



THE EFFECT OF ADDING ORGANIC FERTILIZERS (COWS) AND THIAMINE AND THEIR INTERACTION ON THE GROWTH OF GRAPE SEEDLINGS (KAMALI CULTIVAR)

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Abstract

The experiment was conducted in the Al-Mussaib, Babylon project during the agricultural season 2017 on grape seedlings with 3-year age Kamali cultivar, which included two factors, the first is a thiamine growth regulator at a level of (500, 250, 0) mg / L, while the second factor is fertilizing the seedlings with several levels of organic fertilizer (0, 8 16) ton / ha and their effect on the traits of vegetative growth and the leaf content of chlorophyll and nitrogen. As a factorial experiment was conducted according to the Complete Randomized Blocks Design (C.R.B.D) with three replicates and five seedlings for the experimental unit. The averages were compared according to the least significant difference test under the 0.05% probability level and the results indicated: 1- The level of thiamine (500) mg / L was significantly excelled in rest treatments and in all studied traits. 2- The level of organic fertilizer 16 tons / hectare was significantly excelled in rest treatments and to all growth indicators and the leaf content of chlorophyll and nitrogen, as it gave a high average of studied traits. 3- The interaction between the two factors of the experiment showed significantly excelled the treatment 500 mg / L thiamine and 16 tons / ha organic fertilizer gave the highest average of studied traits.

Keywords: grapes, thiamine, organic fertilizer

Introduction

The *Vitis vinifera* L (Grape) belonged to the Vitaceae family (Al-Saadi, 2000) and it is an important fruit tree in terms of production and cultivated area, where the cultivated area is estimated at 8291220 hectares and the total production is 74584600 (FAO, 2000) and the area cultivated with grapes in Iraq 8 thousand hectares with a total production of 251788 tons and the average productivity per tree (22.9 kg (Central Statistical Organization, 2014). Grapes is one of the most widespread and fruit crops in Iraq and has gained importance due to its taste through high taste and nutritional value as it is used as a stimulant for brain cells and heart muscles and fortifies the liver and kidneys and reduces the incidence of diseases of the stomach and intestines and urinary system (Jamal Al-Din, 2010) and grapes are widely cultivated In the countries of the world, grape cultivation is widespread in Iraq mainly in the northern and central regions, as well as in the southern regions. There are several methods that help to increase grape production and improve the quantitative and qualitative traits of the fruits by adding organic fertilizers. Thiamine has a large and important role for the plant as it is considered one of the growth regulators and regulating the growth processes within the plant where thiamine is present in high concentrations in the active areas in the growth of the plant and there are indications that thiamine formation occurs in the leaves and mostly depends on the presence of light. Therefore, its role can stimulate growth and its arrangement with the plant (kenana online). Organic fertilizers are an important and essential source for the various elements needed by the big and small plants as well as their very important role in improving the physical, chemical and biological soil properties. However, these fertilizers did not receive sufficient attention by farmers due to the widespread of chemical fertilizers, but the damage caused by the intensive use of fertilizers The chemicals that harm humans, animals, plants and the environment have imposed the

necessity of searching for clean sources for the elements that are provided to the plant. Here, the importance of organic fertilizers with their different types (animal and plant) emerged as an important alternative to chemical fertilizers for fruit trees in general and grape trees in particular, and despite the different content of organic fertilizers from total nitrogen, but they are good sources of nitrogen as well as their benefits in improving different soil properties (Hellman, 1997), Ragab and Mohamed (1999) showed that organic fertilization was very effective in improving the quantity and quality of grape tree production in the Thompson Seedless cultivars, which is consistent with the results of his study (Kassem and Marzouk, 2002; Harhsh and Abdul-Nasser, 2000) on the effect of fertilizers different membership in the Flame seedless grape cultivars, as indicated by the results of research conducted by Panicker, *et al.* (2004) when they used the cow and poultry fertilizer and their mixture on the Summit cultivars if the production increased when using these fertilizers. In the field of mineral nutrition, it was found (Al-Diri and Maarouf, 2000) to increase the longitudinal growth of branches when foliar fertilization with microelements and increase fruit production using liquid fertilizers. Also, this result agree with (Salman and Ibrahim, 2015) where it was observed that the organic fertilizer was significantly excelled in All studied traits.

The aim of this study is to know the effect of spraying with thiamine (vitamin B1) and organic fertilizer (cows) and its effect on vegetative growth, plant height, percentage of nitrogen and their effect on the plant.

Materials and Methods

The experiment was conducted in one of the private farms of the Al- Mussaib, Babylon project during the agricultural season 2017 according to The Complete Randomized Blocks Design (C.R.B.D) on grape seedlings at the age of 3 years and included two factors, the first is the

addition of organic fertilizer at levels (16, 8, 0) tons/ha and the second factor is Spraying grape seedlings with two levels of thiamine (250 and 500) mg/L. The seedlings were prepared from the horticultural plant Al-Mahawil and with the same cultivars cultivation on the farmland and at the age of 3 years, the organic fertilization began and according to the Statistical Chart where the experimental unit included five seedlings and three replicates. Thiamine concentrations were sprayed on plants to fully wetness the leaves of the plant early morning using a 2-liter back sprayer with the addition of a diffuser (dish wishes solution of 1 cm² size with each spray as a diffuser material for the purpose of increasing the average Surface tension of the water and to ensure complete wetness. As for the control treatment, it was sprayed with water Distilled only and repeated the treatment of spray 4/4, 2/5, 9/11, 6/10, then I took the required measurements on 1/12/2017.

Two thiamine concentrations were used: -

T0 without adding thiamine, (concentration 0)

Thiamine T1 at a concentration of (250) mg .L⁻¹

T2 thiamine with a concentration of (500) mg. L⁻¹

Two levels of compost were used: -

A0 without adding organic fertilizer, (0)

A1 Organic fertilizer at first level (8) tons/ha

A2 Animal manure at the second level (16) tons/ ha

Soil samples were analyzed for the experiment site before adding fertilizers and carrying out the physical and chemical analysis. The results of the analysis were as in Table (1).

Table 1 : Shows the soil traits used in the experiment

Ece ds.m ⁻¹	pH	Soil texture	%sand	Silt %	Clay%	Type of tests
3.0	7,2	Loam	30	58	12	the tests' results

A distance of 4 m was left between the main units to ensure that thiamine did not transfer between experimental units.

Studied traits

(i) The average seedlings height (cm)

The seedlings height was measured at the end of the experiment using the metric tape measure and the height was measured from the soil surface to the end of the apical meristem.

(ii) The leaf area (cm². seedlings⁻¹)

Use a (planimeter) device to measure this traits in the laboratories of the Institute Al-Mussaib Technical in cm² units by taking four full-width leaves from the middle branch on the main stem of each seedling and for each treatment and according to the total leaf area of the leaves from the average of production from the leaf area of one plant.

(iii) The leaf content of chlorophyll SPAD

Then estimating the chlorophyll content using a Chlorophyll Meter device of type spad-502 prepared from the Japanese company Minolta by taking a reading of 4 leaves per experimental unit (seedlings) and then taking the rate (Minotti *et al.*, 1994) and measured in units (spad unit = mg / cm²).

(iv) Nutrient Percentage (N)

A sample was taken from each seedling and for each replicate and then washed with distilled water from the dust and the impurities suspended in it and placed in perforated paper bags and then dried in an electric oven at a temperature of 70 °C. for 48 hours and until the weight was proven then samples were crushed and 0.5 g of the sample powder (dry leaves were taken by electric) It was digested by concentrated sulfuric acid and lower than Perchloric acid (Black, 1965) and the nitrogen component ratio was estimated using the microceldal device (Jones and Steyn, 1973).

Results and Discussion

Table (2-a-b-c-d-f) showed that the positive effect of organic fertilizer on stimulating seedlings growth, especially the average of 16 tons/hectare was significantly excelled in all traits, where the percentage of chlorophyll reached 38.09 SPAD, while the control treatment was 24.26 SPAD, the number of leaves was 513 leaf, and the control treatment was 439 leaf, while the leaf area was 42.19 cm² compared to the control treatment 20.61 cm². This treatment was significantly excelled to the plant height which gave 389 cm, while the control treatment was 319 cm, This treatment was significantly excelled to the percentage of nitrogen, which gave 1.79%, while the control treatment gave 1.20%. These results are consistent with what he found (Hadi and Thamer, 2017) of a significantly excelled in the amount of chlorophyll when fertilizing the grape plant with organic fertilizer by 6 kg / vine. This is consistent with what was reached by him (Hussein, 2016) that the use of organic fertilizer (DAB) level 6 g/Seedlings where he had a positive role in the growth of apricot seedlings in the first season as he significantly excelled other treatments. (Hamad and Ghaith, 2013) found a significant increase in the number of leaves, the leaf area, the number and length of the roots, and the leaf content of chlorophyll and nutrients when fertilizing trees. Pomegranate with 3 kg/tree organic animal fertilizer. This significantly excelled that appeared when adding organic fertilizer 16 tons/hectare in most of the studied traits may be due to the fact that the organic material is a basic material that must be added to the Iraqi soil, especially in central Iraq because it improves the soil traits and its physical, chemical and biological properties of the soil and increases fertility and production and reduces pollution The environmental resulting from wasteful chemical fertilizer (Abu Rayyan, 2010). Also, the organic matter affected the readiness of many nutrients due to the acids formed during the decomposition or as a result of the activity of the microorganisms, as the organic matter is a basic cradle for these beneficial microorganisms (Dinel, Levesque, Mehugs, 1991). The decomposition of organic fertilizers in the soil due to the activity of the microorganisms is accompanied by

the release of energy warms the root system in winter in addition to increasing the density of the roots improving their ability to absorb as it improves the process of root respiration and plant growth. We also note from Table (2-a-b-c-d-f) that spraying grape seedlings with a solution containing thiamine (B1) showed the level 500 mg / L significantly excelled on other treatments, where the height of the seedling gave 417 cm, compared to the control treatment 319 cm, and this treatment gave 564 leaf, while the non-addition treatment 439 was excelled to the leaf area of the seedlings was 42.23 cm² and control treatment which gave 20.61 cm² also this treatment excelled in the amount of chlorophyll as 37.21 SPAD. Spray treatment with thiamin at concentration 500 mg / L excelled in the leaf content of nitrogen amounted to 2.13%, while non-treatment was 1.20%, and this is consistent with what he found (Abboud and Walid, 2017) that spraying thiamine on certain varieties of white corn affected of plant traits gave a significant increase in the traits of green and dry yield and significantly affected the qualitative traits and protein when using a concentration of 300 mg/L. Perhaps the reason for the excelled of grape seedlings treated with a concentration of 500 mg/L on rest treatment with a concentration of 250 mg/L is due to the increase in thiamine concentration that led to the increase in plant height, number of leaves, leaf area, chlorophyll and the percentage of nitrogen, so thiamin has an effective role in biological reactions. And in the processes of carbon representation,

which leads to an increase in the absorption of the nitrogen component and a representative speed, thus increasing the plant height, the leaf area and the number of branches that increase the percentage of chlorophyll (Cox, 2010 Shau *et al.*, 1993). he reason for the excelled may be due to the role of thiamine in the positive increase in the leaf area and the number of leaves, which increases the number of processed foodstuffs and the accumulation of nutrients in the leaves, especially nitrogen, and this is consistent with (Hamad and Khulaef, 2000) that spraying thiamine on the Sorghum bicolor increases the percentage of protein. The reason for the increase in the percentage of traits is the increase in thiamine concentration and the effective role it plays in increasing plant vitality and increasing cell activity in building new tissues and thus leads to increased absorption of mineral elements from the soil and their accumulation in the leaves and this is consistent with what he found (Abdel-Monaim, 2011) And (Azhar *et al.*, 2015). We also note from the table that for bi-interaction between the treatment of thiamine spray with a concentration of 500 mg /L and organic fertilizer 16 tons / ha well stimulated the growth of grape seedlings as it significantly excelled in the vegetative traits where the percentage of chlorophyll gave 40.80 SPAD, while the leaf content of nitrogen gave 2.28% As for the number of leaves, it gave 582 leaf, while the leaf area gave 44.63 cm², the height of the plant height was 425 cm.

Table (2-a) : Shows the effect of adding fertilizer and thiamine spray on the leaf content of chlorophyll.

Average (T)	A2	A1	A0	A / T
33.43	38.09	37.93	24.26	T0
36.97	38.59	35.99	36.34	T1
38.07	40.80	36.20	37.21	T2
1.14	1.97			0.05 LSD
	39.16	36.71	32.60	Average (A)
	1.14			0.05 LSD

Table (2-b) : Shows the effect of adding fertilizer and thiamine spray on the leaf content of Nitrogen.

Average (T)	A2	A1	A0	A / T
1.49	1.79	1.48	1.2	T0
2.06	2.04	2.08	2.07	T1
2.19	2.28	2.15	2.13	T2
0.09	0.15			0.05 LSD
1.9	2.04	1.9	1.8	Average (A)
	0.09			0.05 LSD

Table (2-c) : Shows the effect of adding fertilizer and thiamine spray on the number of leaves.

Average (T)	A2	A1	A0	A / T
455	513	414	439	T0
539	546	543	529	T1
573	582	573	564	T2
4.35	7.53			0.05 LSD
	547	510	511	Average (A)
	4.35			0.05 LSD

Table (2-d) : Shows the effect of adding fertilizer and thiamine spray on the leaf area.

Average(T)	A2	A1	A0	A / T
32.77	42.19	35.51	20.61	T0
37.61	38.01	37.92	36.90	T1
43.55	44.63	43.80	42.23	T2
0.29	0.51			0.05 LSD
	41.61	39.08	33.25	Average (A)
	0.29			0.05 LSD

Table (2-e) : Shows the effect of adding fertilizer and thiamine spray on plant height.

Average(T)	A2	A1	A0	A / T
360	389	372	319	T0
485	404	381	371	T1
523	425	426	417	T2
6.37	11.03			0.05 LSD
	406	393	369	Average (A)
	6.37			0.05 LSD

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