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USING DIFFERENT SOURCES OF COMPOST TEA ON GRAPES

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ABSTRACT

The present investigation was carried out during 3 successive seasons from 2008 to 2010. The work in the first year was considered as a preliminary trial. This investigation was conducted on 14-year-old King Ruby grapevines cultivar growing at a private vineyard called Chycheny located at meniet samanood village near Mansoura city, Dakahlia Governorate, Egypt. The study aimed to evaluate the effect of different sources of compost tea with or without citric acid on vegetative growth, leaf mineral content, physical and chemical characteristics of clusters and berries, yield and pruning wood weight.

Most tested treatments gave generally a significant increase of different studied parameters especially in the second season of study, where, T_7 (compost tea A + compost tea B + citric acid) gave the highest significant increase in shoot length and total chlorophyll content (112.1 - 144.6 cm), (1.013 - 0.957 mg/g F.W.) as compared with that of control (91.2 - 112.6 cm), (0.923 - 0.695 mg/g F.W.) in 2009 and 2010 seasons, respectively. In addition, T_7 gave a significant increase of NPK content in the leaf petioles (2.94 and 2.72 N %), (0.43 and 0.43 P%) and (2.11 and 2.12 K%) as compared with that of control (2.39 and 2.37 N%), (0.27 and 0.27 P%) and (1.16 and 1.17 K%) in 2009 and 2010 seasons, respectively. Also, this treatment gave a pronounced increase in yield/vine (15.90 and 12.00 kg/vine) as compared with that of control (9.03 and 8.07 kg/vine) in 2009 and 2010 seasons, respectively. Same treatments gave higher increase in the total sugars and total anthocyanin content in berry skin (17.133 – 17.577 %), (45.85 – 50.14 mg/100g) as compared with that of control (14.19 and 14.56 %), (23.52 and 23.08 mg/100g) in 2009 and 2010 seasons, respectively. Also, T_7 gave the highest values on weight of pruning wood at winter season (2.63 and 2.83 kg/vine) comparing with control (2.17 and 1.78 kg/vine) in 2009 and 2010 seasons, respectively.

INTRODUCTION

Grape (*Vitis vinifera*, L) is one of the most favorite, delicious and popular fruit crops and is considered the first one in total area and production all over the world. In Egypt, grape is the second major fruit crop after citrus. The total cultivated area of grape in Egypt reached about 167048 feddans produced about 1531418 tons according to the last statistics of the Ministry of Agriculture (2009).

King Ruby cultivar became one of the most important table grapes both in local and export markets. So, the grape growers donated all cultural practices a great attention, especially fertilization program to improve yield and berry quality.

Compost tea has been utilized in agriculture as a significant source of organic matter and soil amendments that providing plants with mineral nutrients and other benefits. In modern terminology, compost tea is a compost extract product of the fermented compost in water Litterick et al.,

(2004). Ingham (2000 a&b) showed that compost tea is proper than the solid compost, because it can be used for seed treatment by soaking the seeds or the propagation materials before planting. It can be applied through the sprinkler and drip irrigation systems and it can solve the transportation and application problems. Also, Schmitz (2002) mentioned that compost tea is very rich in phytohormones and growth regulators. It stimulates the microorganisms that have a direct or indirect proper effect on the plant rhizosphere, besides, it optimizes the soil pH and their structure.

Compost tea has been received a great attention from growers and researchers during last two decades. Field trials and laboratory tests suggested that these organic substances have the potentiality to provide the plant with the necessary nutrients and improve soil physical and chemical properties as well as suppress some plant diseases pathogen, particularly fungal infections (Biocycle 2004).

Citric acid is considered one of the most common chelating agents and it is used in both soil and foliar application especially in alkaline soils to make micronutrients in available form (WWW.agroservicesinternational.com). Citric acid can be called an anionic organic acid because of its negative charge so it can chelat cations and make mineral uptake more effective and available for plants (WWW.biogro.com).

Therefore, the main goals of this investigation are to study the effect of two sources of compost tea with or without citric acid on vegetative growth, leaf mineral content, physical and chemical characteristics of clusters and berries, yield and weight of pruning wood. Also, to throw some light on using compost tea combined with citric acid as a new methods of fertilization for King Ruby grapevines cultivar.

MATERIALS AND METHODS

The experiment was conducted on 14-year-old king Ruby grapevines growing in a clay soil as shown in Table (1) at a private vineyard Chycheny, located at meniet samanood village, near Mansoura city, Dakahlia Governorate, Egypt.

Vines cultivated at 2m within rows and 3m between-rows. The vines are grown in clay soil, under drip irrigation system with supporting by double (T) and during January of each experimental season, the tested vines were spur-pruned by leaving 5 spurs with 2 eyes buds on each cordon. The total load was 40 buds per vine.

Table (1): Mechanical analysis and chemical constituents of experimental vineyard soil.

Sample depth (cm)	Mechanical analysis					Chemical analysis						
	Coarse sand	Fine sand	Silt	Clay	Texture class	pH 1:2.5	E.C 1:5 dS/m	$CaCO_3$ %	Organic matter %	Available (ppm)		
										N	P	K
0-30	1.66	21.12	30.07	47.15	Clay	7.95	0.88	0.93	1.52	48.6	6.75	328
30-60	1.27	19.75	29.72	49.26		8.12	0.85	1.36	1.13	52.3	6.32	336
60-90	1.05	18.10	29.10	51.75		7.83	0.92	1.52	0.98	50.7	5.95	312

Sixty-three vines were chosen for the present study, almost uniform in growth vigour, apparently healthy, productive and they received the common cultural practices which were applied in that district, such as irrigation and weeds, pests and diseases control. The experiment consists of 7 treatments arranged in a complete randomized blocks design, each treatment include three replicates of three vines, borders were left around and between replicates of treatments.

The treatments were applied as the following :-

1-Control (treated with tap water only). T_1
2-Compost tea (A). Compost tea of rice straw T_2
3-Compost tea (B). Compost tea of pruned wastes T_3
4-1/2 Compost tea (A) + 1/2 Compost tea (B). T_4
5-Compost tea (A) + Citric acid. T_5
6-Compost tea (B) + Citric acid. T_6
7-1/2 Compost tea (A) + 1/2 Compost tea (B) + citric acid T_7

The treatments was applied as soil application at the rate of 860 cm^3/vine at once. Added in four corner under dripping point around of vine at 40 cm distance and 10-15 cm depth according to Mannson and Nelson (1963).

Treatments were applied as at 4 stages:

1- At buds swell stage (29 and 25 March at 2009 and 2010, respectively).
2- A week before flowering (28 and 21 April at 2009 and 2010, respectively).
3- After 7 day of fruit set stage (22 and 17 May at 2009 and 2010, respectively).
4- At veraison stage (25 and 6 July at 2009 and 2010, respectively).

Preparation of enriched compost tea :-

1- Compost tea was prepared from mature compost which made from rice straw or pruned wastes, farmyard manure, bentonite, rock phosphate, elemental sulphur and urea which had been composted in an aerobic heap for three months. Chemical and microbiological characteristics were determined on the two sources of compost and the obtained results are summarized in Table (2).
2- Then to prepare the enriched compost tea for the two kinds of compost, 5kg of mature compost blended with 250gm molass, 25gm $MgSO_4.7H_2O$, 5gm NaCl, 250gm HNO_3 and 250 ml H_3Po_4 mixed with 50 liter tap water (previously stored to avoid the harmful effect of Cl_2 on microbes of compost) and put in a 150 Liter plastic barrel Abd el-Wahab *et al.,* (2007).
3- This mixture had been allowed to stand in a shaded place for 7 days at room temperature and stirred 2 hours during the day until the water turns into brown color and the extract had no smell for fermentation Brinton *et al.,* (1996). The main data of chemical and microbiological analysis of the produced compost tea (A & B) are shown in Table (3).

Table (2) : Physical, chemical and microbiological characteristics of used compost A and B .

Character	Compost A	Compost B
Physical characteristics		
Water holding capacity (%)	224.4	278.00
Bulk density (kg/m^3)	430.00	518.00
Chemical characteristics		
pH (1 : 10 ext.)	7.87	7.28
EC (dS/m)	5.12	3.65
Organic C (%)	22.26	21.95
Total N (%)	1.39	1.72
C/N ratio	16.01	12.76
Total P (%)	0.52	1.08
Total K (%)	1.12	1.32
NH^+_4- N (ppm)	76.3	74.30
NO^-_3-N (ppm)	142.4	199.30
Microbiological characteristics		
Count of bacteria (CFU/g)*	9.8 x 10^7	9.3 x 10^7
Count of fungi (CFU/g)*	7.3 x 10^5	1.8 x 10^6
Count of actinomycetes (CFU/g)*	11.3 x 10^5	1.2 x 10^7
Dehydrogenase activity (mgTPF/100g)**	157.42	173.80

***(CFU): Colony forming unit. **(TPF) : Trichloro-Phenyl-Formazan.**

Table (3): Chemical and microbiological characterstics of used compost tea A and compost tea B.

Character	Compost tea A	Compost tea B
Chemical characterstics		
pH	6.79	7.03
EC (dS/m)	4.36	6.72
Organic C %	6.80	6.88
Total N %	0.41	0.49
Organic matter %	11.69	12.23
C/N ratio	16.53	13.98
NH_4^+-N (ppm)	42	57
NO_3^-N (ppm)	67	75
P (%)	33	39
K (%)	730	790
Microbiological characterstics		
Bacteria (CFU/g)*	7 x 10^7	4.8 x 10^7
Fungi (CFU/g)*	6.4 x 10^6	3.0 x 10^6
Actinomycetes (CFU/g)*	1.6 x 10^7	1.0 x 10^7
Dehydrogenase (mg TPF/100 ml)*	85.2	79.6

***(CFU): Colony forming unit. *(TPF) : Trichloro-Phenyl-Formazan.**

Measurements:

Vegetative growth:

All vegetative growth parameters were carried out at full bloom according to Abd El-Hamied (2007).

Average shoot length (cm):

Shoot length was calculated by measuring the length of 4 shoot per vine (2 shoots from both side) and the average shoot length during each seasons was determined.

Leaf chlorophyll content (mg/g fresh weight):

Total chlorophylls content were determined in the leaves, it was estimated by taken 8 leaves from each vine, as a representative sample at the sixth to seventh leaf from the shoot tip at full bloom stage in the two seasons of study. Fresh leaf sample of 0.5 g was used, soaked in 20 ml methanol for 24 hour in cool chamber and measured by spectrophotometer (Spekol). Chlorophylls A and B were determined according to the following equation, Arnon (1949).

Ch.A = 16.5 OD_{665} – 8.3 OD_{650}

Ch.B = 33.8 OD_{650} – 12.5 OD_{665}

Total = 25.5 OD_{650} + 4.0 OD_{665}

Where OD= Optical Density.

Mineral content in the leaf petiole:

Leaf petioles of the leaves collected for chlorophyll determination were used for the determination of NPK content at full bloom according to Abd El-Hamied (2002).

Total N% was determined according to the methods described as Pregle (1945) using micro- kiejldahl.

Total P % was colorimetrically determined by using the chlorostannus-reduce molybdo phosphuric blue colour method in sulphoric system as described by Jackson (1967).

Total K% was determined in the digested plant sample using a flame photometer according to Black (1965).

Average cluster volume (cm3):

The volume was measured by immersing each of the tested cluster per vine in graduate glass cylinder containing water to a certain level, and then the displaced water was recorded in cm3.

Yield (Kg/vine):

Yield of each vine was estimated in kg/vine in both seasons by multiplying the average cluster number per each vine by the average cluster weight.

Berry chemical characteristics:

Total sugars %

Total sugars were determined colormetrically according to phenol-sulphuric acid reaction method; phenol 5% solution was used. A standard curve was prepared by using asending glucose concentration to determine the absorbance of reaction by Spectro-meters on wave length 490 nm., according to Nelson (1944).

Anthocyanin content in berries skin (mg / 100 g)

Half gram of fresh berries skin + 20 ml of acidify alcohol solution putted in dark place for 48 hours under room temperature, the extract was taking to measure at 535 nm using spectrophotometer according to Hsia *et al.,* (1965).

Weight of pruning wood:

The weight of pruning wood was determined at winter pruning period during the seasons of study and the data were recorded as kg/vine.

Statistical analysis

The obtained data of this study were statistically analyzed according to the technique of Analysis of variance (ANOVA) for the randomized blocks design according to Gomez and Gomez (1984) using GenStat Eleventh Edition. The treatment means were compared using the New Least Significant Differences (New LSD) according to the producer outlined by Waller and Duncan (1969).

RESULTS AND DISCUSSION

Effect of compost tea treatments and their combinations with citric acid on vegetative growth

Shoot length

Data presented in Table (4) showed that all tested treatments significantly increased shoot length in both seasons of the study as compared with that of control except T_3 (compost tea B) and T6 (compost tea B + citric acid) in the first season of study. T_7 (compost tea A + compost tea B + citric acid) gave the highest significant increase in this respect (112.1 and 144.6 cm) as compared with that of T_1 (control) (91.2 and 112.6 cm) in 2009 and 2010 seasons, respectively. These results are in line with those reported by Abd El-Hady *et al.,* (2003) on Flame seedless grapevines, who mentioned that using five organic materials; green manure, filter mud, chicken manure, Nile compost and Nile fertile, were significantly increased shoot length as compared with that of control. Also, Abou El-Khashab *et al.,* (2005) found that compost treatment increased significantly shoot length of Aggazi and Koroneiki olive cultivars. Similarly, Barakat (2009) revealed that compost tea treatments gave significant increase in shoot length of Washington Navel orange trees. Also, Fayed (2010c) showed that compost tea + yeast + humic acid gave significantly increased shoot length of Roghiani olives. As for effect of citric acid, Fayed (2010b) found that citric acid application with ascorbic acid + thiamin gave a significant increase in shoot length of Thompson seedless grapevines in both seasons of study.

Table (4): Effect of compost tea treatments and their combinations with citric acid on shoot length and Total chlorophyll content.

Treatment	Shoot length (cm)		Total chlorophyll content (mg/g FW)	
	2009	2010	2009	2010
T1	91.20	112.6	0.923	0.695
T2	106.2	129.4	0.793	0.903
T3	100.4	138.5	0.777	1.000
T4	105.1	136.1	0.850	1.110
T5	106.4	140.5	0.867	1.028
T6	104.7	143.4	0.800	0.965
T7	112.1	144.6	1.013	0.957
New LSD at 5 %	13.28	9.13	0.283	0.104

Total chlorophyll content in the leaves

Data in Table (4) showed that all tested treatment gave non-significant increase in total chlorophyll content in the leaves in the first season of the study as compared with that of control except T7 (the combination between compost tea A and compost tea B with citric acid), while all treatments gave a significant increase in this respect in the second season of study as compared with that of control. T7 (compost tea A + compost tea B + citric acid) and T4 (compost tea A + compost tea B) gave significantly increased in total chlorophyll content in the leaves as (1.013 – 1.110 mg/g F.W.) as compared with that of control (0.623 – 0.695 mg/g F.W.) in 2009 and 2010 seasons, respectively. The results are agreed with those obtained by Abd El-Hady et al., (2003) on Flame seedless grapevines, Abd El-Maksood (2006) and Abd El-Hamied (2007) on Thompson seedless grapevines and Sefan (2009) on King Ruby grapevines. Fayed (2010a) on Manfalouty pomegranate trees found that compost tea as foliar application with citric acid and ascorbic acid gave a significant increase in chlorophyll A and B in the leaves in both seasons of study.

Effect of compost tea treatments and their combinations with citric acid on mineral content in the leaf petioles

Data in Table (5) showed that all tested treatments gave a significant increase in N, P and K content in leaf petioles, except N% in T_2 (compost tea A), T_3 (compost tea B) and T_4 (compost tea A + B) treatments in the second season of the study. The data indicated that the most effective treatment, which gave the highest significant increase in N, P and K% in leaf petioles was obtained from T_7 (compost tea A + compost tea B + citric acid) in both seasons of study, where N% was (2.943 and 2.720%), P% was (0.432 and 0.433%) and K% was (2.107 and 2.117%) as compared with those of T_1 (control) in 2009 and 2010 seasons, respectively. These data are in agreement with those obtained by Abd El-Naby (2000) on Maghrabi banana plants, Abd El-Hady *et al.,* (2003) on Flame seedless grapevines. Also, Abd El-Hamied (2007) on Thompson seedless grapevines found that the high amount of NPK content in leaf petioles was obtained from compost tea + chicken manure extract at ratio of 1:10 + 1:10 in both seasons of study. Also, Mostafa *et al.,* (2009) found that all treatments of compost tea applications gave a significant increase in leaf content of NPK% on Washington Navel orange trees in both seasons of the study.

Table (5): Effect of compost tea treatments and their combinations with citric acid on NPK content in leaf petioles.

Treatment	N (%)		P (%)		K (%)	
	2009	2010	2009	2010	2009	2010
T1	2.38	2.37	0.270	0.270	1.160	1.167
T2	2.55	2.49	0.296	0.295	1.313	1.300
T3	2.52	2.56	0.320	0.320	1.450	1.400
T4	2.64	2.64	0.351	0.348	1.543	1.570
T5	2.72	2.70	0.373	0.374	1.720	1.723
T6	2.83	2.83	0.412	0.410	1.933	1.960
T7	2.93	2.72	0.432	0.433	2.107	2.117
New LSD at 5 %	**0.07**	**0.31**	**0.003**	**0.006**	**0.04**	**0.04**

Fayed (2010a) on Manfalouty pomegranate trees found that compost tea as foliar application with citric acid and ascorbic acid gave a significant increase in leaf content of NPK% in both seasons of the study. Also, Fayed (2010b) on Thompson seedless grapevines, found that citric acid with ascorbic acid and thiamin gave a high values in leaf content of NPK% in both seasons of study.

Effect of compost tea treatments and their combinations with citric acid on physical characteristics of cluster and yield/vine:

As for cluster volume, the data obtained in Table (6) had no stable trend during the two seasons of study, where all tested treatments gave a significant increase in cluster volume in the first season of study as compared with that of control, while, the only significant increase in cluster volume in the second season of study was detected in T_5 (compost tea A + citric acid) treatment as compared with that of control. T_7 (compost tea A + compost tea B + citric acid) and T_5 gave the highest increase in this respect (505.1 and 484.6 cm^3/cluster) as compared with that of control in 2009 and 2010 seasons, respectively.

Table (6): Effect of compost tea treatments and their combinations with citric acid on yield

Treatment	Cluster volume (cm^3/cluster)		Yield (kg/vine)	
	2009	2010	2009	2010
T1	329.70	405.60	9.03	8.07
T2	395.60	405.80	10.13	12.50
T3	414.80	426.20	10.07	14.07
T4	485.80	466.60	14.23	13.77
T5	462.10	484.60	12.70	15.88
T6	456.50	455.00	13.17	12.47
T7	505.10	444.00	15.90	12.00
New LSD at 5 %	**62.51**	**73.14**	**3.36**	**3.48**

In view of average yield (kg/vine), the results of the present study showed that all tested treatments gave a significant increase in yield/vine as compared with that of control in both seasons of study except T_2 (compost tea A) and T_3 (compost tea B) only in the first season of study. T_5 (compost tea A + citric acid) gave a significant increase (12.70 – 15.88 kg/vine) followed by, T_7 (compost tea A + compost tea B + citric acid) (15.90 – 12.00 kg/vine) as compared with that of T_1 (control) (9.03 – 8.10 kg/vine) in 2009 and 2010 seasons, respectively. These results are in agreement with those reported by Ezz (1999), Omar (2005), Abd El-Maksood (2006) and El-Mansi (2007) on Thompson seedless grapevines. They all mentioned that yield of tested grapevines significantly increased by using different types of compost as compared with that of control. Similarly, Abd El-Hamied (2007) on Thompson seedless grapevines and Mostafa *et al.,* (2009) on Washington Navel orange trees reported that the yield of the tested treatments significantly increased when applied compost tea which used. Also, Fayed (2010a) on Manfalouty pomegranate trees found that compost tea as foliar application combined with citric acid + ascorbic acid significantly increased yield in both seasons of study.

Effect of compost tea treatments and their combinations with citric acid on chemical characteristics of berries

Total sugars

It was cleared from the results shown in Table (7) that all tested treatments gave a significant increase in total sugars% as compared with that of control in both seasons of study. The different treatments can be arranged dissentingly as follows: T_7, T_6, T_4, T_5, T_3, T_2 and T_1 and the differences were significant among them in total sugars in berries in both seasons of study. The obtained results are in agreement with the findings of Abd El-Hamied (2007) on Thompson seedless grapevines, who found that combination between compost tea and chicken manure extract at rate 1:10 (compost : water) when applied as spraying treatment, gave the highest values in total sugars% in berries. Similarly, Mansour and Shaaban (2007) on Washington Navel orange reported that treatment of 50% ammonium sulphate + Neel compost and Biogen each at 25% significantly increased total and reducing sugars% as compared with mineral sources of N during the two seasons of study. Also, Sefan (2009) on King Ruby grapevines, found that application of 10 unit of organic N from orange compost + 30 units mineral N gave the highest values of total and reducing sugar in berries during both seasons of study. Fayed (2010a) on Manfalouty pomegranate trees found that compost tea as foliar application with citric acid and ascorbic acid gave a significant increase in total sugars in fruits in both seasons of study.

Anthocyanin content in berry skin

Data in Table (7) showed that all tested treatments gave a significant increase in total anthocyanin content in berry skin of treated vines as compared with that of control in both seasons of study. Where, T_7 (compost tea A+ compost tea B + citric acid) gave the highest significant value in anthocyanin (45.85 – 50.14 mg/100g) while T_1 (control) gave the lowest significant value (23.52 – 23.08 mg/100g) in 2009 and 2010 seasons, respectively. Also, it was cleared that the values in the second seasons were higher than those in the first one. Generally, the highest values were obtained from treatments mixed with citric acid such T_7, followed by T_5 (compost tea A + citric acid).

Table (7): Effect of compost tea treatments and their combinations with citric acid on total and reducing sugar.

Treatment	Total sugar (%)		Anthocyanin (mg/100g)	
	2009	2010	2009	2010
T1	14.187	14.557	23.52	23.08
T2	14.720	15.213	31.64	36.80
T3	15.317	15.727	34.55	39.20
T4	16.450	16.943	42.31	44.76
T5	15.860	16.423	43.38	48.98
T6	16.920	17.420	40.03	43.34
T7	17.133	17.577	45.85	50.14
New LSD at 5 %	0.103	0.056	4.205	3.863

Similar results have been found by Sefan (2009) on King Ruby grapevines, who reported that application with 30 units mineral N + 10 units organic N from apple compost gave the highest values of the total anthocyanin content in berry skin as compared with that of control during the two seasons of study.

Effect of compost tea treatments and their combinations with citric acid on weight of pruning wood :

Data in Table (8) showed that all treatments gave an insignificant increase in weight of pruning wood/vine in the first season of study and gave a significant increase in the second season of study as compared with that of control. T_7 (compost tea A + compost tea B + citric acid) gave the highest significant increase in pruning wood weight (2.83 kg/vine) in the second season of study as compared with that of control. On the other hand, T_1 (control) gave the lowest significant value in both seasons, respectively (2.17 and 1.78 kg/vin). Likewise, Abd El-Hady *et al.,* (2003) on Flame seedless grapevines, found that application of organic materials; green manure, filter mud, chicken manure, Nile compost and Nile fertile, significantly increased pruning wood as compared with that of control. The maximum weight of pruning wood was obtained from vines that received Nile compost at 3.75 kg/vine. Simillarly, Abd El Maksood (2006) on Thompson seedless grapevines, stated that rice straw compost (RSC) gave the highest values of pruning wood weight (0.995 and 1.04 kg/vine) as compared with that of control (0.900 and 0.935 kg/vine) in 2004 and 2005 seasons, respectively. Sefan (2009) on King Ruby grapevines, found that application of apple compost gave the highest values in pruning wood weight (1.66 and 1.69 kg/vine) as compared with that of control treatment (1.97 and 1.19 kg/vine) in 2007 and 2008 seasons, respectively.

Consequently from the previous mentioned results, it was clear the great role of compost tea for King Ruby grapevines grown in clay soil as it indispensable for improvement of the nutritional status of the vines and production of maximum yield and quality of grapes. Also, minimizing the cost of production and in turn increased the income of vineyards. So, it should be recommended the superiority of application of compost tea, especially T7 (compost tea A + compost tea B + citric acid) which gave the best results in vegetative growth, leaf mineral content, physical and chemical characteristics of clusters and berries, yield and pruning wood weight.

Table (8): Effect of compost tea treatments and their combinations with citric acid on weight of pruning wood.

Treatment	Weight of pruning wood (kg/vine)	
	2009	2010
T1	2.167	1.777
T2	2.267	2.167
T3	2.367	2.520
T4	2.267	2.257
T5	2.567	2.510
T6	2.533	2.553
T7	2.633	2.833
New LSD at 5 %	0. 488	0.287

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إستخدام مصادر مختلفة من شاى الكمبوست على العنب

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أجريت هذه التجربة خلال ثلاث مواسم من ٢٠٠٨ إلى ٢٠١٠ على شجيرات عنب صنف كنج روبى عمر ١٤ سنة مزروعة بمزرعة الشيشينى، قرية منية سمنود, المنصورة، محافظة الدقهلية. وقد أخذت القياسات خلال الموسمين الثانى والثالث حيث أعتبر الموسم الأول تجربة تمهيدية. تهدف هذه الدراسة لتقييم تأثير مصادر مختلفة من شاى الكمبوست مع أو بدون إضافة حمض الستريك على النمو الخضرى، المحتوى المعدنى للأوراق، الصفات الطبيعية والكيمائية للعناقيد والحبات، المحصول و وزن خشب التقليم.

بصفة عامة أشارت النتائج أن معظم المعاملات أعطت زيادة معنوية للقياسات المختلفة خاصة فى الموسم الثانى.

- أعطت معاملة شاى الكمبوست من المصدر الاول (أ) مع شاى الكمبوست من المصدر الثانى (ب) مضاف اليهم حمض الستريك أعلى زيادة معنوية فى كلا من طول الأفرع و محتوى الكلوروفيل الكلى فى الأوراق (١١٢,١ – ١٤٤,٦ سم), (١,٠١٣ – ٠,٩٥٧مجم/جم وزن طازج) مقارنة بالكنترول الذى اعطى أقل قيم فى هذا الأتجاه (٩١,٢ – ١١٢,٦), (٠,٩٢٣ – ٠,٦٩٥ مجم/جم وزن طازج) خلال الموسمين ٢٠٠٩ و ٢٠١٠ على التوالى.
- أعطت نفس المعاملة زيادة معنوية فى محتوى النيتروجين والفسفور والبوتاسيوم فى أعناق الأوراق (٢,٩٤ – ٢,٣٧ نيتـــروجين%), (٠,٤٣ – ٠,٤٣ فســـفور%) و (١,١٦ – ١,١٧ بوتاسيوم%) مقارنة بالكنترول (٢,٣٩ – ٢,٣٧ نيتروجين%)، (٠,٢٧ – ٠,٢٧ فسفور%) و (١,١٦ – ١,١٧ بوتاسيوم%) خلال موسمى الدراسة على التوالى.
- بالنسبة لحجم العنقود؛ كانت أفضل النتائج المتحصل عليها فى هذا الأتجاه ناتجة من إضافة معاملة شاى الكمبوست من المصدر الاول (أ) مع شاى الكمبوست من المصدر الثانى (ب) مضاف اليهم حمض الستريك (٤٧٤,٦ سم^{٣}/عنقود) كمتوسط لموسمى الدراسة.
- نفس المعاملة أعطت زيادة واضحة فى المحصول/الكرمة (١٥,٩٠ – ١٢,٠٠ كجم/كرمة) مقارنة بالكنترول (٩,٠٣ – ٨,٠٧ كجم/كرمة) خلال الموسمين ٢٠٠٩ و ٢٠١٠ على التوالى.كما أعطت زيادة فى كلا من السكريات الكلية ومحتوى الأنثوسيانين فى قشرة الحبات (١٧,١٣٣ – ١٧,٥٧٧ %)، (٤٥,٨٥ – ٥٠,١٤ مجم/١٠٠جم) أعلى من الكنترول (١٤,١٩ – ١٤,٥٦%)، (٢٣,٥٢ – ٢٣,٠٨ مجم/١٠٠جم) خلال موسمى الدراسة على التوالى.
- هذه المعاملة أيضا أعطت أعلى قيم فى وزن خشب التقليم خلال موسم الشتاء (٢,٦٣ – ٢,٨٣ كجم/كرمة) مقارنة بالكنترول الذى أعطى أقل القيم فى هذا القياس (٢,١٧ – ١,٧٨ كجم/كرمة) خلال الموسمين ٢٠٠٩ و ٢٠١٠ على التوالى.

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