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Influence of Spraying Urea, Born, and Active Dry Yeast on Growth, Yield, Leaf Chemical Composition and Fruit Quality of "Superior" Grapevines Grown in Sandy Soil Conditions.

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ABSTRACT

This investigation was carried out during two successive seasons i.e. 2011 and 2012 on grapevines "superior" cultivar grown in sandy soil in a private vineyard located in new reclaimed area in Ahmed Orabi Association, Qalyoub Government - Egypt. Grapevine received 9 spray treatments: Control (sprayed with water), urea at 0.5% and 1.0%, boric acid at 0.1% and 0.2%, active dry yeast at 0.1% and 0.2%, (0.5% urea + 0.1% boric acid + 0.1% yeast), (1.0% urea + 0.2% boric acid + 0.2% +yeast). From the results of this investigation it could be concluded that combined spraying with urea at 1.0% plus boric acid at 0.2% plus active dry yeast at 0.2% four times during growing season(i.e. at the beginning of growth, first bloom, immediately after fruit set and 3 weeks later) in addition to the recommended N, P and K fertilizers is recommended for achieving high growth, yield with fairly good barriers quality from "Superior" grapevines under the condition of the experiment and the resembling conditions.

Key words: Urea, boric Acid, active dry yeast, superior cv., grapevines growth, fruit quality.

Introduction

Grapes (*Vitis vinifera* L.) are considered the first major fruit crop in its production all over the word. In Egypt grapes rank second among fruit crops while citrus being the first. "Superior" grape is one of new cultivars which were introduced to Egypt and characterized by its earliest crop, and has the clusters one light to medium weight, long to medium length, shouldered loose to semi compact and cylindrical, winged shape. The berries are seedless, greenish white to light golden, ripening date at Al-Tahrir region is from June 14 to June 21 according to Haggag *et al.,* (1996).

Nitrogen has many functions in all division, the synthesis of proteins, protoplasm, enzymes and organic compounds as nucleoproteins, amino acid and chlorophyll. The improving effect of N applied via foliage al yield, Fruit quality was emphasized by the results of AKL *et al*., (1997) and Abdel-Hady (1995). Moreover, born plays an important role in flowering and fruiting processes, biosynthesis and translocation of carbohydrates, movement of the natural hormones and the encouragement of both cell division and cell enlargement (Nijjar, 1985).

Recently, the bio-fertilizer active dry yeast was found enhance grape yield and physical of chemical characteristics of berries (Ahmed *et al*., 1997 and Normier, 2000).

The purpose of this study was to add more light on the effect of sprays urea, boric acid and active dry yeast on growth, leaf composition content yield and fruit quality of superior grapevines under the sandy soil conditions.

Materials and Methods

The present work was conducted through two seasons 2011 and 2012 on grapevines "superior" cultivar grown in sandy soil in a private vineyard located in new reclaimed area in Ahmed Orabi Association, Qalyoub Government - Egypt. The vines used in this experiment were healthy, nearly uniform in vigor; Vines were 12 years old and grown in a sandy soil under drip irrigation system. Eighty one vines were selected and arranged into three similar groups (Blocks), each of three vines (replicate). The experimental vines were arranged in complete randomized block design.

Vines were 12 years old and grown 2x3 meters apart in sandy soil under drip irrigation system. All cultural practices were applied according to the recommendations of the Ministry of Agriculture; Egypt. The Spanish Barron system was used as a trellising system. Superior seedless cultivars were cane pruned (120 eyes/vine were left, 10 canes x 12 buds /vine) during the second week January in each season. The physical and chemical properties of the used soil listed in Table (1), soil samples were analyzed according to Wilde *et al*., (1985).

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Table 1: Physical and chemical properties of the used soil:

Character	Value
Sand (%)	88.90
Silt (%)	6.30
Cloy (%)	4.80
Texture grade	Sandy
O.M (%)	0.55
CaCO3 (%)	2.35
EC. (1: 2.5 extract).	1.75
PH (1: 2.5 extract).	7.80
Total N (%)	0.16
Available P (ppm)	11.10
Available K (ppm)	2.30

The substances used in this experiment were urea, boric acid and active dry yeast to study impact of spraying them on growth, leaf composition content yield and fruit quality of superior grapevines under the sandy soil conditions. Active dry yeast solutions at two concentrations were used carefully (0.1 and 0.2 %) and prepared before spraying by dissolved the define amount of active dry yeast (contained 35% protein, 6.88 % each, 6.55% glycogen, 1.33% fats and 2.6% fiber) in warm water (38 °c) followed by the addition of 0.3% Egyptian treacle (as a source of sugar) and left for two hours before spraying for activating the reproduction of yeast Hegab, *et al* (1997).

The experimental treatments applied were as follows:

1- Control (sprayed with water only).
2- Spraying urea at 0.5%.
3- Spraying urea solution 1.0% (46.5% N).
4- Spraying boric acid solution (17 % B) at 0.1%.
5- Spraying boric acid solution at 0.2 %.
6- Spraying active dry yeast solution at 0.1%.
7- Spraying active dry yeast solution at 0.2 %.
8- A combination of 0.5% urea + 0.1% boric acid + 0.1% active dry yeast.
9- A combination of 1.0% urea + 0.2% boric acid + 0.2% active dry yeast.

The all tested treatments were sprayed four times on the same vines:

1- The first spray was applied when the main shoots reached 15 cm (beginning of growth) at the 2nd week of March
2- The second spray was applied at early bloom (1st of April).
3- The third spray just after fruit set (3rd weeks of April).
4- The fourth spray at 3 weeks from the third sprays (2nd of May).

Each spray treatment was replicated three times with three vines for each replicate.

The concentration was applied through the four sprays of each treatments Triton B as wetting agent at 0.1% concentration was added to all the spraying solutions as well as water in control treatment.

Data of this investigation included the following:

1- Main Shoot length and leaf are:

Vegetative growth of the vines evaluated in terms of average leaf area (cm^2) in the leaves situated opposite to the basal clusters according to Ahmed and Morsy, (1999), and average main shoot length (cm).

2- Leaf mineral content:

Leaf content of N, P and K (as percentage on dry weight basis) in petioles from leaves opposite to the basal clusters was determined according to Wilde *et al,* (1985).

3- Leaf pigments content:

Leaf content of chlorophyll a & b, total chlorophyll and carotenoids as (mg/g fresh weight) according to Moran (1982).

4- Yield components:

At harvest time (10 June in 2011 and 12 June in 2012) all clusters on the vines were picked, the number of clusters/vine and their total weight (i.e. the yield in kg) were recorded.

5- Physical proteins of Cluster:

Samples of 5 clusters were taken from each replicate and the following parameters were determined cluster length; number of berries / cluster; rachis weight (g) and cluster index was calculated.

6- Physical and chemical properties of berries:

Sample of 100 berries were taken from each replicate and the following determined: berry weight, berry length 8 diameter and berry shape index (length/diameter, Moreover, fruit chemical properties of the berry juice were determined: total soluble solids (TSS) percentage using a hand refractometer, total titra table acidity by titration against 0.1N sodium hydroxide in presence of phenolphthalein dye (A.O.A.C., 1985) and the T.S.S / acid ratio was calculated.

Statistical analysis:

The completely randomized design was carried out in this study. Data were statistically analyzed according to (Snedecor and Cochran, 1990) and New L.S.D test at 5% level was used for comparison between treatments.

Results and Discussion

1- Main Shoot length and Leaf area:

Data in Table (2) show the effect of spraying with urea boric acid and active dry yeast on main shoot and leaf area of "superior" grapevines in 2011 and 2012 seasons. It is obvious from the obtained data that single or combined application of urea, boric acid and active dry yeast significantly improved shoot length and leaf area. Moreover the combined application of urea 1.0% plus boric acid 0.2% plus 0.2% active dry yeast gave a more pronounced effect in this connection. The role of nitrogen a constituent of amino-acids and proteins as well as its important role in encouraging cell division and the development of meristematic tissues and Devlin & Witham, (1983) can give an explanation for N action on growth characters of vine. Such vine growth improvement due to using boron may be due to the simulative effect it on cell division in meristematic tissues Adriano, (1985).

In regard to the effect of active dry yeast on shoot length and leaf area. The stimulation effect on growth might be attributed to its own higher content of amino acid and cytokinen and minerals as well as its positive action on enhancing the biosynthesis of carbohydrates (N.R.P., 1977).The results of urea on vine growth are in agreement with those obtained by Ahmed *et al*., (1989) and Darwish& Ahmed (1993).

The results dealing with the effect of foliar spraying of boron on activity vine growth one in harmony with those of Rama & Sharma (1975) and Sourial *et al*., (1985) on Thompson seed less grapevines.

Table 2: Effect of foliar spraying with urea and boric acid and active dry yeast on main shoot length and leaf area of "superior" grapevines during 2011 and 2012 seasons.

Characters / Treatments	Main shoot length (cm)		Leaf area (cm^2)	
	2011	2012	2011	2012
1- Control	115.33	123.30	123.10	125.30
2- Urea (N) at 0.5%	130.23	136.32	129.31	130.31
3- Urea (N) at 1.0%	138.31	142.31	135.16	138.16
4- Boric acid (B) at 0.1%	117.31	129.03	127.11	128.31
5- Boric acid (B) at 0.2%	121.52	135.11	128.31	132.10
6- Active dry yeast at 0.1%	153.11	158.13	139.30	143.11
7- Active dry yeast at 0.2%	163.33	169.11	143.11	146.30
8- Urea at 0.5 + Boric acid at 0.1% + yeast at 0.1%	171.12	176.33	148.30	151.12
9- Urea at 1.0% + Boric acid at 0.2% + yeast 0.2%	178.16	183.33	152.11	155.11
New L.S.D at 5%	8.30	7.11	5.33	4.81

2- Leaf mineral content:

The effect of tested treatments on N, P and K percentage in the two experimental seasons are shown in Table (3). It is evident that urea (alone) and yeast (alone) clearly improved N percentage in leaves compared with control. Moreover, the combined application of urea at 1.0% plus boric acid 0.2% + active dry yeast 0.2% gave a more pronounced effect in this respect. Concerning phosphorous percentage in Leaves; results in Table (3) showed that tested treatments tended to increase P percentage in the leaves as compared with control. As for potassium percentage in leaves results in the same Table indicated that all treatments increased the percentage of

K than control. Moreover spraying vines with active dry yeast alone or combined with urea and boric acid significantly increased K percentage than the untreated one. These results agree with those reported by Ahmed *et al* (1997); Ahmed *et al* (1997) and Abada (2002).

Table 3: Effect of foliar spraying with urea, boric acid and active dry yeast on percentage of N, P and K of "superior" grapevines during 2011 and 2012 seasons.

Characters / Treatments	N (%)		P (%)		K(%)	
	2011	2012	2011	2012	2011	2012
1- Control	1.61	1.60	0.14	0.16	1.31	1.33
2- Urea (N) at 0.5%	1.82	1.80	0.13	0.15	1.11	1.12
3- Urea N at 1.0%	2.23	2.25	0.11	0.14	0.90	1.10
4- Boric acid (B) at 0.1%	1.70	1.69	0.17	0.19	1.71	1.69
5- Boric acid (B) at 0.2%	1.72	1.71	0.19	0.21	1.80	1.79
6- Active dry yeast at 0.1%	1.85	1.84	0.24	0.25	1.85	1.86
7- Active dry yeast at 0.2%	1.99	2.01	0.25	0.27	1.90	1.93
8- Urea at 0.5 + Boric acid at 0.1% + yeast at 0.1%	2.11	2.16	0.26	0.27	1.83	1.80
9- Urea at 1.0% + Boric acid at 0.2% + yeast 0.2%	2.33	2.21	0.28	0.29	1.93	1.95
New L.S.D at 5%	0.05	0.04	0.03	0.02	0.05	0.05

3- Leaf pigments content:

It is obvious from Table (4) that all treatments increased chlorophyll a & b, total chlorophyll and total carotenoids than the untreated ones. Moreover, combined application of urea at 1.0% plus boric acid at 0.2% plus active dry yeast at 0.2% gave the highest values than other treatment and the control in this respect on the other hand, control gave the lowest values. These results were true in both seasons.

In regard to the effect of active dry yeast on leaf pigments content it is noticed that spraying with 0.2+ yeast at four times application produced significant increase in chlorophyll (a and b) , (a+b) and carotenoids than the control in both seasons. Similar results were obtained by Fawzi and Eman (2004) on Flame seedless grapevines.

The effect of nitrogen as a constituent of pyrimidine which play an important role in chlorophyll synthesis is suggested on acceptable explanations for the increase leaf chlorophyll content with increasing the concentration of urea Devlin and Witham (1983). The role of boron in hastening the uptake of element especially Mg and N surely reflected on increasing the biosynthesis of chlorophyll Gavrilov, (1985).These results go in line with those reported by Ahmed and El-Dawwey (1992) who worked on urea as fertilizer.

Table (4) Effect of foliar spraying with urea, boric acid and active dry yeast on leaf pigment content of "superior" grapevines during 2011 and 2012 seasons.

Characters / Treatment	Chlorophyll – a (mg/g fresh wt)		Chlorophyll – b (mg/g fresh wt)		Total Chlorophyll (mg/g fresh wt)		Carotenoids (mg/g fresh wt)	
	2011	2012	2011	2012	2011	2012	2011	2012
1- Control	0.79	0.85	0.30	0.36	1.09	1.21	0.85	0.53
2- Urea (N) at 0.5%	0.95	0.85	0.30	0.36	1.09	1.21	0.58	0.53
3- Urea N at 1.0%	0.99	1.10	0.39	0.41	1.38	1.51	0.66	0.63
4- Boric acid (B) at 0.1%	1.11	1.16	0.43	0.45	1.54	1.61	0.69	0.65
5- Boric acid (B) at 0.2%	1.23	1.26	0.46	0.50	1.69	1.76	0.71	0.69
6- Active dry yeast at 0.1%	1.38	1.39	0.53	0.56	1.91	1.95	0.79	0.76
7- Active dry yeast at 0.2%	1.41	1.43	0.56	0.61	1.97	2.04	0.81	0.79
8- Urea at 0.5 + Boric acid at 0.1% + yeast at 0.1%	1.45	1.46	0.59	0.65	2.04	2.11	0.90	0.88
9- Urea at 1.0% + Boric acid at 0.2% + yeast 0.2%	1.51	1.49	0.63	0.70	2.14	2.19	0.93	0.90
New L.S.D at 5%	0.55	0.43	0.05	0.06	0.63	0.66	0.33	0.32

4- Yield components:

Data presented in Table (5) show clearly that all treatments increased yield vine, number of berries/cluster and cluster weight than the control. Moreover, combined application of urea at 1.0% plus boric acid at 0.2% plus active dry yeast at 0.2% gave a more pronounced effect in yield/vine, number of berries/cluster and cluster weight.

The untreated vines produced the minimum values in this respect. The improving effect of yeast on yield might be attributed to its effect on increasing berry set percentage number of cluster/vine and cluster weight. Similar data was found by Akl*et al* (1997) and Mahmoud (1996) on Roomy Red grapevines Ahmed –Kameli*et al*., (2000) on Ruby seedless grapevines and Fawzi and Eman (2004) on Flame seedless grapevines.

Results also indicated that spraying urea 1.0% and boric acid 0.2% increasing number of cluster/vine, cluster weight and yield/vine. There results were true in both seasons.

The beneficial effect of urea on the yield was supported by many authors such as Ahmed *et al* (1989) and El-Moursy*et al* (1993) on Roomy Red grapevines.

Besides, the preferable influence of boron on the yield was reported by Hassan *et al.*, (2005) on apricot trees.

Table 5: Effect of foliar spraying with urea, boric acid and active dry yeast number of clusters/vine, cluster weight and yield/vine of "superior" grapevines during 2011 and 2012 seasons.

Characters / Treatments	No. of clusters/vine		Cluster weight (g)		Yield/ving (kg.)	
	2011	2012	2011	2012	2011	2012
1- Control	15.33	17.00	292.11	350.16	4.48	5.95
2- Urea (N) at 0.5%	16.18	17.11	333.68	391.12	5.39	6.69
3- Urea N at 1.0%	17.30	18.31	351.11	401.11	6.07	7.34
4- Boric acid (B) at 0.1%	15.10	17.10	341.03	388.11	5.15	6.64
5- Boric acid (B) at 0.2%	16.32	17.36	345.18	391.30	5.63	6.79
6- Active dry yeast at 0.1%	17.06	18.52	378.32	438.31	6.45	8.12
7- Active dry yeast at 0.2%	18.30	20.01	403.33	461.23	7.38	9.23
8- Urea at 0.5 + Boric acid at 0.1% + yeast at 0.1%	19.11	20.89	426.11	484.11	8.14	10.11
9- Urea at 1.0% + Boric acid at 0.2% + yeast 0.2%	20.33	21.30	453.20	511.33	9.21	10.89
New L.S.D at 5%	0.5	0.4	8.01	8.02	3.12	3.10

5- Physical properties of clusters:

Data presented in Table (6) show that all treatments increased cluster length, cluster index, number of berries per cluster and reaches weight than the control. Yet, yeast application alone or combined with urea and (boric acid) gave the heaviest values in both seasons. These results were true in both seasons. Moreover, combined application of urea 1.0% plus boric acid 0.2% plus 0.2% yeast gave a more pronounced effect in this respect.

These findings are in harmony with those obtained by Abdel-Hady (1995), reported that, the longest clusters were presented in Roomy Red vines sprayed four times with urea at 1.0% and boric acid at 0.2%. Also, Fawzi and Eman (2004) mentioned that, spraying with 0.1% yeast at three times application produced significant increased cluster length, number of berries per cluster and reaches weight.

Table 6: Effect of foliar spraying with urea, boric acid and active dry yeast on physical properties of clusters of "superior" grapevines during 2011 and 2012 seasons.

Characters / Treatment	Cluster length (cm)		No. of berries/cluster		Rachis weight (g)		Cluster index	
	2011	2012	2011	2012	2011	2012	2011	2012
1- Control	19.11	21.33	72.84	9.25	9.50	10.82	30.75	32.36
2- Urea(N) at 0.5%	23.16	24.01	80.64	97.13	10.32	11.36	32.28	34.43
3- Urea at (N) 1.0%	25.11	26.30	78.99	91.87	11.42	12.50	30.75	32.08
4- Boric acid (B) at 0.1%	20.12	22.13	84.15	91.94	11.99	13.21	28.44	29.38
5- Boric acid (B) at 0.2%	21.11	22.89	83.58	87.17	12.52	13.86	28.79	28.23
6- Active dry yeast at 0.1%	26.31	27.12	79.10	89.70	13.66	14.01	27.69	31.28
7- Active dry yeast at 0.2%	28.11	28.01	82.29	92.66	14.93	15.50	27.01	29.75
8- Urea at 0.5 + Boric acid at 0.1% + yeast at 0.1%	30.10	31.33	84.39	95.50	16.81	17.11	25.35	28.29
9- Urea at 1.0% + Boric acid at 0.2% + yeast 0.2%	32.33	33.63	88.83	98.82	17.03	18.23	26.21	28.05
New L.S.D at 5%	2.03	2.04	6.11	5.30	2.50	2.51	1.30	2.21

6- Physical properties of berries:

Results of various berry characteristics as affected by different studied treatments are presented in Table (7) for the two seasons 2011 and 2012. The results showed significant increase in berry weight, length, diameter and shape by using yeast either alone or combined with urea and boric acid. Meanwhile, the combined treatment of urea 1.0% plus boric acid at 0.2% at plus 0.2% yeast gave a significant increase than all other treatments during both seasons.

These results are in agreement with those revealed by Fawzi and Eman (2004) who reported that foliar spraying with alone or combined with 0.1% yeast and Fe 0.04, Zn 0.05 &Mn 0.05 game a highest values in this connection.

Table 7: Effect of foliar spraying with urea, boric acid and yeast on physical properties of berries of "superior" grapevines during 2011 and 2012 seasons.

Characters / Treatment	Berry weight (g)		Berry length (L) (cm)		Berry diameter (L) (cm)		Berry shape Index (L/D)	
	2011	2012	2011	2012	2011	2012	2011	2012
1- Control	3.88	3.76	1.51	1.58	1.43	1.48	1.06	1.06
2- Urea (N) at 0.5%	4.01	3.91	1.71	1.63	1.56	1.41	1.09	1.16
3- Urea N at 1.0%	4.30	4.23	1.75	1.78	1.63	1.56	1.07	1.14
4- Boric acid (B) at 0.1%	3.91	4.10	1.76	1.78	1.68	1.53	1.04	1.16
5- Boric acid (B) at 0.2%	3.98	4.33	1.80	1.85	1.75	1.63	1.02	1.13
6- Active dry yeast at 0.1%	4.61	4.73	1.86	1.89	1.66	1.50	1.12	1.26
7- Active dry yeast at 0.2%	4.72	4.81	1.91	1.90	1.83	1.73	1.04	1.09
8- Urea at 0.5 + Boric acid at 0.1% + yeast at 0.1%	4.85	4.89	1.99	2.03	1.96	1.82	1.02	1.12
9- Urea at 1.0% + Boric acid at 0.2% + yeast 0.2%	4.91	4.99	2.01	2.11	1.48	2.01	1.02	1.05
New L.S.D at 5%	0.21	023	0.05	0.04	0.03	0.03	0.04	0.02

7- Chemical Properties of berries:

Data concerning the effect of foliar spraying with urea and boric acid and active dry yeast on the percentage of total soluble solids, total acidity and T.S.S/acid ratio of superior grapes in 2011 and 2012 seasons are shown in Table (8). It is evident from the obtained data that single or combined sprays of yeast significantly enhanced the total soluble solids and T.S.S/acid ratio in the berries compared with the control treatment. Percentage of total acidity in the berries was significantly lowered as a result of spraying the vines with yeast in comparison with leaving the vines without spraying. On the other hand, single application of urea 0.5 or 1.0% increased the total acidity percentage in compared with the application of boron.

The enhancing effect of boric acid on quality of berries could be attributed to the effect of boron on acceleration the formation and translocation of carbohydrates (Mengel, 1984) and hence advancing fruit maturity.

The results dealing with the effect of urea on advancing quality of berries was reported by Vitosevic (1978) On Rkatsiteli grapes and Abdel-Hady (1995) on Roomy Red. The improvement in quality of berries due to spraying boron was supported by Makhija*et al* (1990) on perlette grapes with regard to the effect of yeast on T.S.S acidity and T.S.S ratio Fawzi and Eman (2004) found that spraying yeast significantly increased T.S.S and T.S.S/acid ratio and reduced the total acidity in berry juice of flame seedless grapevines.

Table 8: Effect of foliar spraying with urea, boric acid and active dry yeast on chemical properties of berries of "superior" grapevines during 2011 and 2012 seasons.

Characters / Treatments	TSS (%)		Acidity (%)		TSS/Acid ratio	
	2011	2012	2011	2012	2011	2012
1- Control	16.30	16.81	0.68	0.65	23.97	26.68
2- Urea (N) at 0.5%	16.81	16.93	0.69	0.66	24.36	25.65
3- Urea (N) at 1.0%	17.20	17.33	0.70	0.68	24.57	25.49
4- Boric acid (B) at 0.1%	18.70	19.11	0.54	0.51	34.62	37.47
5- Boric acid (B) at 0.2%	18.80	19.90	0.51	0.50	36.86	39.80
6- Active dry yeast at 0.1%	17.70	18.01	0.66	0.63	26.82	28.59
7- Active dry yeast at 0.2%	17.90	18.30	0.61	0.59	29.34	31.02
8- Urea at 0.5 + Boric acid at 0.1% + yeast at 0.1%	18.20	18.66	0.53	0.55	34.34	33.93
9- Urea at 1.0% + Boric acid B at 0.2% + yeast 0.2%	18.33	18.93	0.52	0.50	35.25	37.86
New L.S.D at 5%	1.33	1.31	0.03	0.02	0.6	0.5

References

Abada, M.A., 2002. Effect of yeast and some micronutrients on the yield and quality of Red Roomy grapevines. M.Sc. Thesis Fac. Agric., Minia Univ., Egypt.

Abdel-Hady, A.M., 1995. Response of Roomy Red grapevines to Foliar Sprays Of Urea and Boron. Ph. D. Thesis Fac. of Agric. Minia Univ. Egypt.

A.O.A.C, 1985. Official methods of analysis pp. 490-510, association of official analytical chemists.Washington, d.c.

Adriano, D.C., 1985. Trace elements in the terrestrial environment. Published by springer verlag, new york.

Ahmed, F.F. and G.M. El-Dawwey, 1992. What type of saline water could Red Roomy grapevine seedlings tolerate and at which concentration? 1- Growth and leaf chemical composition Dev., 14(1): 65-81.

Ahmed – Kamelia, I.A., A. Mostafaa and A.F.M. Mansour, 1997. Improving the efficiency of spraying different nutrients for red roomy grapevines (*vitisvinifera*l.) By using glycerol and active dry yeast, egypt. J. Hort. 24(1): 91-108.

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

Ahmed, F.F., M.A. Ragab, A.A. Gobara and A.E.M. Mansour, 1997. Efficiency of spying boron, zinc, parasium and sulphur as affected with application of urea for "ana" appletrees (malusdomestica l.) Egypt. J. Hort., 24(1): 75-90.

Ahmed, F.F., M.H. Rabie, E.A. Abdel-Latif, O. Osmana and K.G. Assay, 1989. Effect of foliar application of urea and potassium on cracking, shot terries and productivity of red roomy grapevines (*vitisvinifera* l.). Accepted for publication in agric, res. Rev., el-dokki, cairo.

Ahmed-Kamelia, I.A., F.M.A. Mostafa and A.A. El-Bolo ck, 2000. Effect of yeast application of bud burst, physical and chemical characteristics of grape berries in king ruby. Cultivar during growth stages. L-effect of applied yeast on bud burst, yield components and winter pruning wood weight. Assiut j. Agric. Sci., 31(4): 193-205.

Akl, A.M., F.F. Ahmed, F.M. E-Morsy and M.A. Ragab, 1997.The beneficial effects of biofertilizers on red roomy grapevines (vitisviniferon – l) 2- the effect on berry set, yield and quality of berries.Annals of agric, sci., moshtohor., 35(1): 497-502.

Darwish, O.H. and F.F. Ahmed, 1993. Growth aspects of red roomy vine seedlings as affected by nitrogen sources. J. Agric. Res., tanta, univ., 19(1).

Devlin, R.M. and F.H. Witham, 1983. Plant physiology. Published by reynolds book corporation, new york (chapter v).

El-Moursy, F.M., F.F. Ahmed and F.H. Abdel-Aziz, 1993. Benefits of spraying urea and boron for red roomy grapevines minia first conf.For hort. Crops.

Fawzi, M.I.F. and A. Eman, Abd El-Moneim, 2004. The effect of foliar application of some trace elements and active dry yeast on vegetative growth, yield, fruit quality and leaf chemical composition of flame seedless grapevines grown in calcareous soil conditions.

Gavrilov, T.K., 1985. Effect of microelements on photosynthesis productivity of grape vines. Hort. Abst., 55(4): 2532.

Haggage, M.N., A.A. Etman, S.M. El-Shazly and I.G. El-Sharkawy, 1996. Comparative studies and evaluation of fourteen grapes cultivars in egypt, bud fertilities, bud fertility coefficient, yield and fruit quality and the morphological characteristics alex. J. Agric. Res., 41(3): 275-291, egypt.

Hassan, H.S.A., E.A.M. Mostafa and Dorria M. Ahmed, 2005. Improving canino apricot trees productivity by foliar spray with boron, gab and active dry yeast. Arab univ. J. Agric. Sci., ain shams univ., cairo, 13(2): 471-480.

Hegab, M.Y., F.F. Ahmed and A.H. At., 1997. Influence of spraying active dry yeast on growth and productivity of valencia orange trees (citrus sinensis) first scientific conf., assiut, fac. Of agric.

Hifny, H.A., 1974. Physiology, production and drying of grapevines.Fac. Agric., al-azharuniv.

Mahmoud, Y.A., 1996. Studies on histophysiological effects of hydrogen cyanamide (dormex) and yeast application on bud fertility vegetative growth and yield of "roumired " grape cultivars ph. D. Thesis. Fac. Agric. Assiutuniv. Egypt.

Makhig'a, M., A. Chandra and R. Yamadgni, 1990. Note on physio-chemical characters of grape berries (cultivar perlette) as influenced by foliar application of chemicals. Hort. Abst., 60(5): 3262.

Mengel, K., 1984. Nutrition and metabolism of plants. Published by fisher verlage, stutgart and new york.

Moran, R., 1982. Formula for determination of chlorophylls pigment extracted with n-dimethyl-formanide. Plant phys., pp: 1376-1381.

Nijjor, G.S., 1985. Nutrition of fruit trees mrs.Usha raj kumar for kily any publishers new delhi, india, 206-234.

Nomier, S.A., 2000. Effect of some ga3, vitamins and active dry yeast treatments on vegetative growth, yield and fruit quality of Thompson seedless grapevines.Zagazig, j. Agric. Res., 7(5).

N.R.P., 1977. Nutrient Requirements ofDomestic Animals No.1 7th Rev. Ed., NationalAcademy of Sci., Washington, D.C.U.S.A.

Rama, R.S. and H.C. Sharma, 1975. Effect of boron on yield and quality of grapes (*vitisvinifera* l.) Indian j. Hort., 36: 275-277.

Snedecor, G.W. and W.G. Cochram, 1990. Statistical methods 7th ed. The iowa state. Univ. Press. Ames. Lowa.Usr. pp: 593.

Souriol, G.F., M.A. Meligi, K.M. Abd-alla and A.M. Mohsen, 1985. Grapevines and their production methods.Ist ed. Arabic house for publication and distribution, pp: 192.

Vitosevic, i., 1978. Effect of rastein on grape yield and quality. Hort. Abst., 47(7): 4556.
Wilde, A.A., R.B. Corey, J.G. Lyer and G.K. Viogt, 1985. Soil and plant analysis for tree culture. 3rd ed. Oxford ibh publishing co., new delhi., pp: 64-115.