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IMPROVING PRODUCTIVITY OF THOMPSON SEEDLESS GRAPEVINES BY APPLICATION OF SOME VITAMINS, HUMIC ACID AND FARMYARD MANURE EXTRACT

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ABSTRACT

Thompson seedless grapevines were treated four times with certain vitamins, humic acid, and farmyard manure extract in ٢٠١٠ and ٢٠١١ seasons, The tested vitamins namely B complex (٢٥٠ ppm B_1 & ١٥ ppm B_2 & ٢٠٠ ppm B_6 & ٢٥٠ ppm B_{12}), E at ٢٥٠ ppm, K at ١٠ ppm and A at ١٥ ppm were used singly or in all possible combinations beside humic acid at ١٠ ml/ vine/ year and farmyard manure extract at ١٠ %. Yield as well as physical and chemical characteristics of the berries of the treated vines were investigated.

Single and combined applications of the four vitamins as well as using humic acid and farmyard manure extract were responsible for improving yield quantitively and qualitatively in relative to the check treatment. Application of Efficacy of the tested vitamins in promoting yield and quality of the berries could be amanged in the following descending order: B complex, E, K and A. Humic acid was preferable than using farmyard manure extract in this connection.

For promoting yield quantitively and qualitatively of Thompson seedless grapevines, it is suggested to spray all vitamins namely B complex, E, K and A four times plus humic acid once at ١٠ ml/ vine/ year.

INTRODUCTION

Improving yield as well as physical and chemical characteristics of Thompson seedless grapes is considered an important target for grape growers. It could be achieved through using vitamins and organic manures. Vitamins participate in nutrient uptake, biosynthesis of proteins and carbohydrates and enhancing the natural hormones (Samiullah *et al*., ١٩٨٨). The use of humic substances and extract of organic manures would permit a reduction on the use of agrochemicals. They are responsible for controlling diseases as well as improving soil fertility, nutrient uptake, plant pigments and microbial activity (Tomasi *et al*., ٢٠٠١ and Loffredo *et al*., ٢٠٠٧).

Vitamins as antioxidants are essential for improving yield and quality of grapes in various grape cvs (Abada and Abd El- Hameed, ٢٠٠٩ and ٢٠١٠; Ahmed *et al*., ٢٠١١a; Bondok- Sawsan *et al*., ٢٠١١; El- Kady- Hanaa, ٢٠١١; El- Hanafy, ٢٠١١; Refaai, ٢٠١١; Uwakiem, ٢٠١١ and Mohamed- Ebtesam, ٢٠١٢). Organic and biofertilization are responsible for promoting yield and quality of the berries in different grapevine cvs (Abada, ٢٠٠٩; Abada *et al*., ٢٠١٠; Madian, ٢٠١٠; Abd El- Hameed and Ahmed ٢٠١٠; Abd El- Hameed *et al*., ٢٠١٠; Ahmed *et al*., ٢٠١١b and Abd El- Aziz, ٢٠١١).

The purpose of this study was examining the effect of various vitamins, humic acid and farmyard manure extract on fruiting of Thompson seedless grapevines.

MATERIALS AND METHODS

This experiment was carried out during ٢٠١٠ and ٢٠١١ seasons on ١٤٤ uniform in vigour ٢٠- years old head trained Thompson seedless grapevines grown at the experimental farm of Sids Agricultural Research Station, Bany Suef Governorate. The texture of the vineyard soil is clay well drained and with a water table not less than two meters deep. Soil analysis (Table ١) was done according to method of Chapman and Pratt (١٩٦٥). Winter pruning was conducted on the first week of January during the three seasons. Head pruning system was applied through leaving ٨٢ eyes (١٠ long fruiting spurs × seven eyes plus six replacement spurs × two eyes). All the selected

vines had the same vine load (٨٢ eyes). They planted at ٢.٠ × ٣.٠ meters apart. Surface irrigation system using Nile water was followed.

Table ١: Analysis of the tested soil:

Constituents	values
Particle size distribution:	
Sand %	: ٥.٢
Silt %	: ٢٣.٨
Clay %	: ٧١.٠
Texture	: clay
pH (١:٢.٥ extract)	: ٧.٧
EC (١: ٢.٥ extract) mmhos/ cm ٢٥° C	: ٠.٧٩
Total $CaCO_3$ %	: ١.٩٦
O.M. %	: ١.٧٢
Total N %	: ٠.٠٧
P ppm (Olsen)	: ٤.٢
K ppm (ammonium acetate)	: ٦٠٥.٠
Mg ppm	: ٦.٠
Available micronutrients (EDTA, ppm):	
Fe	: ٣.٨
Zn	: ٣.٠
Mn	: ٥.٣
Cu	: ١.٠

The selected vines (١٤٤ vines) received the usual horticultural practices that common used in the vineyard, in addition to the present treatment (antioxidants, humic acid and organic manure).

This experiment included two factors (A & B). The first factor (A) involved the following sixteen treatments from single and combined applications of the four vitamins (A, K, E & B):

a_1- Untreated vines (sprayed with water).

a_2- Spraying A vitamin at ١٥ ppm.

a_3- Spraying K vitamin at ١٠ ppm.

a_4- Spraying E vitamin at ٢٥٠ ppm.

a_5- Spraying B vitamins (٢٥٠ ppm B_1, ١٥ ppm B_2, ٢٠٠ ppm B_6 & ٢٥٠ ppm B_{12}).

a_6- Spraying A + K vitamins at the same previous conc.

$a_{٧}$- Spraying A + E vitamins at the same previous conc.
$a_{٨}$- Spraying A + B vitamins at the same previous conc.
$a_{٩}$- Spraying K + E vitamins at the same previous conc.
$a_{١٠}$- Spraying K + B vitamins at the same previous conc.
$a_{١١}$- Spraying E + B vitamins at the same previous conc.
$a_{١٢}$- Spraying A + K + E vitamins at the same previous conc.
$a_{١٣}$- Spraying A + K + B vitamins at the same previous conc.
$a_{١٤}$- Spraying K + E + B vitamins at the same previous conc.
$a_{١٥}$- Spraying A + E + B vitamins at the same previous conc.
$a_{١٦}$- Spraying A + K + E + B vitamins at the same previous conc.

While the second factor (B) consists of three treatments as follows:

$b_{١}$) Untreated vines
$b_{٢}$) Soil addition of humogreen (١٠ % humic acid) as a source of humic acid at ١٠ ml/ vine/ year.
$b_{٣}$) Spraying farmyard manure extract at ١٠ %.

Therefore, this study included ٤٨ treatments. Each treatment was replicated three times, one vine per each. All antioxidants (A, K, E & B vitamins) were sprayed four times at growth start (٢nd week of March), just before bloom (١st week of April), just after berry setting (١st week of May) and at one month later (١st week of June). Farmyard manure extract at ١٠ % was added four times at the same dates of spraying antioxidants.

Analysis of farmyard manure was done according to method of Chapman and Pratt (١٩٦٥) and the obtained data are shown in Table (٢).

Humogreen (١٠ % humic acid) as a source of humic acid was added once at ١٠ ml/ vine/ year via soil before growth start (last week of February). The four vitamins namely A, K and E (soluble in ethyl alcohol vitamins) and B (soluble in water vitamin) were used at the recommended concentrations as mentioned by Abada and Abd El-Hameed (٢٠٠٩) and Abd El- Kariem (٢٠٠٩).

Table ٢: Analysis of farmyard manure:

Characters	values
pH (١:٢.٥ extract)	: ٢.٩
O.M. %	: ٩.٠
Total N %	: ٠.٤٤
P % (Olsen)	: ٠.٥
K % (ammonium acetate)	: ١.٨
Available macronutrients (ppm)	
Fe	: ١٠٥
Mn	: ٩٠
Cu	: ١٥
Zn	: ١١٠

This experiment was set up in a complete randomized block design in split plot arrangement where each treatment was replicated three times, with one vine per each. The whole and subplots were the sixteen antioxidant treatments and the three humic acid and farmyard manure extract treatments, respectively.

Harvesting took place when the total soluble solids (TSS) acid ratio in the berries of the check treatment (vines reached the suitable N through % inorganic form) at least ٢٥: ١ (at the middle of July in the three seasons) according to Weaver,(١٩٧٦). The yield of each vine was recorded in terms of weight (in kg.), and then the average weight of cluster was recorded (g.)

Five clusters from each vine were taken at random for determination of berry weight, total soluble solids % and total acidity % (as g. tartaric acid/ ١٠٠ ml juice) according to A.O.A.C., (١٩٩٥).

All the obtained data were tabulated and statistically analyzed using New L.S.D at ٥ % for comparison among the investigated treatment means according to Mead *et al.*, (١٩٩٣).

RESULTS AND DISCUSSION

١- Yield and cluster weight:

It is clear from the data in Tables (٣ & ٤) that single or combined application of the four tested vitamins significantly improved yield and cluster weight in comparison to the check treatment. The promotion on yield and cluster weight was associated with spraying

vitamins B complex, E, K and A, in a descending order. Combined application of the tested vitamins was superior than using each vitamin alone spraying of all vitamins four times gave the best results.

Table ٣: Effect of some vitamins as antioxidant, humic acid, farmyard manure extract treatments on the yield per vine (kg.) of Thompson seedless grapevines during ٢٠١٠ and ٢٠١١ seasons.

Vitamin treatments (A)	٢٠١٠				٢٠١١			
	Humic acid and F.Y.M treatments (B)							
	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)
a_1 Untreated	٥.٠	٦.٠	٥.٨	٥.٦	٥.١	٦.٧	٥.٩	٥.٩
a_2 A vit.	٥.٢	٦.٣	٦.١	٥.٩	٥.٦	٧.٦	٦.٤	٦.٥
a_3 K vit.	٥.٦	٦.٣	٦.١	٦.٠	٥.٦	٧.٦	٦.٤	٦.٥
a_4 E vit.	٥.٦	٦.٤	٦.٥	٦.٢	٥.٧	٧.٧	٦.٥	٦.٦
a_5 B vit.	٥.٦	٦.٤	٦.٥	٦.٢	٥.٨	٧.٨	٦.٦	٦.٧
a_6 A + K vit.	٥.٨	٦.٥	٦.٧	٦.٣	٦.١	٧.٩	٧.٠	٧.٠
a_7 A + E vit.	٦.٢	٧.٠	٦.٧	٦.٦	٦.٣	٨.٤	٧.٤	٧.٤
a_8 A + B vit.	٦.٣	٧.١	٦.٧	٦.٧	٦.٣	٨.٤	٧.٥	٧.٤
a_9 K + E vit.	٦.٤	٧.٢	٦.٨	٦.٨	٦.٣	٨.٥	٧.٥	٧.٤
a_{10} K + B vit.	٦.٤	٧.٢	٧.٠	٦.٩	٦.٣	٨.٩	٧.٥	٧.٦
a_{11} E + B vit.	٦.٧	٧.٢	٧.٠	٧.٠	٦.٤	٨.٩	٧.٦	٧.٦
a_{12} A + K + E vit.	٧.٠	٧.٩	٧.٦	٧.٥	٧.٠	٩.٢	٧.٨	٨.٠
a_{13} A + K + B vit.	٧.١	٧.٩	٧.٦	٧.٥	٧.٠	٩.٣	٨.٣	٨.٢
a_{14} K + E + B vit.	٧.٢	٨.٠	٧.٨	٧.٧	٧.٥	١٠.٢	٨.٨	٨.٨
a_{15} A + E +B vit.	٧.١	٧.٩	٧.٧	٧.٦	٧.١	٩.٧	٨.٣	٨.٤
a_{16} A + K + E + B vit.	٧.٤	٨.١	٨.٠	٧.٩	٨.٤	١١.٢	٩.٤	٩.٧
Mean (B)	٦.٣	٧.١	٦.٩		٦.٤	٨.٦	٧.٤	
	A	B	AB		A	B	AB	
New L.S.D at ٥ %	٠.٤	٠.٦	٢.٤		٠.٤	٠.٧	٢.٨	

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Table ٤: Effect of some vitamins as antioxidant, humic acid, farmyard manure extract treatments on the average cluster weight (g.) of Thompson seedless grapevines during ٢٠١٠ and ٢٠١١ seasons.

Vitamin treatments (A)	٢٠١٠				٢٠١١			
	Humic acid and F.Y.M treatments (B)							
	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)
a_1 Untreated	٢٨٠.٠	٣٠٢.٠	٢٩١.٠	٢٩١.٠	٢٨٢.٠	٣٠٦.٠	٢٩٤.٠	٢٩٤.٠
a_2 A vit.	٢٩١.٠	٣١٦.٠	٣٠٥.٠	٣٠٤.٠	٢٩٣.٠	٣١٥.٠	٣٠٣.٠	٣٠٣.٧
a_3 K vit.	٢٩٣.٠	٣١٧.٠	٣٠٦.٠	٣٠٥.٣	٢٩٥.٠	٣١٧.٠	٣٠٥.٠	٣٠٥.٧
a_4 E vit.	٢٩٤.٠	٣١٨.٠	٣٠٨.٠	٣٠٦.٧	٢٩٩.٠	٣٢١.٠	٣٠٩.٠	٣٠٩.٧
a_5 B vit.	٢٩٥.٠	٣١٨.٠	٣١٠.٠	٣٠٧.٧	٣٠٦.٠	٣٢٧.٠	٣١٥.٠	٣١٦.٠
a_6 A + K vit.	٣٠٧.٠	٣٢٦.٠	٣١٧.٠	٣١٦.٧	٣٠٧.٠	٣٣٠.٠	٣١٧.٠	٣١٨.٠
a_7 A + E vit.	٣١١.٠	٣٣٥.٠	٣٢٠.٠	٣٢٢.٠	٣١٣.٠	٣٣٦.٠	٣٢٣.٠	٣٢٤.٠
a_8 A + B vit.	٣١٤.٠	٣٣٦.٠	٣٢١.٠	٣٢٣.٧	٣١٥.٠	٣٣٧.٠	٣٢٥.٠	٣٢٥.٧
a_9 K + E vit.	٣١٨.٠	٣٤١.٠	٣٢٥.٠	٣٢٨.٠	٣١٦.٠	٣٤٠.٠	٣٢٧.٠	٣٢٧.٧
a_{10} K + B vit.	٣٢٠.٠	٣٤٢.٠	٣٣١.٠	٣٣١.٠	٣١٧.٠	٣٤١.٠	٣٢٨.٠	٣٢٨.٧
a_{11} E + B vit.	٣٣٣.٠	٣٤٥.٠	٣٣٣.٠	٣٣٧.٠	٣٢٠.٠	٣٤٤.٠	٣٣٠.٠	٣٣١.٣
a_{12} A + K + E vit.	٣٥٠.٠	٣٧٤.٠	٣٦٢.٠	٣٦٢.٠	٣٣١.٠	٣٥٣.٠	٣٤١.٠	٣٤١.٧
a_{13} A + K + B vit.	٣٥٦.٠	٣٧٦.٠	٣٦٤.٠	٣٦٥.٣	٣٣٣.٠	٣٥٧.٠	٣٤٤.٠	٣٤٤.٧
a_{14} K + E + B vit.	٣٥٩.٠	٣٨١.٠	٣٧٢.٠	٣٧٠.٧	٣٤١.٠	٣٦٣.٠	٣٥١.٠	٣٥١.٧
a_{15} A + E +B vit.	٣٥٧.٠	٣٧٧.٠	٣٦٩.٠	٣٦٧.٧	٣٣٦.٠	٣٥٨.٠	٣٤٦.٠	٣٤٦.٧
a_{16} A + K + E + B vit.	٣٦٨.٠	٣٩٢.٠	٣٨١.٠	٣٨٠.٣	٣٥١.٠	٣٧٣.٠	٣٦١.٠	٣٦١.٧
Mean (B)	٣٢١.٦	٣٤٣.٥	٣٣٢.٢		٣١٥.٩	٣٣٨.٦	٣٢٦.٢	
	A	B	AB		A	B	AB	
New L.S.D at ٥ %	١٠.١	٩.٢	٣٦.٠		٩.٠	٨.٠	٢٤.٠	

Application of humic acid at ١٠ ml/ vine/ year or farmyard manure extract at ١٠ % significantly improved the yield and cluster weight comparing with control treatment. Soil application of humic acid was superior than spraying farmyard manure extract in this connection.

Spraying the four vitamins four times besides soil application of humic acid gave the best results with regard to yield and cluster weight. Under such promised treatment yield per vine reached ٨.٢ and ١١.٢ kg comparing with ٥.٠ and ٥.١ kg produced by the untreated

vines during both seasons, respectively. Percentage of increase of the yield due to application of the promised treatment reached ٦٤.٠ and ١١٩.٦ % over the check treatment during both seasons, respectively. These results were similar during ٢٠١٠ and ٢٠١١ seasons.

The effect of vitamins and organic fertilizers on stimulating soil fertility, nutritional status of the vines and vigour (Samiullah *et al*., ١٩٩٨٨ and Tomasi *et al*., ٢٠٠١) positively reflected on improving the yield.

These results are in approval with those obtained by Abada and Abd El- Hameed (٢٠٠٩); Abd El- Kariem (٢٠٠٩); Ahmed *et al*., (٢٠١١a) and Bondok- Sawsan *et al*., (٢٠١١) who worked on vitamins as well as Abada (٢٠٠٩); Abd El- aziz (٢٠١١) and Mohamed-Ebtesam (٢٠١٢) who worked on organic fertilization.

٢- Quality of the berries:

Data in Tables (٥ & ٦ & ٧) obviously revealed that quality of the berries was significantly improved with using the four vitamins (B complex, E, K and A) either singly or in combinations rather non-application. This promotion on quality was appeared in terms of increasing berry weight and total soluble solids % and reducing total acidity %. The promotion on quality of the berries was associated was using vitamins A, K, E and B complex, in ascending order. Treating the vines four times with the four vitamins gave the best results with regard to quality of the grapes.

Humic acid application surpassed the application of farmyard manure extract in promoting quality of the berries. Also, using both organic manures significantly enhanced quality in relative to the control treatment.

Combined application of the four vitamins four times plus humic acid at ١٠ ml/ vine/ year gave the best results with regard to physical and chemical characteristics of Thompson seedless grapes. These results were similar during the two seasons.

The positive effect of vitamins and organic fertilization on biosynthesis of carbohydrates and stimulation of cell division could result in enhancing fruit quality (Samiullah *et al*., ١٩٨٨ and Tomasi *et al*., ٢٠٠١).

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Table ٥: Effect of some vitamins as antioxidant, humic acid, farmyard manure extract treatments on the average berry weight (g.) of Thompson seedless grapevines during ٢٠١٠ and ٢٠١١ seasons.

Vitamin treatments (A)	٢٠١٠				٢٠١١			
	Humic acid and F.Y.M treatments (B)							
	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)
a_1 Untreated	١.٥١	١.٥٩	١.٥٦	١.٥٥	١.٥٣	١.٦٢	١.٥٩	١.٥٨
a_2 A vit.	١.٥٥	١.٦٦	١.٦١	١.٦٠	١.٥٧	١.٦٧	١.٦٤	١.٦٢
a_3 K vit.	١.٥٦	١.٦٦	١.٦١	١.٦١	١.٥٨	١.٦٧	١.٦٤	١.٦٣
a_4 E vit.	١.٥٨	١.٦٧	١.٦٤	١.٦٣	١.٥٩	١.٧٠	١.٦٧	١.٦٥
a_5 B vit.	١.٥٩	١.٦٨	١.٦٥	١.٦٤	١.٦١	١.٧٢	١.٦٩	١.٦٧
a_6 A + K vit.	١.٦٣	١.٧٣	١.٧٠	١.٦٨	١.٦٥	١.٧٦	١.٧٣	١.٧١
a_7 A + E vit.	١.٦٤	١.٧٤	١.٧١	١.٦٩	١.٦٦	١.٧٧	١.٧٤	١.٧٢
a_8 A + B vit.	١.٦٥	١.٧٦	١.٧٢	١.٧١	١.٦٧	١.٨٠	١.٧٦	١.٧٤
a_9 K + E vit.	١.٦٦	١.٧٧	١.٧٢	١.٧١	١.٦٨	١.٨١	١.٧٦	١.٧٥
a_{10} K + B vit.	١.٦٩	١.٧٨	١.٧٣	١.٧٣	١.٧١	١.٨٢	١.٧٧	١.٧٦
a_{11} E + B vit.	١.٧١	١.٧٩	١.٧٥	١.٧٥	١.٧٣	١.٨٥	١.٧٨	١.٧٨
a_{12} A + K + E vit.	١.٧٢	١.٨٠	١.٧٦	١.٧٦	١.٧٤	١.٨٨	١.٨٠	١.٨٠
a_{13} A + K + B vit.	١.٧٣	١.٨٤	١.٧٩	١.٧٨	١.٧٥	١.٨٩	١.٨٤	١.٨٢
a_{14} K + E + B vit.	١.٧٧	١.٨٩	١.٨٤	١.٨٣	١.٧٨	١.٩٥	١.٩٠	١.٨٧
a_{15} A + E +B vit.	١.٧٥	١.٨٧	١.٨١	١.٨١	١.٧٦	١.٩١	١.٨٧	١.٨٤
a_{16} A + K + E + B vit.	١.٨١	١.٩٥	١.٨٦	١.٨٧	١.٨٢	٢.٠٣	١.٩٥	١.٩٣
Mean (B)	١.٦٥	١.٧٦	١.٧		١.٦٧	١.٨٠	١.٧٥	
	A	B	AB		A	B	AB	
New L.S.D at ٥ %	٠.٠٢	٠.٠٢	٠.٠٨		٠.٠٢	٠.٠٢	٠.٠٨	

Table ٦: Effect of some vitamins as antioxidant, humic acid, farmyard manure extract treatments on the percentage of total soluble solids in the fruits of Thompson seedless grapevines during ٢٠١٠ and ٢٠١١ seasons.

Vitamin treatments (A)	٢٠١٠				٢٠١١			
	Humic acid and F.Y.M treatments (B)							
	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)	b_1 untreated	b_2 Humic	b_3 F.Y.M	Mean (A)
a_1 Untreated	١٧.٠	١٧.٧	١٧.٣	١٧.٣	١٧.١	١٧.٩	١٧.٥	١٧.٥
a_2 A vit.	١٧.٢	١٨.٠	١٧.٦	١٧.٦	١٧.٢	١٨.٢	١٧.٨	١٧.٧
a_3 K vit.	١٧.٣	١٨.٣	١٧.٩	١٧.٨	١٧.٤	١٨.٥	١٨.١	١٨.٠
a_4 E vit.	١٧.٣	١٨.٤	١٨.٠	١٧.٩	١٧.٤	١٨.٦	١٨.٢	١٨.٠
a_5 B vit.	١٧.٥	١٨.٦	١٨.٢	١٨.١	١٧.٦	١٨.٨	١٨.٣	١٨.٢
a_6 A + K vit.	١٧.٨	١٩.١	١٨.٨	١٨.٥	١٧.٩	١٩.٣	١٨.٩	١٨.٧
a_7 A + E vit.	١٨.٠	١٩.٢	١٨.٨	١٨.٦	١٨.٠	١٩.٤	١٨.٩	١٨.٧
a_8 A + B vit.	١٨.٠	١٩.٣	١٨.٩	١٨.٧	١٨.٠	١٩.٥	١٩.٠	١٨.٨
a_9 K + E vit.	١٨.٠	١٩.٤	١٩.٠	١٨.٨	١٨.٠	١٩.٦	١٩.٠	١٨.٨
a_{10} K + B vit.	١٨.٢	١٩.٦	١٩.٢	١٩.٠	١٨.٣	١٩.٧	١٩.٣	١٩.١
a_{11} E + B vit.	١٨.٢	١٩.٧	١٩.٤	١٩.١	١٨.٣	١٩.٩	١٩.٥	١٩.٢
a_{12} A + K + E vit.	١٨.٥	٢٠.٣	١٩.٨	١٩.٥	١٨.٥	٢٠.٤	١٩.٩	١٩.٦
a_{13} A + K + B vit.	١٨.٧	٢٠.٥	٢٠.٠	١٩.٧	١٨.٧	٢٠.٦	٢٠.٠	١٩.٧
a_{14} K + E + B vit.	١٩.٢	٢١.٠	٢٠.٥	٢٠.٢	١٩.٢	٢١.٠	٢٠.٦	٢٠.٢
a_{15} A + E +B vit.	١٩.٠	٢٠.٧	٢٠.٢	١٩.٩	١٩.٠	٢٠.٨	٢٠.٣	٢٠.٠
a_{16} A + K + E + B vit.	١٩.٤	٢١.٧	٢٠.٨	٢٠.٦	١٩.٥	٢١.٨	٢٠.٩	٢٠.٧
Mean (B)	١٨.٠	١٩.٤	١٩.٠		١٨.١	١٩.٦	١٩.١	
	A	B	AB		A	B	AB	
New L.S.D at ٥ %	٠.٠٢	٠.٠٢	٠.٠٨		٠.٠٢	٠.٠٢	٠.٠٨	

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Table ٧: Effect of some vitamins as antioxidant, humic acid, farmyard manure extract treatments on the percentage of total acidity in the grapes of Thompson seedless grapevines during ٢٠١٠ and ٢٠١١ seasons.

Vitamin treatments (A)	٢٠١٠				٢٠١١			
	Humic acid and F.Y.M treatments (B)							
	b١ untreated	b٢ Humic	b٣ F.Y.M	Mean (A)	b١ untreated	b٢ Humic	b٣ F.Y.M	Mean (A)
a١ Untreated	٠.٥٥٩	٠.٥٢٥	٠.٥٤٠	٠.٥٤١	٠.٥٥٥	٠.٥١١	٠.٥٢١	٠.٥٢٩
a٢ A vit.	٠.٥٤٤	٠.٥١٥	٠.٥٣٠	٠.٥٣٠	٠.٥٤٠	٠.٥٠٠	٠.٥١١	٠.٥١٧
a٣ K vit.	٠.٥٢٩	٠.٥٠٠	٠.٥١٤	٠.٥١٤	٠.٥٢٥	٠.٤٨٦	٠.٤٩٧	٠.٥٠٣
a٤ E vit.	٠.٥١٥	٠.٤٨٥	٠.٥٠٠	٠.٥٠٠	٠.٥١١	٠.٤٦٩	٠.٤٨٠	٠.٤٨٧
a٥ B vit.	٠.٥٠١	٠.٤٧١	٠.٤٨٥	٠.٤٨٦	٠.٤٩٧	٠.٤٥٥	٠.٤٦٦	٠.٤٧٣
a٦ A + K vit.	٠.٤٨١	٠.٤٥٠	٠.٤٦٥	٠.٤٦٥	٠.٤٧٧	٠.٤٣٣	٠.٤٤٦	٠.٤٥٢
a٧ A + E vit.	٠.٤٧٧	٠.٤٤٧	٠.٤٦١	٠.٤٦٢	٠.٤٧٣	٠.٤٣٠	٠.٤٤٣	٠.٤٤٩
a٨ A + B vit.	٠.٤٧١	٠.٤٤٥	٠.٤٦٠	٠.٤٥٩	٠.٤٦٧	٠.٤٢٨	٠.٤٤١	٠.٤٤٥
a٩ K + E vit.	٠.٤٦٩	٠.٤٤٢	٠.٤٥٩	٠.٤٥٧	٠.٤٦٥	٠.٤٢٥	٠.٤٣٧	٠.٤٤٢
a١٠ K + B vit.	٠.٤٦٤	٠.٤٤٠	٠.٤٥٥	٠.٤٥٣	٠.٤٦٠	٠.٤٢٣	٠.٤٣٦	٠.٤٤٠
a١١ E + B vit.	٠.٤٦٢	٠.٤٣٥	٠.٤٥٠	٠.٤٤٩	٠.٤٥٨	٠.٤٢٠	٠.٤٣١	٠.٤٣٦
a١٢ A + K + E vit.	٠.٤٤٠	٠.٤٠٠	٠.٤١٥	٠.٤١٨	٠.٤٣٥	٠.٤٠٥	٠.٤١٦	٠.٤١٩
a١٣ A + K + B vit.	٠.٤٣	٠.٣٨	٠.٤١	٠.٤١	٠.٤٣	٠.٣٧	٠.٣٨	٠.٣٩

	٧	٩	٢	٣	٣	١	٥	٦
$a_{١٤}$ K + E + B vit.	٠.٤٣٠	٠.٣٨٢	٠.٤٠٥	٠.٤٠٦	٠.٤٢٦	٠.٣٦٦	٠.٣٧٨	٠.٣٩٠
$a_{١٥}$ A + E +B vit.	٠.٤٣٥	٠.٣٨٥	٠.٤١٠	٠.٤١٠	٠.٤٣١	٠.٣٦٩	٠.٣٨١	٠.٣٩٤
$a_{١٦}$ A + K + E + B vit.	٠.٤١٥	٠.٣٦٠	٠.٣٨٠	٠.٣٨٥	٠.٤١١	٠.٣٤١	٠.٣٥٥	٠.٣٦٩
Mean (B)	٠.٤٧٦	٠.٤٤١	٠.٤٥٨		٠.٤٧٢	٠.٤٢٧	٠.٤٣٩	
	A	B	AB	A	B	AB		
New L.S.D at ٥ %	٠.٠١٥	٠.٠١٢	٠.٠٤٨	٠.٠١٤	٠.٠١١	٠.٠٤٤		

These results are in conformity with those obtained by Bondok-Sawsan *et al.*, (٢٠١١) and El- Kady- Hanaa (٢٠١١) with regard to vitamins and Madian (٢٠١٠) and Ahmed *et al.*, (٢٠١١b) with connection to organic fertilization.

As a conclusion, enhancing yield and quality of Thompson seedless grapes can be obtained through spraying the vines four times with vitamins B complex, E, K and A plus soil addition of humic acid at ١٠ ml/ vine/ year.

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تحسين إنتاجية كرمات العنب الطومسون سيدلس عن طريق استخدام بعض الفيتامينات حامض الهيوميك ومستخلص السماد البلدي

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خلال موسمي ٢٠١٠، ٢٠١١ تم معاملة كرمات العنب الطومسون سيدلس أربعة مرات بأربعة فيتامينات هي ب المركب (٢٥٠ جزء في المليون ب١، ١٥ جزء في المليون ب٢، ٢٠٠ جزء في المليون ب٦، ٢٥٠ جزء في المليون)، فيتامين هـ بتركيز ٢٥٠ جزء في المليون، فيتامين ك بتركيز ١٠ جزء في المليون وفيتامين أ بتركيز ١٥ جزء في المليون ب١٢ إما بصورة فردية أو بجميع التوليفات المختلفة بالإضافة الي حامض الهيوميك بمعدل ١٠ مل للكرمة في السنة ومستخلص السماد البلدي بتركيز ١٠ %. ولقد تم دراسة تأثير معاملات الفيتامينات والأسمدة العضوية علي المحصول وكذلك الخصائص الطبيعية والكيميائية للحبات.

أدي الاستخدام الفردي والمشترك للأربعة فيتامينات وكذلك حامض الهيوميك ومستخلص السماد البلدي لحدوث تحسن في المحصول كما ونوعا وذلك بالمقارنة بمعاملة الكونترول. وكان استخدام الفيتامينات ب المركب ، هـ ، ك، أ مرتبة ترتيبا تنازليا فعالا جدا في تحسين كمية المحصول وخصائص الجودة للحبات ولقد تفوق استخدام حامض الهيوميك عن استخدام مستخلص السماد البلدي في هذا الصدد.

لأجل تحسين المحصول كما ونوعا للعنب الطومسون سيدلس فإنه يقترح رش الكرمات بالأربعة فيتامينات (ب المركب، هـ، ك، أ) أربعة مرات بالإضافة الي استخدام حامض الهيوميك بمعدل ١٠ مل/ الكرمة/ السنة مرة واحدة.