during flowering and berry setting % (Oertili, ١٩٨٧) could result in reducing shot berries %.

Similar results were obtained by Madian, (٢٠٠٤); Amin, (٢٠٠٧); El- Sawy (٢٠٠٩) on Superior grapevines.

Table ٣: Effect of some antioxidants on the percentage of shot berries and berry weight (g.) of Red Roomy grapevines during ٢٠١٠ and ٢٠١١ seasons.

Treatments	Shot berries %		Berry weight (g.)	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
Control.	٨.٢	٨.٠	٤.٥٠	٤.٥٣
Amino acids (AM) at ٢٥٠ ppm.	٦.٥	٦.٣	٤.٨٦	٤.٩١
Amino acids (AM) at ٥٠٠ ppm.	٦.٥	٦.٣	٤.٨٧	٤.٩١
Citric acid (CA) at ٢٥٠ ppm.	٧.٠	٦.٨	٤.٧٧	٤.٨٢
Citric acid (CA) at ٥٠٠ ppm.	٦.٩	٦.٧	٤.٧٩	٤.٨٤
Salicylic acid (SA) at ٢٥٠ ppm.	٧.٣	٧.١	٤.٦٨	٤.٧٢
Salicylic acid (SA) at ٥٠٠ ppm.	٧.٢	٧.١	٤.٧٠	٤.٧٤
Ascorbic acid (AA) at ٢٥٠ ppm.	٧.٧	٧.٥	٤.٥٧	٤.٦٣
Ascorbic acid (AA) at ٥٠٠ ppm.	٧.٦	٧.٥	٤.٥٩	٤.٦٤
AM + CA at ٢٥٠ ppm.	٤.٦	٤.٣	٥.٢٧	٥.٣٢
AM + SA at ٢٥٠ ppm.	٥.٠	٤.٧	٥.١٨	٥.٢٤
AM + AA at ٢٥٠ ppm.	٥.٦	٥.٣	٥.٠٩	٥.١٥
CA + SA at ٢٥٠ ppm.	٥.٣	٥.٠	٥.١٠	٥.١٥
CA + AA at ٢٥٠ ppm.	٥.٩	٥.٦	٥.٠٠	٥.٠٦
SA + AA at ٢٥٠ ppm.	٦.٢	٥.٩	٤.٩٣	٤.٩٨
CA + AA + SA at ٢٥٠ ppm.	٤.٣	٤.٠	٥.٣٤	٥.٤٠
CA + AA + AM at ٢٥٠ ppm.	٤.٠	٣.٧	٥.٤٩	٥.٥٥
CA + SA + AM at ٢٥٠ ppm.	٣.٧	٣.٠	٥.٥٧	٥.٦٢
AA + SA + AM at ٢٥٠ ppm.	٤.٠	٣.٧	٥.٤١	٥.٤٦
All at ٢٥٠ ppm.	٣.٢	٢.٩	٥.٦٥	٥.٧٠
New L.S.D at ٥.٠ %	٠.٣	٠.٣	٠.٠٦	٠.٠٦

Quality of the berries:

It is clear from the obtained data in Tables ٣, ٤ and ٥ that single or combined application of the four antioxidants each at ٢٥٠ to ٥٠٠ ppm significantly improved both physical and chemical characteristics of Red Roomy grapes in terms of increasing berry weight and dimensions, total soluble solids, total sugars and T.S.S/ acid and decreasing total acidity compared with the check treatment. The promotive effect was associated with using ascorbic acid, salicylic

acid, citric acid and amino acids, in ascending order. Increasing concentrations of each antioxidant from ٢٥٠ to ٥٠٠ ppm failed to show measurable promotion on quality of the berries. Significant differences on these quality parameters were observed among most antioxidant treatments. Increasing number of antioxidants applied to the vines was followed by a gradual promotion on quality of the berries.

Table ٤: Effect of some antioxidants on the percentages of total soluble solids and total acidity in the grapes of Red Roomy grapevines during ٢٠١٠ and ٢٠١١ seasons.

Treatments	T.S.S %		Total acidity %	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
Control.	١٨.٠	١٨.٢	٠.٧١٧	٠.٧١٦
Amino acids (AM) at ٢٥٠ ppm.	١٩.٣	١٩.٤	٠.٦٥٥	٠.٦٥٠
Amino acids (AM) at ٥٠٠ ppm.	١٩.٤	١٩.٤	٠.٦٥٣	٠.٦٤٨
Citric acid (CA) at ٢٥٠ ppm.	١٩.٠	١٩.٢	٠.٦٧٠	٠.٦٦٥
Citric acid (CA) at ٥٠٠ ppm.	١٩.١	١٩.٢	٠.٦٦٩	٠.٦٦٤
Salicylic acid (SA) at ٢٥٠ ppm.	١٨.٧	١٨.٨	٠.٦٨٥	٠.٦٧٩
Salicylic acid (SA) at ٥٠٠ ppm.	١٨.٨	١٨.٩	٠.٦٨٤	٠.٦٨٠
Ascorbic acid (AA) at ٢٥٠ ppm.	١٨.٣	١٨.٤	٠.٧٠٢	٠.٧٠١
Ascorbic acid (AA) at ٥٠٠ ppm.	١٨.٤	١٨.٥	٠.٧٠١	٠.٧٠٠
AM + CA at ٢٥٠ ppm.	٢١.٣	٢١.٢	٠.٥٩٩	٠.٥٩٤
AM + SA at ٢٥٠ ppm.	٢١.٠	٢٠.٩	٠.٦٠٠	٠.٥٩٥
AM + AA at ٢٥٠ ppm.	٢٠.٤	٢٠.٤	٠.٦١٦	٠.٦١١
CA + SA at ٢٥٠ ppm.	٢٠.٧	٢٠.٦	٠.٦٠٣	٠.٥٩٨
CA + AA at ٢٥٠ ppm.	٢٠.١	٢٠.١	٠.٦٢٩	٠.٦٢٤
SA + AA at ٢٥٠ ppm.	١٩.٨	١٩.٨	٠.٦٤٠	٠.٦٣٥
CA + AA + SA at ٢٥٠ ppm.	٢١.٧	٢١.٥	٠.٥٨٠	٠.٥٧٦
CA + AA + AM at ٢٥٠ ppm.	٢٢.٤	٢٢.١	٠.٥٥٥	٠.٥٥٠
CA + SA + AM at ٢٥٠ ppm.	٢٢.٦	٢٢.٤	٠.٥٤١	٠.٥٣٦
AA + SA + AM at ٢٥٠ ppm.	٢٢.٠	٢١.٨	٠.٥٦٦	٠.٥٦٠
All at ٢٥٠ ppm.	٢٢.٩	٢٢.٨	٠.٥٢٩	٠.٥٢٣
New L.S.D at ٥.٠ %	٠.٢	٠.٢	٠.٠١١	٠.٠١٢

Table ٥: Effect of some antioxidants on the ratio between total soluble solids and acid and percentage of total sugars in the berries of Red Roomy grapevines during ٢٠١٠ and ٢٠١١ seasons.

Treatments	T.S.S/ acid		Total sugars %	
	٢٠١٠	٢٠١١	٢٠١٠	٢٠١١
Control.	٢٥.١	٢٥.٤	١٦.٣	١٦.٥
Amin o acids (AM) at ٢٥٠ ppm.	٢٩.٥	٢٩.٨	١٧.٨	١٨.٢
Amino acids (AM) at ٥٠٠ ppm.	٢٩.٧	٢٩.٩	١٧.٩	١٨.٣
Citric acid (CA) at ٢٥٠ ppm.	٢٨.٤	٢٨.٩	١٧.٥	١٧.٩
Citric acid (CA) at ٥٠٠ ppm.	٢٨.٦	٢٨.٩	١٧.٥	١٧.٩
Salicylic acid (SA) at ٢٥٠ ppm.	٢٧.٣	٢٧.٧	١٧.٠	١٧.٣
Salicylic acid (SA) at ٥٠٠ ppm.	٢٧.٥	٢٧.٨	١٧.١	١٧.٤
Ascorbic acid (AA) at ٢٥٠ ppm.	٢٦.١	٢٦.٢	١٦.٦	١٦.٩
Ascorbic acid (AA) at ٥٠٠ ppm.	٢٦.٢	٢٦.٤	١٦.٧	١٦.٩
AM + CA at ٢٥٠ ppm.	٣٥.٦	٣٥.٧	١٩.٤	١٩.٨
AM + SA at ٢٥٠ ppm.	٣٥.٠	٣٥.١	١٩.٢	١٩.٦
AM + AA at ٢٥٠ ppm.	٣٣.١	٣٣.٤	١٨.٦	١٩.٠
CA + SA at ٢٥٠ ppm.	٣٤.٣	٣٤.٤	١٨.٩	١٩.٣
CA + AA at ٢٥٠ ppm.	٣٢.٠	٣٢.٢	١٨.٣	١٨.٧
SA + AA at ٢٥٠ ppm.	٣٠.٩	٣١.٢	١٨.١	١٨.٥
CA + AA + SA at ٢٥٠ ppm.	٣٧.٤	٣٧.٣	١٩.٥	١٩.٩
CA + AA + AM at ٢٥٠ ppm.	٤٠.٤	٤٠.٢	٢٠.٠	٢٠.٥
CA + SA + AM at ٢٥٠ ppm.	٤١.٨	٤١.٨	٢٠.٣	٢٠.٨
AA + SA + AM at ٢٥٠ ppm.	٣٨.٩	٣٨.٩	١٩.٧	٢٠.٠
All at ٢٥٠ ppm.	٤٣.٣	٤٣.٦	٢٠.٩	٢١.٤
New L.S.D at ٥.٠ %	٠.٩	٠.٨	٠.٢	٠.٢

The best results with regard to quality of the berries were obtained when all antioxidants were sprayed three times at ٢٥٠ ppm. Neglection of antioxidant application gave unfavourable effects on quality of the berries. These results were true during in the two experimental seasons.

The beneficial effects of these antioxidants on quality of the berries might be attributed to their positive action on enhancing cell

division, plant pigments and the biosynthesis of organic foods especially carbohydrates (Oertili, ١٩٨٧).

These results are in accordance with those obtained by Madian, (٢٠٠٤); Mahran, (٢٠٠٥); Amin, (٢٠٠٧); Ibrahiem, ٢٠٠٩; Fayed (٢٠١٠) and Refaai (٢٠١١) on Thompson seedless grapes.

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علاج شلشلة العناقيد والحبات الصغيرة في كرمات العنب الرومي الأحمر باستخدام بعض مضادات الأكسدة

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تركزت هذه الدراسة علي اختبار تأثير الاستخدام الفردي أو المشترك لأربعة مواد مضادة للأكسدة هي حامض الأسكوربيك، حامض السلسليك، حامض الستريك وخليط من ثلاثة أحماض أمينية (التربتوفان، المثيونين، السيستئين) بتركيز ما بين ٢٥٠ الي ٥٠٠ جزء في المليون في تخفيف الظواهر الغير مرغوبة وهي شلشلة العناقيد والحبات الصغيرة الموجودة في صنف العنب الرومي الأحمر وقد تم رش هذه المواد المضادة للأكسدة ثلاثة مرات في بداية النمو وبعد عقد الحبات مباشرة وبعدها بشهر.

ولقد أشارت نتائج الدراسة أن النسبة المئوية لعقد الحبات وكمية المحصول والخصائص الطبيعية والكيميائية لحبات العنب الرومي الاحمر قد تاثرت ايجابيا بالاستخدام الفردي أو المشترك لهذه المواد وذلك بالمقارنة بمعاملة الكونترول وأدي استخدام حامض الاسكوربيك وحامض السلسليك وحامض الستريك والاحماض الامينية الثلاثة مرتبة ترتيبا تصاعديا إلي حدوث تحسن واضح في كمية المحصول كما ونوعا. وقد نجحت جميع معاملات مضادات الأكسدة في الحصول علي عناقيد ممتلئة وكبيرة وفي نفس الوقت انخفضت نسبة وجود الحبات الصغيرة في العناقيد.

إن رش كرمات العنب الرومي الاحمر ثلاثة مرات بمخلوط من جميع مضادات الاكسدة (حامض الأسكوربيك، حامض السلسليك، حامض الستريك) والأحماض الأمينية (التربتوفان، المثيونين، السيستئين) بتركيز ٢٥٠ جزء في المليون لكلا منهم كان فعلا في تحسن كمية المحصول وخصائص الجودة للحبات.