



EFFECT OF THE STIMULANT AMINOQUELANT- Ca ON YIELD AND BERRIES QUALITY OF THOMPSON SEEDLESS GRAPEVINES

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ABSTRACT

The effect of spraying Thompson seedless grapevines three or four times with Aminoquelant- Ca at 0.05 , 0.1 , 0.2 or 0.4 % on berry set % , yield as well as physical and chemical properties of the berries was investigated during 2006 and 2007 seasons.

Results showed that carrying out three or four sprays of the stimulant aminoquelant – Ca at 0.05 to 0.4 % had beneficial effect on berry set %, yield as well as all physical and chemical characters of the berries. The promotion was depended on increasing concentrations and number of stimulant sprays. Increasing concentrations from 0.2 to .4 % and number of sprays from three to four times had negligible effect on these characters.

Carrying out three sprays of aminoquelant – Ca at 0.2% gave the best results with regard to yield and quality of Thompson seedless grapes.

INTRODUCTION

Improving physical and chemical characters of the prime and popular grape cv. Thompson seedless is considered an important target for grape growers in El- Minia region and other region of Egypt. It could be achieved through conducting new horticultural practices

Basma M. Seleem and H. M. Abd El- Hameed

depend on using new stimulants that safe for environment. Out of those stimulants aminoquelant –Ca as a compound containing amino acids and calcium was developed.

Aminoquelant- Ca is an amino acid chelated calcium product developed to correct Ca deficiency of plants. Calcium in such compound is readily available and easily absorbed by the leaves of the plants regardless of most environmental and soil conditions.

The amino acids not only increase the absorption of Ca, but also enhance the translocation of this essential macronutrient to growing points of the plant. These biologically active free amino acids also improve photosynthesis and offer maximum protection from stress.

Calcium has been known as an essential element for vines for a long time and it has received much attention from the fertility standpoint and also very important for facilitating marketing of the fruits. Calcium is required for cell division and chromosome stability . As Ca-pectate, it is a constituent of the middle lamella of cell walls (Evans and Sorger, 1966). Calcium indirectly influences many enzyme systems such as amalyase and ATPase. It also seems to have a regulating role in respiration and prolonging shelf life of fruits (Nason and McElroy , 1965 and Jones and Lunt , 1967).

Application of amino acids were found to have a beneficial effect on flowering and fruit setting of grapevine and other fruit crops (Farag, 1996; Ahmed and Abd El Hameed, 2003; Abd El- Hafeez, 2006 and Ahmed, 2007). In addition, it also have a definite role in accelerating ripening and improving yield and fruit quality.

Previous studies showed that application of Ca was accompanied with improving yield and fruit quality as well as extending shelve life of fruits and facilitating transportation of fruit to markets (Burstrom 1968; Winkler *et al.*,1974; Chapman, 1975; Weaver, 1976; Nijjar, 1985, Ahmed, 1988and Gobara *et al.*, 1996).

The objective of this study was to examine the effect of the new stimulant aminoquelant – Ca on yield as well as physical and chemical characters of Thompson seedless grapes.

Effect of aminoquelant- CA on yield and quality of Thompson seedless grapevines

MATERIALS AND METHODS

This study was carried out during 2006 and 2007 seasons on 27 uniform vigour ten-years old Thompson seedless grapevines in a private vineyard located at Matay district, Minia Governorate where the soil is clay, well drained and water table not less than two meters deep. The chosen vines were trained according to cane pruning method using modified Y shape supporting system. Pruning was carried out during the first week of Jan in both seasons. Vine load was 72 eyes / vine (as six fruiting canes x 10 eyes plus six renewal spurs x 2 eyes . The uniform in vigour vines were spaced at 2x3 meters.

The present experiment included the following nine treatments from aminoquelant –Ca applications:

- 1- Control treatments (untreated vines) .
- 2- Spraying aminoquelant –Ca at 0.05 % three times (growth start , just after berry setting and at 21 days later).
- 3- Spraying aminoquelant –Ca at 0.05 % four times (growth start, just after berry setting and at 21 days intervals).
- 4- Spraying aminoquelant –Ca at 0.1 % three times as previously mentioned.
- 5- Spraying aminoquelant –Ca at 0.1 % four times as previously mentioned.
- 6- Spraying aminoquelant –Ca at 0.2 % three times as previously mentioned..
- 7- Spraying aminoquelant –Ca at 0.2 % four times as previously mentioned.
- 8- Spraying aminoquelant –Ca at 0.4 % three times as previously mentioned.
- 9- Spraying aminoquelant –Ca at 0.4 % four times as previously mentioned.

Each treatment replicated three times, one vine per each. Triton B as a wetting agent at 0.05% was added to all aminoquelant –Ca solutions. The control vines were sprayed with water containing the wetting agent. The chosen vines received all horticultural practices already applied in the vineyard except foliar application of amino acids and calcium.

Basma M. Seleem and H. M. Abd El- Hameed

Completely randomized block design was adopted. Berry set % was recorded by dividing number of fruitlets / cluster by total number of flowers and multiplying the product by 100.

At harvesting date for both seasons, when T.S.S./ acid of the control berries reached at least 25/1 , clusters of each vine were harvested and counted. Yield / vine was recorded (in kg), then average cluster weight (g) was recorded . Five clusters from each vine were taken for measuring the following physical and chemical characters:-

1-Average berry weight (g).

2-Total soluble solids %.

3-Total sugars % (Lane and Eynon procedure) as outlined by A.O.A.C., (1995).

4-Total acidity % (as g tartaric acid / 100 ml juice), according to A.O.A.C., (1995).

All obtained data were tabulated and statistically analyzed according to **Snedecor and Cochran (1967)** using new L.S.D. at 5%.

RESULTS AND DISCUSSION

Effect of aminoquelant –Ca on berry set % , yield and cluster weight:

It is clear from the data in Table 1 that berry set % , yield expressed in weight (kg.) and number of clusters (only in the second season) per vine and cluster weight were significantly improved in response to foliar application of aminoquelant –Ca at 0.05 to 0.4 % three or four times compared to the control. A gradual promotion on yield and cluster weight were observed with increasing concentrations and number of aminoquelant –Ca sprays. Increasing concentrations from 0.2 to 0.4 % and number of sprays from three to four times had meaningless promotion on yield and cluster weight. Therefore, from economical point of view, spraying the vines three times with aminoquelant –Ca at 0.2 % gave satisfactory increment on the yield. The minimum yield was recorded on untreated vine. Numerically point of view in the previous recommended treatment (0.2 % concentration and three number of sprays), the vine produced 10.4 and 11.1 kg per vine compared to 8.2 and 8.1 produced by the untreated vines in both seasons respectively. This means that the percentage of increase due to

Effect of aminoquelant- CA on yield and quality of Thompson seedless grapevines

application of the recommended treatment reached 26:8 and 37.0% in relation to the untreated vines.

Table 1: Effect of concentrations and dates of spraying aminoquelant –Ca on berry set %, yield and cluster weight (g.) of Thompson seedless grapevines during 2006 and 2007 seasons.

Treatment	Berry set %		Yield / vine (kg)	
	2006	2007	2006	2007
Control	13.3	14.0	8.2	8.1
Aminoquelant – Ca at 0.05 % three times	14.9	15.1	9.1	8.9
Aminoquelant – Ca at 0.05 % four times	15.0	15.2	9.1	8.9
Aminoquelant – Ca at 0.1 % three times	17.5	17.8	9.5	9.8
Aminoquelant – Ca at 0.1 % four times	18.0	18.0	9.5	9.8
Aminoquelant – Ca at 0.2 % three times	19.5	20.0	10.4	11.1
Aminoquelant – Ca at 0.2 % four times	19.9	20.2	10.5	11.1
Aminoquelant – Ca at 0.4 % three times	19.6	20.1	10.5	11.1
Aminoquelant – Ca at 0.4 % four times	20.0	20.3	10.5	11.1
New L.S.D. at 5%	1.1	1.2	0.7	0.7
Treatment	No. of clusters / vine		Cluster weight (g.)	
	2006	2007	2006	2007
Control	24.0	23.0	341.0	350.0
Aminoquelant – Ca at 0.05 % three times	25.0	24.0	362.0	371.0
Aminoquelant – Ca at 0.05 % four times	25.0	24.0	364.0	372.0
Aminoquelant – Ca at 0.1 % three times	25.0	25.0	380.0	390.0
Aminoquelant – Ca at 0.1 % four times	25.0	25.0	381.0	392.0
Aminoquelant – Ca at 0.2 % three times	26.0	27.0	401.0	410.0
Aminoquelant – Ca at 0.2 % four times	26.0	27.0	402.0	412.0
Aminoquelant – Ca at 0.4 % three times	26.0	27.0	402.0	411.0
Aminoquelant – Ca at 0.4 % four times	26.0	27.0	403.0	413.0
New L.S.D. at 5%	NS	1.0	15.0	14.0

These results are in agreement with those obtained by Ahmed and Abd El- Hameed (2003) and Ahmed (2007) who worked on amino acids as well as Ahmed (1988) and Gobara *et al.*, (1996) who worked on calcium components.

Basma M. Seleem and H. M. Abd El- Hameed

Effect of aminoquelant –Ca on physical and chemical characters of the berries.

It is clear from the data in Table 2 that carrying out three or four sprays of aminoquelant –Ca at 0.05 to 0.4% was very effective in improving berries quality in terms of increasing berry weight, total soluble solids % and total sugars % and in reducing total acidity %. The promotion was associated with increasing the concentrations and the number of sprays.

Table 2: Effect of concentrations and dates of spraying aminoquelant –Ca on some physical and chemical characters of the berries of Thompson seedless grapevines during 2006 and 2007 seasons.

Treatment	Av. Berry weight (g)		T.S.S. %	
	2006	2007	2006	2007
Control	1.60	1.62	18.0	18.2
Aminoquelant – Ca at 0.05 % three times	1.71	1.73	18.3	18.6
Aminoquelant – Ca at 0.05 % four times	1.72	1.74	18.4	18.7
Aminoquelant – Ca at 0.1 % three times	1.82	1.83	18.7	19.1
Aminoquelant – Ca at 0.1 % four times	1.83	1.85	18.8	19.2
Aminoquelant – Ca at 0.2 % three times	1.92	1.94	19.1	19.5
Aminoquelant – Ca at 0.2 % four times	1.93	1.95	19.2	19.6
Aminoquelant – Ca at 0.4 % three times	1.93	1.95	19.2	19.6
Aminoquelant – Ca at 0.4 % four times	1.94	1.96	19.3	19.7
New L.S.D. at 5%	0.07	0.06	0.3	0.3
Treatment	Total sugars %		Total acidity %	
	2006	2007	2006	2007
Control	16.2	16.5	0.719	0.720
Aminoquelant – Ca at 0.05 % three times	16.6	17.0	0.702	0.707
Aminoquelant – Ca at 0.05 % four times	16.7	17.1	0.700	0.706
Aminoquelant – Ca at 0.1 % three times	17.0	17.5	0.684	0.690
Aminoquelant – Ca at 0.1 % four times	17.1	17.6	0.680	0.688
Aminoquelant – Ca at 0.2 % three times	17.5	18.0	0.666	0.670
Aminoquelant – Ca at 0.2 % four times	17.6	18.1	0.662	0.669
Aminoquelant – Ca at 0.4 % three times	17.6	18.1	0.664	0.669
Aminoquelant – Ca at 0.4 % four times	17.7	18.2	0.660	0.667
New L.S.D. at 5%	0.3	0.3	0.011	0.012

Effect of aminoquelant- CA on yield and quality of Thompson seedless grapevines

A slight stimulation on quality of the berries was attained with increasing concentrations from 0.02. to 0.4 % and number of sprays from three to four times. Untreated vines gave unfavourable effects on fruit quality. Spraying the vines three times with aminoquelant –Ca at 0.2 % gave the best results with regard to fruit quality. Similar trend was observed in both seasons.

These results are in harmony with those obtained by Farag (1996) and Abd El- Hafeez (2006) who worked on amino acids and Ahmed (1988) and Gobara *et al.*, (1996) who worked on calcium compounds.

As a conclusion, three sprays of aminoquelant –Ca at 0.2% were found to be sufficient for improving yield and fruit quality of Thompson seedless grapevines.

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Basma M. Seleem and H. M. Abd El- Hameed

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Effect of aminoquelant- CA on yield and quality of Thompson seedless grapevines

تأثير منشط امينوكيولانت الكالسيوم على كمية المحصول وجودة الحبات في كرمات العنب الطومسون سيدلس

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تم دراسة تأثير رش كرمات العنب الطومسون سيدلس بمنشط النمو امينوكيولانت الكالسيوم ثلاثة أو اربعة مرات بتركيزات ٠,٠٥ ، ٠,١ ، ٠,٢ ، ٠,٤ % على النسبة المئوية لعقد الحبات وكمية المحصول والخصائص الطبيعية والكيميائية للحبات وذلك خلال موسمي ٢٠٠٦ ، ٢٠٠٧ .

لقد اشارت نتائج الدراسة ان رش مركب امينوكيولانت الكالسيوم ثلاثة أو اربعة مرات بتركيز ما بين ٠,٠٥ ، ٠,٤ % كان له تأثير مفيد على النسبة المئوية لعقد الحبات وكمية المحصول والخصائص الطبيعية والكيميائية للحبات وكان التحسن في هذه الصفات مرتبطا بزيادة التركيز المستخدم وكذلك عدد مرات الرش لهذا المنشط .

إن زيادة التركيز المستخدم من المركب من ٠,٢ الى ٠,٤ % وعدد مرات الرش من ثلاثة الى اربعة مرات كان له تأثير طفيف على هذه الخصائص .

أعطى رش مركب امينوكيولانت الكالسيوم ثلاثة مرات بتركيز ٠,٢ % أفضل النتائج بخصوص كمية المحصول وخصائص الجودة لحبات العنب الطومسون سيدلس.