

Effect of Some Plant Oil and Amino Acid Treatments on Berries Colouration and Productivity of Flame Seedless Grapevines

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Abstract: This study was carried out during 2016 and 2017 seasons to examine the effect of single and combined applications of four oils namely sesame seed, castor, sour almond and coconut each at 5 % and two amino acids namely methionine and tryptophan each at 0.1 % on some vegetative growth aspects, vine nutritional status, berry setting %, yield, berries colouration % and berries quality of Flame seedless grapevines. They were sprayed three times at growth start, just after berry setting and at one month later. Single and combined applications of the four plant oils (sesame seed, castor, sour almond and coconut) each at 5 % and the two amino acids (methionine and tryptophan) each at 0.1 % caused a positive stimulation on all growth aspects, vine nutritional status, yield, berries colouration % and quality of the berries over the control treatment. The best material in this respect was sesame seed oil followed by coconut oil and castor oil ranked the last position in this respect. Using plant oils was superior than using amino acids in this respect. The best results with regard to berries colouration %, yield and both physical and chemical characteristics of the berries were observed with treating Flame seedless grapevines three times with a mixture of sesame seed oil at 5 % plus tryptophan and methionine each at 0.1%.

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Keywords: Flame seedless grapevines, oils of sesame seed, castor, sour almond, coconut, methionine, tryptophan, growth, yield, fruit quality.

1. Introduction

Recently, pomologists tried to solve all problems facing grape production by using unconventional methods responsible for protecting our environment from pollution and at the same enhancing sustainable agriculture concept.

However, the use of natural products is horticultural practice instead of other synthetic chemical products is becoming a main target for many fruit crop producers, where, the world markets has been growing rapidly in recent years for organic fruit production (**Dimitri and Oberholzer, 2006**).

Recently, plant extracts are used for improving production and storability of grapes instead of using chemicals. The change for using plant extract against chemicals was performed because pathogens resistance to the fungicides has developed as well as for protecting our environment from pollution. The higher own content of these plant extracts from plant pigments, phenolic compounds and essential oils seem to have synergistic effects on the yield of grapevines (**Kirtikare and Basu, 1984; Haggerty, 1999; Maia et al., 2014 and Dhekney, 2016**).

Amino acids with their antioxidative properties play an important role in plant defense against oxidative stress induced by unfavourable conditions. Application of amino acids was accompanied with enhancing proteins biosynthesis as well as protecting plant cells from senescence and death, preventing the free radicals from oxidation of lipids the components

of plasma membrane which is accompanied with the loss of permeability and controlling the incidence of disorders. They are responsible for stimulating the biosynthesis of natural hormones like, IAA, ethylene, cytokinins and GA₃, cell division, organic foods, enzymes as well as DNA and RNA. These positive effects surely reflected on producing healthy trees (**Davis, 1982**).

Amino acids as organic nitrogenous compounds are the building blocks in the synthesis of proteins, which are formed by a process in which ribosomes catalyze the polymerization of amino acids. Several hypothesis have been proposed to explain the role of amino acids in plant. Available evidence suggests several alternative routes of IAA and ethylene synthesis in plants, starting from amino acids. In this respect, the regulatory effect of certain amino acids like phenylalanine and ornithine in plant development appeared through their influence on the biosynthesis of gibberellins. (**Hashimoto and Yamada, 1994**).

Castor oil is a triglycerides of fatty acids which occurs in the seeds of the castor plant. It contains eight fatty acids namely 89.5 % Ricinoleic acid, 4.2 % Linoleic acid, 3.0 % Oleic acid, 1.0 % Stearic acid, 1.0 % Palmitic acid, 0.7 % Dihydroxystearic acid, 0.3 % Linolenic acid and 0.3 % eicosanoic acid (**Gunstone, 2011**). The major component of crude oils is 95 % triacylglycerol, while the minor components comprise free acids, monoacylglycerol;

dacylglycerols, phospholipids. The major fatty acids are lauric at 48 % and myristic at 18 %. Coconut oil contains about 92.9 % saturated fatty acids. This makes the crude oil very stable against oxidation (**Gunstone, 2011**). Sesame seed oil belongs to the oleic-linoleic acid group. It has less than 20 % saturated fatty acids mainly palmitic and stearic acids oleic acid and linoleic acid constitute more than 80 % of the total fatty acids in sesame seed oil. It contains about thirteen fatty acids namely.

Myristic, Palmitic, Palmitoleic, Heptadeceroic, Stearic, Oleic, Linoleic, Linolenic, Arachidic, Gadoleic, Eicosenoic, Behenic and Lgnoonic and Sweet almond oil contains proteins, vitamins E, Calcium as well as fatty acids namely palmitic acid, palmitoleic acid, stearic acid, oleic acid, inoleic acid and linolenic acid according to (**Gunstone, 2011**). Oils of castor, coconut, sesame seed and almond had higher amounts of amino acids, vitamins, K, E, D, A, pigments and nutrients Ca, Fe, Mg, P, K, Na and Zn. The occurrence of these components on the four oils surely reflected on preventing reactive oxygen species (ROS) and enhancing cell division, photosynthesis and the biosynthesis of most organic foods (**Marschner, 1995**).

Using plant extracts was found by many authors to stimulate growth, vine nutritional status, yield and berries quality in different grapevine cvs (**Shaddad, 2010; Sabry-Gehan et al., 2011; Abdelaal and Aly, 2013; Gad El-Kareem and Abd El-Rahman, 2013; Hammouda et al., 2014; Osman, 2014; Uwakiem, 2014; Ahmed et al., 2014; Abada, 2014; Samra, 2015; Rizkalla, 2016; Ahmed et al., 2016 and Khalil, 2016**).

The findings of **Ahmed and Abd El-Hameed, (2003); Amin, (2007); Ahmed et al., (2007); Seleem-Basma and Abd El-Hameed, (2008); Sayed-Heba, (2010); Ahmed et al., (2011); Ahmed, (2016) and Mohamed, (2017)** emphasized the beneficial effects of using plant extracts on growth and fruiting of different grapevine cvs.

Application of amino acids has an outstanding effect on growth and fruiting of different grapevine cvs (**Ahmed and Abd El-Hameed, 2003; Amin, 2007; Ahmed et al., 2007; Seleem-Basma and Abd El-Hameed, 2008; Sayed-Heba, 2010; Ahmed et al., 2011; Mohamed, 2014; Ahmed, 2016 and Mohamed, 2017**).

The objective of this study was elucidating the effect of single and combined applications of some plant extracts namely oils of sesame seed, castor, sour almond and coconut and two amino acids namely methionine and tryptophan on growth, vine nutritional status, berry setting %, yield, berries colouration % and berries quality of Flame seedless grapevines.

2. Materials and Methods

This study was carried out during the successive seasons of 2016 and 2017 on sixty- six 7-year old uniform in vigour Flame seedless grapevines grown on own roots in a private vineyard located at West Esna district, Luxor Governorate where the soil texture is sandy and well drained and water table is not less than two meters deep. Vines are spaced at 2 x 3 meters apart, 2 (between vine) X 3 meters (between rows) (700 vines per feddan). The selected vines (66 vines) were chosen as uniform in vigour as possible and devoted to achieve this study. The chosen vines were pruned during the first week of January in both seasons. Spur pruning system using cordon trellis supporting system was followed. Vine load for all the selected vines was adjusted to 72 vines (on the basis of 20 fruiting spurs x three eyes plus six replacement spurs x two eyes). Drip irrigation system was followed using well water (EC was 515 ppm).

Mechanical, physical and chemical analysis of the tested soil at 0.0 – 90.0 cm depth were carried out at the start of the experiment according to the procedures of **Black et al., (1965)**.

Table (1): Analysis of the tested soil

Constituents	Values
Particle size distribution	
Sand %	77.1
Slit %	11.9
Clay %	11.0
Texture %	Sandy
pH (1:2.5 extract)	7.5
E.C. (1: 2.5 extract) ppm	799.0
O.M. %	0.4
CaCO ₃ %	2.89
Total N%	0.009
Available P (Olsen method, ppm)	1.1
Available K (ammonium acetate, ppm)	20.1
EDTA extractable micronutrients (ppm):	
Fe	0.5
Mn	0.9
Zn	1.0
Cu	0.21

Except those dealing with the present treatments (application of plant extracts and amino acids), all the selected vines (66 vines) received the usual horticultural practices which are commonly used in the vineyard.

This experiment included the following eleven treatments from single and combined applications of

the four plant oils and amino acids can be listed as follows:

1. Control (water spraying vines).
2. Spraying Sesame seed oil at 5 %.
3. Spraying Castor oil at 5 %.
4. Spraying sour almond oil at 5 %.
5. Spraying Coconut oil at 5 %.
6. Spraying Methionine at 0.1 %.
7. Spraying Tryptophan at 0.1 %.
8. Spraying Sesame seed oil at 5 % + Methionine at 0.1 % + Tryptophan at 0.1 %.
9. Spraying Castor oil at 5 % + Methionine at 0.1 % + Tryptophan at 0.1 %.
10. Spraying sour almond oil at 5 % + Methionine at 0.1 % + Tryptophan at 0.1 %.
11. Spraying Coconut oil at 5 % + Methionine at 0.1 % + Tryptophan at 0.1 %.

Therefore, this study involved eleven treatments. Each treatment was replicated three times, two vines per each. The total number of selected vines for achieving of this study was 66 uniform in vigour vines. All plant oils and amino acids were sprayed three times during the two seasons at growth start when the mean lengths of main shoot reached at least 30cm (mid of March), just after berry setting (3rd week of April) and at one month later (3rd of May). Tritan B as a wetting agent was applied at 0.05% to all plant oils and amino acid before spray. Control vines were sprayed with tap water containing Tritan B at 0.05%. Spraying was done till runoff (1-2 L vine solution according to date of spraying).

The present experiment was set up in a randomized complete block design (RCBD with three replicates each consisted from two Flame seedless grapevines.

The following, growth characteristics, leaf chemical composition, fruit setting %, yield and both physical and chemical berries characteristics were recorded during the two seasons.

1. Vegetative growth characteristics namely the leaf area using the following equation outlined by **Ahmed and Morsy (1999)**.

Leaf area (cm)² = 0.45 (0.79 x diameter 2) + 17.77.

2. Leaf pigment namely chlorophylls a & b and total carotenoids and total chlorophylls as (mg / g F.W). (**Von Wettstein, 1957**).

3. Percentages of N, P, K and Mg were measured (**Summer, 1985; Wilde et al 1985 and Baloet et al, 1988**).

4. Berry setting %:

It was calculated by caging five clusters per each vine in perforated white paper bags before bloom. After completed setting of all berries in each cluster, the bags were removed for counting:

- a) The number of attached barriers.

- b) The number of dropped berries.

- c) The number of dropped flowers.

d) The number of total flowers (a + b + c) per cluster. Berry set % was estimated by dividing number of attached berries by total number of flowers per cluster and multiplying the product by 100.

5. Yield and berries quality:

- 5.1. Yield:

Harvesting took place when T.S.S./acid in the berries of the check treatment reached at least 22:24 (at the 2nd week of June in both seasons) (according to **Weaver, 1976**). The yield of each vine was recorded in terms of weight (in kg.) and number of clusters per vine, then the average weight of cluster (g) was recorded.

- 5.2. Berries quality:

Five clusters from each vine were taken at random for determination of the following physical and chemical characteristics namely:

- 1- Berries colouration %, berry weight (g) and dimensions (longitudinal and equatorial in cm).

- 2- Percentage of total soluble solids and Percentage of total sugars (**Lane and Eynon, 1965 and A.O.A.C, 2000**).

- 3- Percentage of total acidity (as g tartaric acid / 100 ml juice) (**A.O.A.C, 2000**).

- 4- The ratio between T.S.S. and acid.

- 5- Total anthocyanins (mg/100 ml juice) using Ethyl alcohol and HCL at 85:15 and the optical density was determined using spectrophotometer at wave length of 532 (**Fulcki and Francis, 1968**).

All the obtained data were tabulated and statistically analyzed using New L.S.D. at 5% for made all comparisons among the eleven investigated treatment means according to (**Snedecor and Cochran, 1967 and Mead et al., 1993**).

3. Results and Discussion

1. Leaf area:

It is clear from the data in Table (2) that treating the vines with four plant oils (sesame seed, castor, sour almond and coconut) each at 5 % and the two amino acids (methionine and tryptophan) each at 0.1 % significantly stimulated the leaf area relative to the control treatment. Application of any one of the four oil oils (sesame seed, castor, sour almond and coconut) each at 5 % was significantly preferable than using any one of the two amino acids (methionine and tryptophan) each at 0.1 % in stimulating such growth trait. Using any one of the four plant oils with the two amino acids was significantly superior than using any one of the investigated plant oils alone in this respect. Using methionine significantly stimulated the leaf area than using the other amino acid namely tryptophan. The promotion on such growth aspect was significantly

observed in plant oils namely castor, sour almond, coconut and sesame seed, in ascending order. The maximum values of leaf area 137.3 & 138.4 cm² were observed on the vines that received sesame seed oil at 5 % + the two amino acids namely methionine and tryptophan each at 0.1 % during both seasons, respectively. The untreated vines produced the lowest values. Similar trend was noticed during both seasons.

2. Leaf chemical components:

As shown in Table (2), total chlorophylls and total carotenoids as well as percentages of N, P, K and Mg in the leaves of Flame seedless grapevines were significantly stimulated in response to treating the vines three times with plant oils and the two amino acids either alone or in combinations over the control treatment. Application of plant oils was significantly superior than using the two amino acids in enhancing the leaf pigments and nutrients. Combined applications of oil plants and the two amino acids significantly enhanced these pigments and nutrients over the application of such material alone. Using methionine was significantly superior than using tryptophan in enhancing these pigments and nutrients. The best plant oils in this respect were castor, sour almond, coconut and sesame seed, in ascending order. Significant differences on these chemical components were observed among the ten plant oil and amino acid treatments. The maximum total chlorophylls (20.0 & 21.8 mg/g F.W) and total carotenoids (6.3 & 6.7 mg/g F.W), N (2.41 & 2.55 %), P (0.215 & 0.218 %), K (2.02 & 2.16 %) and Mg (0.93 & 1.14 %) were observed on the vines that supplied with sesame seed oil + tryptophan and methionine. The lowest values were reached on untreated vines. The same trend was noticed during both seasons.

3. Berry setting, yield and cluster weight:

Table (3) shows that single and combined applications of plant oils each at 5 % and the two amino acids each at 0.1 % significantly was followed by improving berry setting %, yield expressed in weight (kg.) and number of clusters /vine and cluster weight compared to the control treatment. Using any one of the four oils (sesame seed, castor, sour almond and coconut) each at 5 % was significantly superior than using any one of the two amino acids in improving these parameters. Using both plant extracts together with the two amino acids significantly surpassed the application of each material alone in this respect. The best results with regard to yield (10.3 & 17.5 kg) were obtained due to treating the vines three times with a mixture of

sesame seed oil at 5 % plus both tryptophan and methionine each at 0.1 % while the untreated vines produced the minimum values (6.8 & 9.5 kg) during both seasons, respectively. The percentage of increment on the yield due to application of the previous promised treatment over the check treatment reached 51.5 and 84.2 % during both seasons, respectively. Number of cluster per vine was significantly unaffected during 2016 season. These results were true during both seasons.

4. Percentage of berries colouration:

Data in Table (3) clearly show that subjecting Flame seedless grapevines three times with plant oils each at 5 % and / or the two amino acids namely tryptophan and methionine each at 0.1 % significantly was accompanied with enhancing the percentage of berries colouration rather than the control treatment. Using plant oils at 5 % was significantly preferable than using any one of the two amino acids in enhancing berries colouration. Using any one of the four plant oils with the two amino acids significantly enhanced berries colouration compared to using plant oil or amino acids alone. Using a mixture of sesame seed oil at 5 % in combined with the two amino acids namely tryptophan and methionine each at 0.1 % gave the maximum values of berries colouration in the clusters of Flame seedless grapevines (81.3 & 81.0 %) while the lowest values (61.9 & 62.9 %) were recorded on the clusters of the untreated vines during both seasons, respectively. These results were true during both seasons.

5. Physical and chemical characteristics of the berries:

It is obvious from the data in Tables (3 & 4) that treating the vines three times with plant oils each at 5 % and/or the two amino acids each at 0.1% was significantly favourable than the check treatment in enhancing quality of the berries in terms of increasing berry weight and dimensions, T.S.S.%, reducing sugars %, T.S.S./acid and total anthocyanins and decreasing total acidity %. The promotion on quality of the berries was significantly associated with using tryptophan, methionine, castor oil, sour almond oil, coconut oil and sesame seed oil, in ascending order. Combined application of the oil plants and the two amino acids was significantly preferable than using each alone in enhancing quality of the berries. Treating the vines three times with a mixture of sesame seed oil at 5 % plus the two amino acids each at 0.1 % gave the best results with regard to quality of the berries. These results were true during both seasons.

Table (2): Effect of some plant extracts and amino acid treatments on the leaf area, total chlorophylls, total carotenoids and percentages of N, P, K and Mg in the leaves of Flame seedless grapevines during 2016 and 2017 seasons.

Treatments	Leaf area (cm) ²		Total chlorophylls (mg/g F.W)		Total carotenoids (mg/g F.W)		Leaf N %		Leaf P %		Leaf K %		Leaf Mg %	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Control	118.0	118.3	8.1	9.0	2.1	1.90	1.57	1.55	0.112	0.109	1.19	1.13	0.46	0.48
Sesame seed oil at 5 %	129.9	131.0	14.9	16.0	4.1	4.4	2.05	2.11	0.168	0.170	1.66	1.70	0.75	0.88
Castor oil at 5 %	123.3	124.5	11.2	12.3	3.0	3.3	1.80	1.87	0.141	0.143	1.41	1.45	0.60	0.71
Sour almond oil at 5 %	125.5	126.7	12.3	13.4	3.3	3.6	1.89	1.95	0.150	0.153	1.49	1.53	0.64	0.78
Coconut oil at 5 %	127.4	128.5	14.0	14.9	3.7	4.1	1.96	2.02	0.157	0.160	1.57	1.60	0.69	0.82
Methionine at 0.1 %	121.7	122.8	10.0	11.0	2.7	3.1	1.72	1.79	0.130	0.133	1.34	1.40	0.55	0.65
Tryptophan at 0.1 %	119.9	120.9	9.1	10.2	2.4	2.7	1.64	1.71	0.121	0.124	1.27	1.30	0.50	0.55
Sesame seed oil + Methionine + Tryptophan	137.3	138.4	20.0	21.8	6.3	6.7	2.41	2.55	0.215	0.218	2.02	2.16	0.93	1.14
Castor oil + Methionine + Tryptophan	132.3	133.5	16.1	17.0	4.5	4.8	2.15	2.21	0.180	0.182	1.80	1.85	0.80	0.94
Sour almond oil + Methionine + Tryptophan	134.0	135.1	17.1	18.1	5.0	5.4	2.23	2.28	0.189	0.191	1.88	1.93	0.85	1.01
Coconut oil + Methionine + Tryptophan	135.0	136.1	18.3	19.3	5.4	5.8	2.30	2.35	0.201	0.203	1.95	2.03	0.89	1.07
New L.S.D at 5%	0.9	1.1	0.8	0.6	0.2	0.2	0.06	0.04	0.04	0.05	0.05	0.04	0.04	0.06

Table (3): Effect of some plant extracts and amino acid treatments on the percentage of berry setting, yield, cluster weight, berries colouration and weight and equatorial of berry of Flame seedless grapevines during 2016 and 2017 seasons.

Treatments	Berry setting %		No. of clusters /vine		Yield/vine (kg.)		Avr. Cluster weight (g.)		Berries colouration %		Avr. Berry Weight (g.)		Avr. Berry Equatorial (cm)	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Control	12.1	11.9	20.0	22.0	6.8	9.8	341.0	339.0	61.9	62.9	3.81	3.76	1.94	1.92
Sesame seed oil at 5 %	16.3	16.5	22.0	33.0	9.2	13.9	416.0	420.0	74.0	72.0	4.61	4.56	2.37	2.39
Castor oil at 5 %	14.0	14.2	21.0	28.0	8.2	10.6	377.0	380.0	66.3	67.0	4.20	4.14	2.15	2.17
Sour almond oil at 5 %	14.8	15.0	21.0	29.0	8.5	11.4	390.0	393.0	68.0	68.9	4.32	4.27	2.22	2.21
Coconut oil at 5 %	15.6	15.7	21.0	31.0	7.7	12.6	404.0	407.0	70.0	70.3	4.50	4.45	2.30	2.31
Methionine at 0.1 %	13.5	13.6	21.0	26.0	7.7	9.6	365.0	368.0	70.0	70.3	4.50	4.45	2.30	2.31
Tryptophan at 0.1 %	12.8	13.0	21.0	24.0	7.5	8.5	353.0	355.0	64.0	65.0	3.92	4.37	2.01	2.02
Sesame seed oil + Methionine + Tryptophan	19.2	20.1	22.0	37.0	10.3	17.5	470.0	472.0	81.3	81.0	5.11	5.05	2.64	2.65
Castor oil + Methionine + Tryptophan	17.1	17.3	22.0	34.0	9.4	14.7	429.0	431.0	76.0	74.0	4.74	4.68	2.44	2.45
Sour almond oil + Methionine + Tryptophan	17.8	18.0	22.0	35.0	9.7	15.6	443.0	445.0	77.9	76.9	4.85	4.79	2.50	2.51
Coconut oil + Methionine + Tryptophan	18.5	18.6	22.0	36.0	10.1	16.6	457.0	460.0	79.9	78.0	4.96	4.91	2.57	2.57
New L.S.D at 5%	0.7	0.6	NS	2.0	0.7	0.7	11.1	10.8	1.0	0.9	0.11	0.10	0.06	0.07

Table (4): Effect of some plant extracts and amino acid treatments on some physical and chemical characteristics of the grapes of Flame seedless grapevines during 2016 and 2017 seasons.

Treatments	Avr. berry longitudinal (cm)		T.S.S. %		Reducing sugars %		Total acidity %		T.S.S. / acid		Total anthocyanins	
	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
Control	2.15	2.12	17.2	17.0	15.1	14.9	0.711	0.709	24.2	24.0	6.11	6.20
Sesame seed oil at 5 %	2.55	2.54	19.5	19.6	17.0	16.9	0.600	0.599	32.5	32.7	9.55	9.65
Castor oil at 5 %	2.35	2.34	18.4	18.5	16.0	15.9	0.661	0.659	27.8	28.1	7.71	7.80
Sour almond oil at 5 %	2.41	2.41	18.8	18.7	16.3	16.4	0.641	0.639	29.3	29.3	8.40	8.50
Coconut oil at 5 %	2.50	2.49	19.2	19.3	16.6	16.6	0.617	0.616	31.1	31.3	9.00	9.11
Methionine at 0.1 %	2.27	2.28	18.0	17.9	15.7	15.7	0.680	0.678	26.5	26.4	7.20	7.31
Tryptophan at 0.1 %	2.21	2.20	17.6	17.5	15.4	15.5	0.694	0.693	25.4	25.3	6.61	6.70
Sesame seed oil + Methionine + Tryptophan	2.77	2.76	21.3	21.4	18.6	18.7	0.520	0.518	41.0	41.3	11.94	12.06
Castor oil + Methionine + Tryptophan	2.60	2.59	20.0	19.9	17.5	17.6	0.575	0.576	34.8	34.5	10.11	10.25
Sour almond oil + Methionine + Tryptophan	2.66	2.66	20.4	20.3	17.8	17.9	0.559	0.560	36.5	36.3	10.80	10.86
Coconut oil + Methionine + Tryptophan	2.71	2.70	20.9	20.8	18.2	18.3	0.539	0.540	38.8	38.5	11.30	11.40
New L.S.D at 5%	0.05	0.04	0.4	0.3	0.3	0.2	0.012	0.014	0.3	0.5	0.41	0.31

4. Discussion

The positive action of plant oils on growth, vine nutritional status, yield, berries colouration and berries quality might be attributed to their higher content of fatty acids, vitamins, K, E, D, A, proteins, amino acids, minerals, antioxidants and plant pigments. The occurrence of these antioxidants makes these plant extracts essential for preventing of reactive oxygen species (ROS) and protecting plant cells from aging as well as encouraging cell division, the biosynthesis of organic foods and stimulating the tolerance of fruit crops to different pathogenesis (Marschener, 1995 and Gunstone, 2011).

The results are in agreement with those obtained by Shaddad, (2010); Sabry-Gehanet *et al.*, (2011); Abdelaal and Aly, (2013); Gad El-Kareem and Abd El-Rahman, (2013); Hammoudaet *et al.*, (2014); Osman, (2014); Uwakiem, (2014); Ahmed *et al.*, (2014); Abada, (2014); Samra, (2015); Rizkalla, (2016); Ahmed *et al.*, (2016) and Khalil, (2016).

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Amino acids with their antioxidative properties play an important role in plant defense against oxidative stress induced by unfavourable conditions.

Application of amino acids was accompanied with enhancing proteins biosynthesis as well as protecting plant cells from senescence and death, preventing the free radicals from oxidation of lipids the components of plasma membrane which is accompanied with the loss of permeability and controlling the incidence of disorders. They are responsible for stimulating the biosynthesis of natural hormones like, IAA, ethylene, cytokinins and GA₃ cell division, organic foods, enzymes as well as DNA and RNA. These positive effects surely reflected on producing healthy trees (Davis, 1982).

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Conclusion

The best results with regard to berries colouration %, yield and both physical and chemical characteristics of the berries were observed with treating Flame seedless grapevines three times with a mixture of sesame seed oil at 5 plus tryptophan and methionine each at 0.1%.

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