The effect of agriculture media and the quality of irrigation water in the pomegranate leaves content (Wonderful and Salimi cultiars) of some mineral elements

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ABSTRACT

The experiment was conducted in Al-Qasim district, Al-Bosmik village, Babylon Province in the season 2017 with three factors. The first factor was three agricultural media [soil only, soil + organic substance (Peat moss) with ratio of 1:1, soil + organic substance (Peat moss) with ratio of 1:3] which is symbolized by B1, B2 and B3, respectively. The second factor is the quality of irrigation water at four levels (1.2 river water, 4.48, 7.58, 10.46 $ds.m^{-1}$ drainage water), which is symbolized by W1, W2, W3 and W4 Respectively, the third factor is two pomegranates cultivars (Wonderful and Salimi) which is symbolized by V1 and V2 respectively and interaction between them. The experiment was conducted as a factorial experiment according to Randomized Complete Blocks Design (RCBD), with three replicates, each replicate containing 24 treatments with 4 seedlings per experimental unit. The arithmetic averages were measured according to the least significant difference (LSD) %. The results showed that pomegranate seedlings grown in the media of 1 soil volume: 3 organic substance were significantly excelled on other treatments in all studied traits which included the average increase in the percentage of nitrogen, phosphorus, potassium, calcium, magnesium (2.25%, 0.33, 2.09%, 1.29%, 0.46%), respectively. While the percentage of sodium in the leaves decreased when treating with agricultural media B3 which gave 0.68% and the electrical conductivity at this media amounted of the lowest level of (4.45 $ds.m^{-1}$). As for the source of irrigation water, the drainage water (10.48 $ds.m^{-1}$) which is symbolized by W4 gave the lowest averages in the percentage of nitrogen, phosphorus, potassium, calcium, magnesium (1.45%, 0.18%, 1.13%, 0.63% 0.24%), respectively, obtaining the highest average for the two traits of the percentage for sodium (1.23%) and the electrical conductivity of (7.63 $ds.m^{-1}$) in this treatment. The results showed that the Wonderful cultivar V1 was significantly excelled in the traits of the percentage for (Mg, Ca, K, P, N) which amounted of (1.97%, 0.28%, 1.64%, 1.06%, 0.37%), respectively compared to Salimi cultivar, the results also showed a decrease in both the percentage of sodium and the electrical conductivity in the soil of the wonderful cultivar compared to the soil of the Salimi cultivar.

Keywords: agricultural media, the quality of irrigation water, two pomegranate cultivars.

***Research paper from PHD thesis for the first Author.**

تأثير وسط الزراعة ونوعية مياه الري في محتوى اوراق الرمان صنفي Wonderful و سليمي من بعض العناصر المعدنية

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الخلاصة

نفذت التجربة في قضاء القاسم/ قرية ال بوسميك/ محافظة بابل في الموسم 2017 بثلاثة عوامل وكان العامل الاول هو ثلاثة اوساط زراعية هي (تربة فقط، تربة + مادة عضوية(بتموس) بنسبة 1:1، تربة + مادة عضوية(بتموس) بنسبة 3:1) والذي رمز له بالرمز B1 و B2 و B3 على التوالي، والعامل الثاني هو نوعيات مياه الري بأربعة مستويات(1.2 ماء نهر، 4.48، 7.58، 10.46 ds/m ماء بزل) والتي رمز لها بالرمز W1 و W2 و W3 و W4 على التوالي، والعامل الثالث هو صنفين من الرمان هما(Wonderful و سليمي) والذي رمز لهم V1 و V2 على التوالي والتداخلات فيما بينهم. نفذت التجربة كتجربة عامليه (2X4X3) وفق تصميم القطاعات العشوائية الكاملة Randomized

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(R.C.B.D) Complete Blocks Design بواقع ثلاثة مكررات وكل مكرر يحتوي على 24 معاملة وبواقع 4 شتلات لكل وحدة تجريبية، وقورنت المتوسطات الحسابية حسب اختبار اقل فرق معنوي (L.S.D) تحت مستوى احتمال 5%. اذ اظهرت النتائج بان شتلات الرمان المزروعة في الوسط المكون من حجم تربة : 3 حجوم مادة عضوية تفوق معنويا على المعاملات الاخرى في جميع الصفات المدروسة والتي شملت معدل الزيادة في النسبة للمئوية للنتروجين، الفسفور، البوتاسيوم، الكالسيوم، المغنيسيوم(2.25%،0.33، 2.09%، 1.29%، 0.46%) على التوالي، فيما انخفضت النسبة المئوية للصوديوم في الاوراق عند المعاملة بوسط الزراعة B3 وكانت 0.68%، ودرجة التوصيل الكهربائي عند هذا الوسط بلغت اقل مستوى ds/m4.45. اما بالنسبة الى مصدر مياه الري فقد اعطى ماء البزل ds/m10.48 الذي رمز له بالرمز W4 ادنى المعدلات في النسبة المئوية للنتروجين، الفسفور، البوتاسيوم، الكالسيوم، المغنيسيوم(1.45%، 0.18 %، 1.13 %، 0.63 % 0.24%) على التوالي، وحصل اعلى معدل لصفتي النسبة المئوية للصوديوم 1.23%، ودرجة التوصيل الكهربائي ds/m7.63 في هذه المعاملة. كما بينت النتائج تفوق الصنف الامريكي V1 Wonderful معنويا في صفات النسبة المئوية للـ (Mg,Ca,K,P,N) بلغت (1.97%، 0.28%، 1.64%، 1.06%، 0.37%)على التوالي، قياسا بالصنف سليمي، وحصل انخفاض في صفتي النسبة المئوية للصوديوم ودرجة التوصيل الكهربائي في تربة الصنف Wonderful قياسا بتربة الصنف سليمي.

كلمات مفتاحية: اوساط زراعة، نوعيات مياه ري، صنفين من الرمان

البحث مستل من اطروحة دكتوراه للباحث الاول.

1. INTRODUCTION

Pomegranate is Globally called Punica granatum L. This name means the red fruit with many seeds belonging to the Punicaceae family, which includes only one genus (1).This tree has been found in the Middle East for 5000 years (2). The pomegranate is considered one of the trees of the temperate region, Iran is the original country for it. It has been cultivated in the Arab countries, then moved to North Africa, moved to Spain, Italy, Greece, Mexico and from Mexico to the United States. The number of pomegranate trees in Iraq is amounted of (5,448,850 trees) with a total production of (160124 tons) and the average of production for one tree (29.44 kg / tree) (4). Organic fertilizer has long been used as a soil enhancer and thus improved plant growth because it is rich in nutrients that contribute to increasing soil fertility. This in turn affects vegetative growth of the plant. It not only supplies the nutrients needed by the plants but also is a good source of organic substance. Animal or plant wastes These wastes are decomposed (Compost) and are useful in organic farming and are compensated for processed fertilizers (5, 6). The use of organic fertilizers in general and in various stages of decomposition as a fertilizers increases soil fertility and improves the yield due to the positive effects of organic substance that add to the soil (7). This study will examine the impact of the quality of irrigation water as water is the main factor of agricultural production and development, especially in dry and semi-dry regions, as agricultural expansion requires sufficient irrigation water, thus forcing water users to find additional sources of irrigation water. One of these sources is the use of salt water, The salinity of saline water is dependent on the extent to which it contains salts and when used over time it reduces the nutrient availability of the soil (8). In most regions of the world, water is an important economic resource for most countries. Therefore, the source should be actively and effectively exploited to maximize the benefit and development. The water reserves Sources has been used. Due to the steady population Increasing, The need Urgent to provide larger quantities food and Good quality water has become Rare sources (9). Pomegranate is considered a tree that bears the abnormal conditions, including high salinity and high level of ground water, but this is at the expense of growth and yield (10). In Iraq, there are many local cultivars, which are estimated to be 23 cultivars, including Salimi, Al-huluw, Rawah, Seedless, nab aljamal, jilawi, Hijazi, Almasabiq, Pink, Black and American, which have been recently cultivated (10). The American cultivar (Wonderful) is characterized by the dark red color for the Peels and the grains, the abundance of production, large fruits, their

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grain with acidic taste, their large size and soft kernel (12). Therefore, the study aims to test the effect of salinity on the growth of two pomegranate cultivars (Salimi and wonderful). Testing the role of addition of organic substance in the mitigation of salinity in addition to benefiting from limited-use water quality.

2. MATERIALS AND METHODS

1) Research implementation:

The experiment was conducted in Al-Qasim district, Al-Bosmik village, Babylon Province on two seedlings of pomegranate (salimi and Wonderful), with two years old, as homogenous as possible, Purchased from the General Company for Horticulture and Forestry, Horticultural station in Al-Hindia, in Karbala province, cultivated in 1 kg bags on 5/1/2017 and was transferred on 22/1/2017 to 17 kg bags made of polyethylene filled with the agricultural media and according to the statistical plan of the experiment. The organic material was brought from (Kufa Factory) to agricultural fertilizers belonging to college of Agriculture, University of Kufa, It consists of the macro and micronutrient elements necessary for growth (Fe, Mn, Zn, Ca, Mg, K, P, N). The irrigation water was taken from the drainages distributed within the geographical area to Research implementation.

Experiment factors: -

The first factor: - Agriculture media with three types are.

A- Cultivation in soil.
B- Cultivation in soil + organic substance by 50:50.
C- Cultivation in soil + organic substance by 75:25

The second factor: - The qualities of irrigation water included four types:

A- River water (Control). (1.2 $ds.m^{-1}$)
B- Drainage water (4.48 $ds.m^{-1}$)
C- Drainage water (7.58 $ds.m^{-1}$)
D- Drainage water (10.46 $ds.m^{-1}$)

Third Factor: - Cultivars.

A- American cultivar (Wonderful).
B- The local cultivar (salimi).

Experiment Design :

The experiment was conducted as a factorial experiment according to Randomized Complete Blocks Design (RCBD), in three factors: the first factor with three levels of organic substance and the second factor with four types of water (River water, Drainage water with three concentrations). The third factor is cultivars (wonderful, salimi) to become (3 x 4 x 2), with three replicates. The experimental unit consisted of four seedlings, Thus, the total number of 96 seedlings per replicate, and for three replicates we planted 288 seedlings for both cultivars. The averages were measured by a last significant difference (L.S.D) below the 5% probability level (13). The data were analyzed using the genstat.

Studied traits:

1- Nitrogen content was estimated according to the modified kjeldahl method using micro-kjeldahl (14).
2- Phosphorus is estimated by fresh digestion using Ammonium heptamolybdate and ascorbic acid by a spectrum photometer device (15).
3- Potassium was measured using a Flame photometer (16).
4- Calcium and magnesium in leaves (%) were estimated by Titration with ethylene diamine tetra acetic acid disodium (EDTA Na2) according to method of (17).
5- The amount of sodium was estimated using flame photometer device (18).
6- Electrical conductivity EC: It was measured for the extract of the saturated paste by meter EC device according to method (18).

3. RESULTS

1- Percentage of nitrogen in the leaves (%)

Table (1) that the organic matter in the agriculture media has a significant effect in

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this traits, where the B3 treatment significantly excelled by giving it 2.25% compared to B1 treatment which gave 1.45%. This results agree with (19) when fertilizing the grape with (sheep manures and plant wastes with an average of (9 kg / tree) and the bio-fertilizer (Effective Microorganism), known as EM1 with an rate of (25 $ml.L^{-1}$), where It obtained on the highest significant increase in nitrogen concentration in leaves when treating it with Sheep manures followed by plant wastes compared to the control treatment. It is clear that the quality of water have a significant effect in this trait, where it noted wherever the concentration of salts increased, the percentage of nitrogen in the leaves is decreased. The lowest average in the W4 treatment which amounted of 1.45%, while the river water treatment W1 gave the highest average amounted of 2.42%. As for the cultivars, the cultivar V1 was significantly excelled in this trait by giving it an average of 1.97% compared to the cultivar V2, which gave 1.94%. The bi-interaction between the agriculture media and the quality of irrigation water showed a significant effect on this trait. This indicates that the organic matter found in the agriculture media caused a significant increase in this trait. The bi-interaction treatment B3W1 was excelled by giving it 2.89% compared to the B1W4 treatment which gave the lowest value of 1.29%. The bi-interaction treatment between the agriculture media and the cultivar showed its significant effect in this trait. The treatments V2B3 and V1B3 were significant excelled by giving them the same average which amounted of 2.25 while the treatment of V2B1 was the lowest of 1.45%. It is noted from bi-interaction between the qualities of irrigation water and cultivars, the V1W1 treatment was significantly excelled by giving it 2.52% compared to the V2W4 treatment which gave 1.44%. As for the triple interaction, the treatment of V1B3W1 was significantly excelled by giving it the highest value of 3.00% compared to the V2B1W4 treatment, which gave the lowest value of 1.26%.

2- Percentage of phosphorous in leaves (%)

Table (1) shows that the organic matter in the agriculture media B3 gave a significant superiority in this trait amounted of 0.33% while the control treatment B1 gave the lowest average of 0.18%. This result agrees with (20) when adding 10 $ml.L^{-1}$ of humic acid to the soil of Japanese pears seedlings, which obtained a significant increase in the percentage of phosphorus in the leaves compared to the control treatment. The results of the table showed that the increase in salinity of irrigation water had a significant effect in reducing this trait, where the W4 treatment gave 0.18% compared to the W1 treatment which gave 0.38%.The results in the same table showed that the V1 cultivar was significantly excelled by giving it 0.28% compared to the V2 cultivar, which gave 0.26%. The bi-interaction between the agriculture media and the quality of irrigation water (B × W) showed significant differences. Where the B3W1 treatment recorded a percentage 0.50% while the B1W4 treatment gave 0.13%. The bi-interaction between the agriculture media and the cultivar (B × V) had a significant effect on this trait. The V1B3 treatment was significantly excelled by giving it 0.36% while the V1B1 treatment recorded 0.18%. As for the bi-interaction between the quality of irrigation water and the cultivar (V × W) where the V1W1 treatment gave the percentage of phosphorous in leaves amounted of 0.41% while the V2W4 treatment gave 0.17%. The results of triple interaction showed that there was a significant difference in the percentage of phosphorus in the leaves, where the V1B3W1 treatment gave the highest average amounted of 0.56% compared to the V2B1W4 treatment, which gave the lowest average amounted of 0.13%.

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Table 1: The effect of agriculture media and the quality of irrigation water in in the percentage of nitrogen and phosphorus in the leaves (%) for two cultivars of pomegranate seedlings.

Cultivars (V)	Agriculture media (B)	Percentage of nitrogen (%)					Percentage of phosphorus (%)				
		The quality of irrigation water ($ds.m^{-1}$)				V×B	The quality of irrigation water ($ds.m^{-1}$)				V×B
		1.2 W1	4.48 W2	7.58 W3	10.46 W4		1.2 W1	4.48 W2	7.58 W3	10.46 W4	
Wonderful (V1)	B1	1.60	1.50	1.46	1.33	1.47	0.22	0.20	0.18	0.14	0.18
	B2	2.97	2.43	1.80	1.53	2.18	0.45	0.31	0.24	0.20	0.30
	B3	3.00	2.51	1.94	1.56	2.25	0.56	0.38	0.29	0.23	0.36
Salimi (V2)	B1	1.60	1.55	1.42	1.26	1.45	0.24	0.21	0.19	0.13	0.19
	B2	2.61	2.46	2.01	1.46	2.13	0.39	0.32	0.25	0.20	0.29
	B3	2.77	2.52	2.11	1.60	2.25	0.45	0.34	0.24	0.20	0.30
L.S.D 0.05		**0.11**				**0.05**	**0.03**				**0.01**
						V					**V**
V×W	V1	2.52	2.14	1.73	1.47	1.97	0.41	0.29	0.23	0.19	0.28
	V2	2.33	2.17	1.85	1.44	1.94	0.36	0.29	0.22	0.17	0.26
L.S.D 0.05		**0.06**				**0.03**	**0.02**				**0.01**
						B					**B**
W×B	B1	1.60	1.52	1.44	1.29	1.46	0.23	0.20	0.18	0.13	0.18
	B2	2.79	2.44	1.91	1.49	2.16	0.42	0.31	0.24	0.20	0.29
	B3	2.89	2.51	2.02	1.58	2.25	0.50	0.36	0.26	0.21	0.33
L.S.D 0.05		**0.08**				**0.04**	**0.02**				**0.01**
W		2.42	2.16	1.79	1.45		0.38	0.29	0.23	0.18	
L.S.D 0.05		**0.04**					**0.01**				

3- Potassium percentage in leaves (%)

Table (2) show that the organic matter has a significant effect on this trait, where the B3 treatment was significantly excelled by giving it 2.09% compared to the B1 treatment which gave 0.82%.The results showed that the treatment of drainage water had a negative effect on this trait. wherever the concentration of salt increased, the greater the effect. The W4 treatment gave the lowest average amounted of 1.13% while the W1 treatment gave the highest average amounted of 2.04%.This results agree with (21) who found a decrease in the percentage of potassium in the leaves in the presence of salinity, which in turn enhances the interpretation of decrease the percentage potassium in leaves due to the high concentration of sodium in irrigation water. The results of the same table showed a significant difference between the types of experiment, where the V1 treatment was significantly excelled by giving it an average 1.64% compared to the V2 cultivar, which gave 1.55%. It was also shown from the table that the bi-interaction between the agriculture media and the quality of irrigation water had a significant effect in this trait. The B3W1 treatment recorded the highest average of 2.60% compared to the B1W4 treatment which gave the lowest average of 0.64%. There was also a significant difference between the bi-interaction treatments between the agriculture media and the cultivars of the experiment. The V1B3 treatment was significantly excelled by giving it 2.13% compared to the V2B1 treatment which gave 0.76%. The bi-interaction treatment between the quality of irrigation water and cultivars showed a significant effect in this trait. The V1W1 treatment recorded 2.11% compared to the V2W4 treatment which gave 1.09%. Triple interaction treatments between the experiment treatments had a significant effect in this trait, where the V1B3W1 treatment recorded the highest average amounted of 2.62% compared to the V2B1W4 treatment which gave 0.59%.

4- Percentage of calcium in leaves (%)

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Table (2) shows that there was a significant increase in this trait when treating pomegranate seedlings with organic matter, where the B3 treatment was significantly excelled by giving it the highest average compared to the rest of the treatments 1.29% and compared to the B1treatment which gave 0.63%.As for the qualities of irrigation water, there was a significant decrease in this trait when the salinity of irrigation water increased, where the W4 treatment gave the lowest average amounted of 0.63%, while the W1 treatment gave the highest average amounted of 1.45%. These results agree with (22) that the Irrigation with different saline levels achieved a decrease in the percentage of calcium in olive leaves compared to the control treatment. The results of the table show that there is an insignificant increase for the V1 cultivar by giving it the highest value amounted of 1.06% while the V2 gave the lowest value amounted of 1.01%.Significant differences were observed in the bi-interaction treatments between the agriculture media and the qualities of irrigation water, where the B3W1treatment was significantly excelled by giving it 1.70% compared to the B1W4 treatment, which gave 0.19%.In the bi-interaction between agriculture media and cultivars there was a significant difference between the treatments, where the V1B3 treatment was significantly excelled by giving it 1.33% while the V2B1 treatment gave 0.61%. As for the bi-interaction treatment between the qualities of irrigation water and the cultivars, the results of the following table show significant differences, where the V1W1 treatment gave 1.51% compared to the V1W4 and V2W4 treatments, which gave the same average 0.63%. In the triple interaction between the factors of the study, the treatment V1B3W1 gave the highest values amounted of 1.80% compared to the treatment V2BW4, which gave the lowest value amounted of 0.19%.

Table 2: The effect of agriculture media and the quality of irrigation water in in the percentage of potassium and calcium in the leaves (%) for two cultivars of pomegranate seedlings.

Cultivars (V)	**Agriculture media (B)**	**Percentage of potassium (%)**					**Percentage of calcium (%)**				
		The quality of irrigation water ($ds.m^{-1}$)				**V×B**	**The quality of irrigation water ($ds.m^{-1}$)**				V×B
		1.2 W1	4.48 W2	7.58 W3	10.46 W4		1.2 W1	4.48 W2	7.58 W3	10.46 W4	
Wonderful (V1)	B1	1.20	0.89	0.74	0.70	0.88	1.13	1.00	0.24	0.20	0.64
	B2	2.51	1.97	1.86	1.36	1.92	1.60	1.30	1.10	0.83	1.10
	B3	2.62	2.45	2.00	1.46	2.13	1.80	1.46	1.20	0.86	1.33
Salimi (V2)	B1	1.06	0.79	0.63	0.59	0.76	1.06	0.96	0.25	0.19	0.61
	B2	2.30	1.91	1.82	1.30	1.83	1.53	1.36	1.03	0.80	1.18
	B3	2.57	2.31	1.94	1.40	2.05	1.60	1.40	1.10	0.90	1.25
L.S.D 0.05		0.14				0.07	0.27				0.13
						V					**V**
V×W	V1	2.11	1.77	1.53	1.17	1.64	1.51	1.25	0.84	0.63	1.06
	V2	1.97	1.67	1.46	1.09	1.55	1.40	1.24	0.79	0.63	1.01
L.S.D 0.05		**0.08**				**0.04**	**0.15**				**0.07**
						B					**B**
W×B	B1	1.13	0.84	0.68	0.64	0.82	1.10	0.98	0.24	0.19	0.63
	B2	2.40	1.94	1.84	1.33	1.88	1.56	1.33	1.06	0.81	1.19
	B3	2.60	2.38	1.97	1.43	2.09	1.70	1.43	1.15	0.88	1.29
L.S.D 0.05		**0.10**				**0.05**	**0.19**				**0.09**
W		2.04	1.72	1.50	1.13		1.45	1.25	0.82	0.63	
L.S.D 0.05		**0.05**					**0.11**				

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5- Percentage of magnesium in leaves (%)

Table (3) shows that the organic matter has the significant effect in this trait. The B3 treatment has significantly excelled by giving it 0.46% compared to the control treatment which gave the lowest average amounted of 0.20%.The results in the same table showed that the qualities of irrigation water affected on this trait where the W4 treatment gave the lowest average amounted of 0.24%, while the W1 treatment gave the highest average amounted of 0.48%.These results agree with (23) when irrigation the two cultivars of apricot trees (Labib1 and Zienni), with levels of (1, 2, 3 ds.m-1), The increased salinity of irrigation water led to reduce the leaves content of magnesium of the leaves compared to that of both cultivars and for both two years of study. The results of the same table showed an insignificant increase among the experiment cultivars, where the V1 cultivar recorded 0.37% while the V2 cultivar gave an average amounted of 0.36%.It was also shown from the table that the bi-interaction between the agriculture media and the qualities of irrigation water had a significant effect in this trait, where the B3W1 treatment was significantly excelled by giving it an average amounted of 0.58% compared to the B1W4 treatment which gave 0.14%.There were also significant differences in the bi-interaction between the agriculture media and the experiment cultivars. The V1B3 treatment was significantly excelled by giving it an average of 0.47%, while the V2B1 treatment recorded 0.20%.The bi-interaction treatment between the qualities of irrigation water and the cultivars showed a significant effect in this trait. The V1W1 treatment was excelled by giving it an average of 0.49% compared to the V2W4 treatment which gave 0.24. Triple interaction treatments between the experiment treatments had a significant effect in this trait. The V1B3W1 treatment was excelled by giving it 0.60% compared to the V2B1W4 treatment which gave 0.13%.

6- Percentage of sodium in leaves (%)

Table (3) showed significant differences between the treatments of the agriculture media. The B1 treatment was significantly excelled by giving it an average amounted of 1.07% compared to the B3 treatment which gave 0.68%.It is noted from the table that there is an effect of the qualities of irrigation water on this trait where obtained on the highest average in the W4 treatment, which amounted of 1.23% compared to the treatment of river water W1, which gave the lowest average amounted of 0.52%.This result agrees with (24) when irrigating the sour orange seedlings by water with three levels of salinity (2, 4, 6 $ds.m^{-1}$) by adding sodium chloride, calcium and magnesium salts with ratio of 1: 1: 1 to well water with salinity of (2 $ds.m^{-1}$), The results of the leaves content of sodium increased significantly by increasing the salinity of irrigation water. The same table showed a significant increase between the cultivars of the study in this trait where the V2 cultivar obtained an increase and gave 0.83% compared to the V1 cultivar which gave 0.79%.The interaction between the agriculture media and the quality of irrigation water showed a significant effect, where the B1W4 treatment gave an average amounted of 1.80% compared to the B3W1 treatment, which gave 0.45%.The results showed that there was a significant difference between the treatments. The V2B1 treatment was significantly excelled by giving it the highest average amounted of 1.10% compared with the V1B3 treatment which gave the lowest average amounted of 0.67%.The bi-interaction between the quality of irrigation water and cultivars, the V2W4 treatment was significantly excelled by giving it 1.27% compared to the V2W1 treatment which gave 0.51%. As for the triple interaction, the V2B1W4 treatment was significantly excelled and

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gave the highest average amounted of 1.90%, while the V2B3W1 and V1B3W1 treatments recorded the lowest average amounted of 0.45%.

Table 3: The effect of agriculture media and the quality of irrigation water in in the percentage of magnesium and sodium in the leaves (%) for two cultivars of pomegranate seedlings.

Cultivars (V)	Agriculture media (B)	Percentage of potassium (%)					Percentage of calcium (%)				
		The quality of irrigation water ($ds.m^{-1}$)				V×B	The quality of irrigation water ($ds.m^{-1}$)				V×B
		1.2 W1	4.48 W2	7.58 W3	10.46 W4		1.2 W1	4.48 W2	7.58 W3	10.46 W4	
Wonderful (V1)	B1	0.30	0.20	0.20	0.15	0.21	0.62	0.86	0.99	1.70	1.04
	B2	0.58	0.50	0.38	0.29	0.43	0.46	0.52	0.81	0.94	0.68
	B3	0.60	0.55	0.42	0.31	0.47	0.45	0.50	0.79	0.93	0.67
Salimi (V2)	B1	0.28	0.22	0.17	0.13	0.20	0.70	0.82	1.00	1.90	1.10
	B2	0.55	0.52	0.39	0.30	0.44	0.46	0.54	0.85	0.96	0.70
	B3	0.57	0.53	0.40	0.30	0.45	0.45	0.51	0.84	0.95	0.69
L.S.D 0.05		0.06				0.03	0.12				0.06
						V					**V**
V×W	V1	0.49	0.41	0.33	0.25	0.37	0.51	0.62	0.86	1.19	0.79
	V2	0.46	0.42	0.32	0.24	0.36	0.54	0.62	0.89	1.27	0.83
L.S.D 0.05		**0.03**				**0.01**	**0.06**				**0.03**
						B					**B**
W×B	B1	0.29	0.21	0.18	0.14	0.20	0.66	0.84	0.99	1.80	1.07
	B2	0.56	0.51	0.38	0.29	0.43	0.46	0.53	0.83	0.95	0.69
	B3	0.58	0.54	0.41	0.30	0.46	0.45	0.50	0.81	0.94	0.68
L.S.D 0.05		**0.04**				**0.02**	**0.08**				**0.04**
W		0.48	0.42	0.32	0.24		0.52	0.62	0.88	1.23	
L.S.D 0.05		**0.02**					**0.04**				

7- Estimate Electrical Conductivity for Soil (EC):

Table (4) shows that the organic matter has a clear effect in reducing the salinity of irrigation water when used in the cultivation of pomegranate seedlings, where the B3 treatment gave the lowest average of electric conduction, which amounted of (4.45 $ds.m^{-1}$) compared to the B1 treatment, which gave the highest average amounted of (5.59 $ds.m^{-1}$). These results agree with (25) when adding organic wastes to soil (goat manure and plant wastes) led to a significant decrease in electrical conductivity, respectively and for the two seasons compared to the control treatment. As for the qualities of irrigation water, there was a significant increase in electrical conductivity when salinity of irrigation water was increased, where the W4 treatment recorded the highest average amounted of (7.63 $ds.m^{-1}$), while the W1 treatment recorded (3.02 $ds.m^{-1}$). The results showed that there were significant differences between the cultivars in this trait. The soil of V2 cultivar gave (5.06 $ds.m^{-1}$) compared to the soil of V1 cultivar, which gave (4.92 $ds.m^{-1}$). From the same table, there were significant differences in the bi-interaction treatments between the agriculture media and the quality of the irrigation water, where the B1W4 treatment was excelled and gave the highest average amounted of (8.52 $ds.m^{-1}$) compared to the B3W1 treatment which gave the lowest average of (2.90 $ds.m^{-1}$). Bi-interaction treatment between agriculture media and cultivars showed significant differences between the treatments. The V2B1 treatment was significantly excelled and gave the highest average amounted of (5.70 $ds.m^{-1}$) compared to the V1B3 treatment which

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recorded (4.41 ds.m^{-1}). As for the bi-interaction treatment between the qualities of irrigation water and the cultivars, the results of the following table indicate significant differences, where the V1W4 treatment recorded a salinity with a concentration of (7.69 ds.m^{-1}) compared to the V1W1 treatment which gave (2.98 ds.m^{-1}). In the triple interaction between the study factors, the treatment V1B1W4 recorded the highest values amounted of (8.85 ds.m^{-1}) compared to the V1B3W1 treatment, which gave the lowest value of (2.87 ds.m^{-1}).

Table 4: The effect of agriculture media and the quality of irrigation water in in the Electrical Conductivity for Soil (EC) for two cultivars of pomegranate seedlings.

Cultivars (V)	**Agriculture media (B)**	**Percentage of potassium (%)**				
		The quality of irrigation water (ds.m^{-1})				
		1.2 W1	4.48 W2	7.58 W3	10.46 W4	**V×B**
Wonderful (V1)	B1	3.16	4.36	5.60	8.85	5.49
	B2	2.91	3.89	5.03	7.55	4.85
	B3	2.87	3.58	4.55	6.66	4.41
Salimi (V2)	B1	3.24	4.67	6.70	8.20	5.70
	B2	2.99	3.96	5.21	7.78	4.98
	B3	2.92	3.62	4.66	6.74	4.48
L.S.D 0.05		**0.36**				**0.18**
						V
V×W	V1	2.98	3.94	5.06	7.69	4.92
	V2	3.05	4.08	5.52	7.57	5.06
L.S.D 0.05		**0.20**				**0.10**
						B
W×B	B1	3.20	4.51	6.15	8.52	5.59
	B2	2.95	3.92	5.12	7.67	4.92
	B3	2.90	3.60	4.60	6.70	4.45
L.S.D 0.05		**0.25**				**0.12**
W		3.02	4.01	5.29	7.63	
L.S.D 0.05		**0.14**				

4. DISCUSSION

The results showed that the agriculture media (Soil: peat moss 3: 1) B3 was excelled on the rest of the treatments by giving it the highest values in most studied traits, while the percentage of sodium in leaves and electrical conductivity of the soil decreased. This is due to the organic matter found in the agriculture media rich with macro and micronutrient elements, especially the basic elements such as nitrogen, phosphorus and potassium availability for absorption and what these elements play an important role in many of the physiological and vital events that stimulate the process of nutrient manufacturing in the plant. Nitrogen stimulates the plant to produce Auxins and the synthesis of proteins, which encourages the process of cell division and elongation (26, 27). The reason for increasing concentration of absorbed nutrient elements in the roots can be attributed to the role played by Organic fertilizers in reducing significantly the pH of soil, which has a significant impact in increasing the availability of nutrient elements in the soil and thus increase absorption of them, Organic fertilizers can also supply various nutrient elements and thus increase the absorption of them by the root hairs. This is by dissolving the organic waste, which produces the organic acids and releases the CO_2 gas, which is in combination with water, H_2CO_3, which is quickly ionized into HCO_3 and H^+, which leads to the

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reduction of the pH of the soil, which dissolves some of the deposited phosphate compounds and releasing phosphorus of them, and makes it availability for plant, as well as the availability of microelements, such as Fe, Mn, B, Cu, Zn, As it reduces the loss of nutrient elements in the soil as a result of washing with rain or irrigation water and by adsorption on the surfaces of its particles, In addition, it supplies the plant with some macronutrient elements, in small quantities and according to the need of plants such as N.P.K and other elements, thus increasing the cation exchangeability (28, 29). This is due to the low values of electrical conductivity of soil when treated with organic fertilizer because its degradation produces an abundance of organic and inorganic acids, which are soluble salts of humate, sodium sulphate and salts of precipitated calcium and magnesium. These compounds tend to be washed with irrigation water inside the soil (30). As for the second factor: the quality of irrigation water, it has been shown that irrigation with saline water increased the salinity of the soil, which increased its Osmotic pressure and reduced its water stress, resulting in a lack of water and nutrient availability for the plant, decreasing the Turgor pressure of the plant cells and thus decreasing the division and elongation of the cells (31). As for the effect of the quality of irrigation water on the plant content of nutrient may be due to the reduction of nutrient elements in pomegranate seedlings by increasing the salinity of irrigation water to the role of salts in increasing the Osmotic pressure for the soil solution and preventing nutrient absorption by the plant or disruption of the nutrient and hormonal balance within the plant (8, 32). Or due to the high percentage of sodium in the leaves of plants irrigated with drainage water, which is due to the rise it concentration in the root area, causing competition in the permeability of other elements, which causes increasing absorption and accumulation it in the leaves with low percentage of other elements (33). The values of electrical conductivity also increased positively with increasing salinity of irrigation water. This is due to the accumulation of salts during the plant growth stage due to the rise of electrical conductivity for the drainage irrigation water compared to the treatment of river water. Differences in the leaves content of the nutrient elements between the two cultivars (Wonderful and Salimi) were attributed to genetic causes related to the cultivar (34). This affected the difference of the strength of vegetative and root growth of both cultivars or perhaps due to the large leaf area and the number of leaves which characterized by it the wonderful cultivar and because they have a role in the photosynthesis process and improve the nutritional status of the plant because it works to withdraw the largest amount of water and nutrient elements from the root area as The vegetative growth extends the roots with the largest amount of carbohydrates. In terms of the bi-interaction between the organic media and the qualities of irrigation water, salt stress causes low plant growth and productivity by disrupting physiological processes, especially photosynthesis, while the organic matter showed a clear effect in improving plant growth in the conditions of salt stresses as the addition of organic fertilizer has an important role and effective in Improving chemical, physical and biological soil traits. The role of these organic substances From the Chemical side is to add a lot of ions and nutrient elements directly to the soil, meaning processing the soil with nutrient elements. From the Physical side, organic wastes improve the soil structure, increase soil porosity, decrease the soil apparent density values and increase Soil retention with water. This indirectly affects the changing chemical traits of the soil through the process of washing salts down and changes the chemical composition of negative and positive ions and provides favorable conditions for microorganisms of ventilation, moisture and nutrient elements

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(35). As for the bi-interaction between the quality of irrigation water and cultivars, the drainages water led to the reduction of most of the studied traits of both types, especially in irrigation level W4, The direct effects caused by increased salinity in the soil solution are due to the inhibition of enzymes, resulting in imbalances in food balance, cellular membrane functions and plant metabolism in general, and consequently their effect on Photosynthesis, respiration and energy transfer. Or the decrease may be due to the indirect effects of increasing salinity on the physical and chemical soil traits and therefore its effect on the growth of seedlings in these saline media. The height of Osmotic pressure leads to a decrease in the ability of the plant to absorb the water and decrease the bulging of the cells Which affects the softness of the cell wall and the lack of expansion and elongation. Thus, reducing the amount of CO_2 inside the Stoma, ionic imbalance, Thus reducing the ability of the plant to absorb the nutrient elements, all this leads to a decrease in the percentage of nutrient elements concentration in the leaves (36). It was noted from the bi-interactions between the agriculture media and cultivars that the American cultivar (wonderful) has excelled in all the studied traits of the Salimi cultivar when treating with the organic media, especially in the B3 media, and this difference may be due to the variation of genetic factors among the cultivars (37). Which has been positively reflected in the physiological events necessary for vegetative and root growth, as well as the large root mass and the large of the leaf area of the wonderful cultivar compared to the Salimi cultivar and this helps the plant to absorb the largest amount of water and nutrient elements from the root area. In the triple interactions, the highest values were obtained in the studied traits. This is due to the presence of the organic agriculture media, which reduced the effect of saline irrigation water qualities and thus improved the chemical and physiological soil traits and thus positively reflected on plant growth. The organic matter has also significantly affected the concentration of nutrient elements in pomegranate seedlings. This may be due to the role played by organic matter in maintaining the regulatory capacity of the soil through the hydrogen ions released from the carboxylic groups. It also affects the validity of many nutrient elements through interactions, the organic matter and its degradation processes are an important step in contributing to the improvement of physiochemical and chemical soil traits. However, they are also a major source of nitrogen, a large part of phosphorus, potassium and other nutrients, Thus obtaining the plant's need for those elements in relation to non-treatment with the organic media.

CONCLUSION

The results showed that pomegranate seedlings bear salt water irrigation (4.48-7.58 $ds.m^{-1}$), especially pomegranates Wonderful cultivar, The use of organic media (Peat Moss) in soils Which suffer from water scarcity and that irrigated with salt water, the two cultivars seedlings of pomegranate has helped to withstand the conditions of salt stresses and improved the growth of plants, especially the media (3: 1 soil: Peat Moss). It also appeared that the American cultivar (Wonderful) more tolerable conditions of salt stresses and was the best.

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