EFFECT OF FOLIAR SPRAY OF KNO3, HUMIC ACID CULTIVARS AND THEIR INTERACTIONS ON LEAF NUTRIENTS OF OLIVE (*OLEA EUROPAEA* L.) CVS. KHITHARY AND I18 TRANSPLANTS

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Abstract:

This study was carried out during the growing season (2012) in Bakrajo Nursery Station/ Sulaimani, Kurdistan Region-Iraq. Uniform and healthy olive (*Olea europaea* L.) cvs. Khithary and I 18 transplants of (2) years old were used. Filled with river loamy soil to investigate the effect of three levels KNO_3 (0, 100 and 200 mg.L^{-1}), three humic acid concentrations (0,150 and 300 mg.L^{-1}) and their interactions on leaf nutrients of Olive cvs. Khithary and I 18 transplants. The results are summarizing as follows: Khithary significantly dominated over cv. I 18 in total leaf chlorophyll, P, K, Zn. However cv. I 18 significantly increased N and Fe. The interactions between cv. Khithary with KNO_3 significantly increased P, K, Fe. While, cv. I 18 significantly increased N and Fe. The interactions between cv. I 18 +300ppm of humic acid significantly increased Fe. While Khithary with humic acid caused the highest values of N, P, K, Zn. The interactions between KNO_3, humic acid and cv. Khithery affected significantly on most of the leaf nutrients characteristics. While, 200 ppm KNO_3+0 humic acid with cv. Khithary increased all parameters except leaf Zn.

* Part of M.Sc thesis of the second author

Key words: KNO3, Humic acid, Olive transplant

INTRODUCTION

Olive belongs to the botanical order, *Ligustrales*, family (Oleaceae), this family includes (30) genus including (*Olea*) which has (600) species. Olive is botanically called (*Olea europaea* L.). Commercial olives belong to the (*Europaea*) species, this species has two subspecies: *oleaster* and *sativa (*Bartolucci, and Dhakal 1999). World olive production performs an important role in the economy of many countries such as Spain, Italy, Greece, Turkey and Tunisia. Olive is an important perennial crop in many agricultural regions of the Mediterranean countries, as it is the most important olive growing region. The olive tree yield has two main products: oil and table olives (Sibbett, *et al,* 2005). In Iraq, olive trees growing in some areas of central North Iraq and Kurdistan Region, Nineveh is the governorate leading olive producer, its cultivation in Nineveh spreading in an area including villages of (Baashiqa, Bahzany, Fadiliya, Sheikh Uday, Dhecan, Sinjar), Diyala, Kirkuk, Baghdad, Erbil, Duhok, Aqrah, Bamarni followed by Babylon (Shaima, 2012).

The importance of olive fruit is due to heavy loading and dietic value, as the fruit is a good source of vitamins (A, B, C, D, E) and minerals like (K, Ca, Mg and P) Ibrahim, (2005). In addition, olive oil is filled with mono-unsaturated fatty acids and has many anti-oxidative properties as phenolic acid (Shaima, 2012). Potassium takes part in many important processes, regulating the opening and closing of stomata, the transport of organic and inorganic ions within the plant; promoting the maturity, yield, size and quality of the fruit. Sufficiency level of (K %) in olive leaves were (0.8-1.3), which sampled from the mid-length of current year's young shoots that do not bear fruit (Ashraf, *et al,*. 2004). Organic fertilizers are natural materials and good medium for the interaction of micro-organisms and provide plant with nutrients as well as having an indirect role in nutrition by the activity of micro organisms. So using organic and bio-fertilizers instead of the chemical forms could be the way to produce the natural healthy fruits. In this respect, the organic fertilization improved vegetative growth and nutritional status (Farag, 2006).

This investigation aimed to:

Study the effect of KNO_3 and humic acid on leaf nutrients parameters of (Khithary and I 18) transplants in the climate at Kurdistan Region. Find out a fertilization program can replace the

mineral which will be beneficial for organic production of olives. Save human health and environment.

Impact of both olive cultivars which newly entered to the region on the vegetative growth of olive transplants. In addition to study the possibility of the production transplanting with proper size, in a short period of time.

Materials and Methods:

The study was carried out during (2012) in Bakrajo Nursery station/ Sulaimani, Kurdistan Region-Iraq, located on 15km southwestern of Sulaimani city. Uniform and healthy olive (cvs. Khithary and I 18) transplants of (2) years old were chosen, (Khithary is originated in Syria and I 18 is originated in Spain). The experiments were started in (March 15th 2012), as transplants were grown in pots each of (5 kg) weight. Three KNO_3 concentrations (0, 100 and 200 mg.L^{-1}), KNO_3 compound of 44% K_2O, 13% N and 37% K. (Restrep-Diaz *et al*,. 2009). Humic acid (HA) concentrations (0,150 and 300 mg.L^{-1}), abo najmeh20, compound of %20 humic acid, %20 organic potassium and %10 organic carbon, Naser company for agrochemical-Syria), were sprayed at 15th April and repeated at same concentrations in 15th May.

Experimental design and statistical analysis:

The experiment was arranged in factorial experiment. The completely Randomized Block Design (R.C.B.D) was used, the experiment comprised of (18) treatments with three replicates, each replicate was presented by five pots each pot contained one transplant (Al-Rawi, and Khalafalla1980).

The obtained data were tabulated and statistically analyzed by computer using SAS system (1996). The differences among various treatment means were tested with Duncun multiple range test at (5%) level. SAS Institute (1996).

Parameters:

The following measurements were recorded on November 25th

1-Nitrogen concentration was determined with Microkjeldahl.

2-Phosphorus concentration was determined with colorimetric methods using Spectrophotometer Pharmacia LKB method.

3- Potassium concentration was determined with using flamephotometer.

4- Iron and Zing concentration (ppm) was determined by Atomic Absorption Spectrophotometer.

RESULTS AND DISCUSSION

1- Leaf nitrogen%

Table (1) shows that the transplant when treated with 200 mg KNO_3.L^{-1} gave the highest value of nitrogen content (1.56%) and the lowest value (1.44%) recorded from untreated transplants. Nitrogen content% in the leaves of transplants untreated with humic acid significantly increased leaf nitrogen contents compared with other treatments. Leaves nitrogen content% differed between the two cultivars, leaves of 'I 18' cultivar contained significantly higher nitrogen content (1.52%) compared with 'Khithary' leaves (1.46%). The interactions between KNO_3 and humic acid significantly influenced nitrogen content in transplants leaves that treated with 0 mg humic acid.L^{-1} and 200 mg KNO_3.L^{-1} which gave the highest value (1.76%) and the lowest value (1.26%) obtained with 200 mg KNO_3.L^{-1} plus 300 mg humic acid.L^{-1}. KNO_3 and cultivar interactions displayed cv. 'I 18' transplants treated with 200 mg KNO_3.L^{-1} gave the highest percentage of nitrogen (1.58%).The interactions between humic acid and cultivar significantly increased nitrogen content% untreated 'Khithary' transplant which gave the highest value (1.75%) and the lowest value (1.23%) was recorded from in 'Khithary'

Table (1): Effect of KNO_3, humic acid and their interactions on leaf nitrogen (%) content of olive transplants cvs. 'Khithary' and'I 18'.

Var.	HA (mg.L^{-1})	KNO_3 (mg.L^{-1})			Var*HA	Mean effect of Var.
		0	100	200		
Khithary	0	1.57 c-e	1.72 bc	1.95 a	1.75 a	1.46 b
	150	1.32 g	1.32 g	1.54 d-f	1.39 d	
	300	1.39e-g	1.16 h	1.14 h	1.23 e	
I 18	0	1.45e-g	1.48d-g	1.57c-e	1.50 c	1.52 a
	150	1.53d-f	1.64b-d	1.79 b	1.65 b	
	300	1.35 g	1.53d-f	1.37 fg	1.42 cd	
Mean effect of KNO_3		1.44 b	1.47 b	1.56 a		
Var* KNO_3	Khithary	1.43 b	1.40 b	1.54 a	Mean effect of HA	
	I 18	1.45 b	1.55 a	1.58 a		
HA* KNO_3	0	1.51 cd	1.60 bc	1.76 a	1.62a	
	150	1.43 d-f	1.48 de	1.66 ab	1.52b	
	300	1.37e-g	1.35 fg	1.26 g	1.32c	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other's according to Duncans multiple ranges test at 5% level.

transplants when treated with 300 mg humic acid.L^{-1}. Results of KNO_3, humic acid and cultivars interactions indicated that spraying 'Khithary' olive cultivar with 200 mg KNO_3.L^{-1} plus 0 mg humic acid.L^{-1} was the most potent treatment which gave (1.95%) nitrogen% while the lowest nitrogen coincided with untreated 'Khithary' olive cultivar(1.14%)

2- Leaf phosphorus%.

Table (2) reveals that the transplant treated with 200 mg KNO_3.L^{-1} gave the highest value of phosphorus content (0.47%) and the lowest value (0.39%) recorded in untreated transplants. Humic acid concentration decreased leaf phosphorus content%, while untreated transplants gave the highest value of leaf p% compared with other treatments. Khithary cultivar leaves contained higher phosphorus content (0.45%) compared with leaves of 'I 18' (0.41%). The interactions between KNO_3 and humic acid significantly influenced phosphorus leaf content when treated 200 mg KNO_3.L^{-1} which gave the highest value (0.66%) and the lowest value (0.37%) was recorded from 200 mg KNO_3.L^{-1} plus 300 mg humic acid.L^{-1}. In the case of KNO_3 and cultivar interaction, it was found that 'Khithary' leaves treated with 200 mg KNO_3.L^{-1} gave the highest percentage of phosphorus (0.53%) compared with other interactions. The interactions between humic acid and cultivar showed that phosphorus content % of untreated 'Khithary' transplants gave the highest value (0.56%) and the lowest value (0.39%) was recorded from 'I 18' transplants when treated by 150 mg humic acid.L^{-1}. Results of KNO_3, humic acid and cultivars interactions indicated that spraying 'Khithary' olive cultivar with 200 mg KNO_3.L^{-1} plus 0 mg humic acid.L^{-1} was the most potent treatment which gave (0.85%) phosphorus, while the lowest phosphorus content (0.33%) in Khithary transplant when treated with 0 mg KNO_3. L^{-1} plus 300 mg humic acid.L^{-1}.

Table (2): Effect of KNO_3, humic acid and their interactions on leaf hosphorus (%) content of olive transplants cvs. 'Khithary' and 'I 18'.

Var.	HA (mg.L^{-1})	KNO_3 (mg.L^{-1})			Var*HA	Mean effect of Var.
		0	100	200		
Khithary	0	0.35 ef	0.48 bc	0.85 a	0.56 a	0.45 a
	150	0.41 b-f	0.43b-e	0.38d-f	0.41 b	
	300	0.33 f	0.49 b	0.37d-f	0.40 b	
I 18	0	0.46 bd	0.36 ef	0.46 bd	0.43 b	0.41 b
	150	0.39c-f	0.39c-f	0.38c-f	0.39 b	
	300	0.42b-f	0.41b-f	0.38d-f	0.40 b	
Mean effect of KNO_3		0.39 b	0.43 b	0.47 a		
Var* KNO_3	Khithary	0.36 d	0.47 b	0.53 a	Mean effect of HA	
	I 18	0.43 bc	0.38 cd	0.41 cd		
HA* KNO_3	0	0.41 bc	0.42 bc	0.66 a	0.49a	
	150	0.40 bc	0.41 bc	0.38 c	0.40b	
	300	0.38 c	0.45 b	0.37 c	0.40b	

Means within a column, row and their interactions followed with the same letters are not significantly different from each other's according to Duncans multiple ranges test at 5% level.

3- Leaf potassium (%)

Table (3) shows that spraying olive transplant with KNO_3 or humic acid at both levels not affect the leaf potassium content%. Leaves of 'Khithary' cultivar contained significantly higher potassium content (0.99%) when compared with leaves of 'I 18' (0.77%). The interactions between KNO_3 and humic acid significantly influenced potassium content in the leaves of transplants when untreated transplant gave the highest value (0.98%). KNO_3 and cultivar interactions showed that the leaves of 'Khithary' transplants treated with 100 mg.L^{-1} KNO_3 contained the highest percentage of potassium (1.08%) compared with other interaction between KNO_3 and cultivar. The interactions between humic acid and cultivar non affecter on potassium content% of the 'Khithary' transplants when treated with 300 mg humic acid.L^{-1} which gave the highest value (1.00%). Results of KNO_3, humic acid and cultivars interactions indicated that spraying 'Khithary' olive cultivar with 100 mg KNO_3.L^{-1} plus 300 mg humic acid.L^{-1} was the most potent treatment which gave the highest value (1.14%) potassium, while the lowest potassium content (0.62%) in 'I 18' transplant was found when treated with 100 mg KNO_3.L^{-1} plus 0 mg humic acid.L^{-1}.

Table (3): Effect of KNO_3, humic acid and their interactions on leaf of potassium (%) content of olive transplants cvs. 'Khithary' and 'I 18'.

Var.	HA (mg.L^{-1})	KNO_3 (mg.L^{-1})			Var*HA	Mean effect of Var.
		0	100	200		
Khithary	0	1.04 ab	1.00 ab	0.92 a-d	0.98 a	0.99 a
	150	0.92 a-d	1.12 a	0.91 a-e	0.98 a	
	300	0.93 ab	1.14 a	0.92 a-d	1.00 a	
I 18	0	0.92 a-c	0.62 e	0.92 a-d	0.82 b	0.77 b
	150	0.89 a-e	0.77b-e	0.78 b-e	0.81 b	
	300	0.80 b-e	0.63 de	0.63 c-e	0.69 b	
Mean effect of KNO_3		0.92 a	0.88 a	0.85 a	Mean effect of HA	
Var* KNO_3	Khithary	0.96 ab	1.08 a	0.91 bc		
	I 18	0.87 bc	0.67 d	0.78 cd		
HA* KNO_3	0	0.98 a	0.81 ab	0.92 ab	0.90a	
	150	0.90 ab	0.94 ab	0.84 ab	0.90a	
	300	0.87 ab	0.88 ab	0.77 b	0.84a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each others according to Duncans multiple ranges test at 5% level.

4- Leaf iron (ppm)

In table (4), iron content (ppm) in leaves differed significantly between the two cultivars, 'I 18' cultivar contained significantly higher iron content (82.70 ppm) when compared with 'Khithary' (78.69 ppm).

Table (4): Effect of KNO_3, humic acid and their interactions on leaf iron (ppm) concentrations of olive transplants cvs.'Khithary 'and 'I 18'.

Var.	HA (mg.L^{-1})	KNO_3 (mg.L^{-1})			Var*HA	Mean effect of Var.
		0	100	200		
Khithary	**0**	34.68 i	60.28 h	101.40 a	65.46 f	78.69 b
	150	68.91 f	95.69 b	99.79 a	88.13 b	
	300	86.61 c	75.23 e	85.63 c	82.49 c	
I 18	**0**	63.36 g	93.97 b	77.79 d	78.37 d	82.70 a
	150	95.11 b	66.43 f	68.01 f	76.52 e	
	300	84.96 c	95.08 b	99.59 a	93.21 a	
Mean effect of KNO_3		72.27c	81.11 b	88.70 a	Mean effect of HA	
Var* KNO_3	**Khithary**	63.40 e	77.07 d	95.61 a		
	I 18	81.15 c	85.16 b	81.80 c		
HA* KNO_3	**0**	49.02 g	77.13 f	89.59 b	71.91c	
	150	82.01 e	81.06 e	83.90 d	82.33b	
	300	85.79 c	85.16cd	92.61 a	87.85a	

Means within a column, row and their interactions followed with the same letters are not significantly different from each others according to Duncans multiple ranges test at 5% level.

It was clear that treated transplants, with 200 mg KNO3.L-1 gave the highest value of iron content (88.70 ppm. Results of KNO3, humic acid and cultivars interactions indicated that spraying 'Khithary' olive cultivar with 200 mg KNO3.L-1 plus 0 mg humic acid.L-1 was the most potent treatment which gave (101.40 ppm) iron,. The interactions between KNO_3 and humic acid significantly influenced iron content in leaf, when treated with 200 mg $KNO_3.L^{-1}$ plus 300 mg humic acid.L^{-1} gave the highest value (92.61 ppm) and the lowest value (49.02 ppm) was recorded in untreated transplants. Regarding KNO_3 and cultivar interactions, leaf of 'Khithary' transplants treated with 200 mg $KNO_3.L^{-1}$ contained the highest percentage of potassium (95.61ppm) compared with other interaction between KNO_3 and cultivar.The interactions between humic acid and cultivar had significantly increased in iron content (ppm) in cv. 'I 18' transplant when treated with 300 mg humic acid.L^{-1} giving the highest value (93.21 ppm) and the lowest value (65.46 ppm) was recorded in untreated transplants of cv. 'Khithary'.

5- Leaf zinc (ppm).

In table (5), it was notice that the transplant when treated to 200 mg $KNO_3.L^{-1}$ gave the highest value of zinc content (17.02ppm). Zinc content in leaf of transplants treated with 300 mg humic acid.L^{-1} increased significantly. Zinc content in leaves differed significantly between the two cultivars, 'Khithary' leaves cultivar contained higher zinc content (13.48 ppm) when compared with 'I 18' (12.68 ppm). The interactions between KNO_3 and humic acid significantly influenced zinc content in the leaves when treated with 200 mg $KNO_3.L^{-1}$ plus 0 mg humic acid.L^{-1} by giving the highest value (20.75ppm).

Table (5): Effect of KNO_3, humic acid and their interactions on leaf Zinc (ppm) concentrations of olive transplants cvs. 'Khithary ' and ' I 18'.

Var.	HA (mg.L^{-1})	KNO_3 (mg.L^{-1})			Var*HA	Mean effect of Var.
		0	100	200		
Khithary	0	6.54 g	13.84 d	14.81 cd	11.73 cd	13.48 a
	150	7.84 f	14.84 cd	14.25 cd	12.31 c	
	300	14.87cd	15.24 c	19.12 b	16.41 a	
I 18	0	6.53 g	11.85 e	26.68 a	15.02 b	12.68 b
	150	15.11 c	7.42 fg	12.55 e	11.69 cd	
	300	7.85 f	11.43 e	14.67 cd	11.32 d	
Mean effect of KNO_3		9.79 c	12.44 b	17.02 a		
Var* KNO_3	Khithary	9.75 d	14.64 c	16.06 b	Mean effect of HA	
	I 18	9.83 d	10.23 d	17.97 a		
HA KNO_3	0	6.53 e	12.85 c	20.75 a	13.38	b
	150	11.47 d	11.13 d	13.40 c	12.00	c
	300	11.36 d	13.34 c	16.90 b	13.86	a

Means within a column, row and their interactions followed with the same letters are not significantly different from each others according to Duncans multiple ranges test at 5% level.

Regarding KNO_3 and cultivar interactions, it was found that the leaves of 'I 18' transplants treated with 200 mg.L^{-1} KNO_3 contained the highest percentage of zinc (17.97 ppm) compared with other interactions between KNO_3 and cultivar. The interactions between humic acid and cultivar had significantly increased zinc contents in' Khithary' transplants when treated with 300 mg. humic acid.L^{-1} giving the highest value (16.41ppm) and the lowest value (11.32 ppm) was recorded from the untreated transplants of cv. 'I 18'. Results of KNO_3, humic acid and cultivars interactions indicated that spraying 'I 18' olive cultivar with 200 mg KNO_3.L^{-1} plus 0 mg humic acid.L^{-1} was the most potent treatment which gave (26.68ppm) zinc, while the lowest zinc (6.53ppm) was recorded in untreated 'I 18' transplant.

Discussions:

1- KNO_3: It is clear from studied parameters that the effect of KNO_3 on nutrient composion characteristics significantly affected and improved all parameters, the results may be due to role of K and N in plants such as photosynthesis reactions, nucleic acid metabolism, protein and carbohydrate biosynthesis due to increased leaf mineral content. (Hafez, and El-Metwally 2007). Potassium takes part in many important processes, regulating the opening and closing of stomata, the transport of organic and inorganic ions within the plant, (Ibrahim, 2005) and (Elloumi, *et al,*. 2009).

2- Humic acid: For the effect of humic acid, the same tables that show studied parameters indicates that leaf nutrient status gave the highest value. The reason for the positive effect of humic acid may be due to the role of (HA) to stimulate plant growth by acting on mechanisms involved in: cell respiration, photosynthesis, protein synthesis, water and nutrient uptake and enzyme activities (Nardi *et al,*.1996, Chen *et al,*. 2004, and Ali, *et al,*.2007). Whereas direct effects are various biochemical actions exerted at the cell wall, membrane or cytoplasm and mainly of hormonal nature (Varanini and Pinton 2001 and Chen *et al,*. 2004). The hormone like activities of HAs is well documented in various papers, in particular auxin, cytokinin and gibberellins like effects (Piccolo *et al,*. 1992 and Pizzeghello, *et al,*. 2002).

3- Cultivars: It's clear from most tables that the vegetative growth characteristics significantly differed between the two cultivars. The differences between the cultivars in leaves nutrient such as (N, P, K, Fe and Zinc, may be ascribed to the differences in genotype characteristics (Jordao, *et al,*. 1999). In addition, the genetic integrity of the plant species might influence particular nutrient uptake efficiency (Popovic *et al,*. 1999). Then, these differences in nutrient uptake efficiency between cultivars may cause differences in vegetation growth characteristics. Also, the differences in growth vigor between the two cultivars may be attributed to the response of different cultivars to the local environmental conditions according to the genetic variation between the cultivars (Gaafar and Saker 2006 and Khalifa 2007).

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کارتێکرنا زبلێ پوتاسیم نایترێت و ترشێ هیومیك و تێکه لکرنا وان لسەر توخێت ناڤ بەلگێت نەمامکێت زەیتونێ جورێ Khithary and I18

پوختە:

ئەڤ ڤەکولینه یا هاتیه ئەنجامدان ل سالا (۲۰۱۲) لە نەمامگەها زەیتونا لبەکرەجۆ ل پارێزگەها سلێمانی. هەرێما کوردستانا عێراقێ. نەمامێت وەك ئێك و دوور ژ نەخۆشیا هەلّبژارتینه ژ هەردوو چورێت خزێری و I 18 زەیتون (*Oleaeuropaea*L.)ژیێ وان (۲) سالّ بوون. کاریگەریا زبلیێ KNO_3 (0، ۱۰۰، ۲۰۰ .ملگم. لتر$^{-1}$) زبلێ ترشێ هیومیك (۰، ۱۵۰ ، ۳۰۰ ملگم.لیتر$^{-1}$) و تێکەل کرنا وان بمەبەستا زانینا کاریگەریا وان لسەر تایبەتمەندیا شینبون و کەسکاتی پێکهاتیا بەلگا ژ مادێ خارنێ بۆ نەماما هەردوو چورێت زەیتونا خزێریو I18. KNO_3 و ترشی هیومیك: رەشاندنا بەلگا ب KNO_3 و ترشێ هیومیك زالّبوو بشێوەیەکێ پشوەری ل هەمی خەسلّەتێت گەشەکرنا کەسکی و چوریا: چورێ I18 زالّبوو بشێوەیەکێ پشوەری بسەر چورێ خزێری ل هەمی خەسلّەتێت گەشا کەسك .تێکەل کرن ل ناڤبەرا چورێ I18 دگەل KNO_3 زێدەبوو بشێوەیەکێ پشوەری ل هەمی خەسلّەتێت وەرگرتی ژبلی بلندیا نەمامکێ، درێژیا تاکێت تەنیشتا، تێکەل کرن ل ناڤبەرا چورێ و I18 ترشێ هیومیك زێدە کر بشێوەیەکێ پشوەری ل تیرێ قرمی، ژمارا بەلگ، رووبەرێ بەلگا. بەلێ چورێ خزێری دگەل ترشێ هیومیك هۆکارێ پێدانا بهایەکێ بلندە ل بلندیا نەمامکێ، درێژیا تاکێت تەنیشتا . تێکەل کرن لناڤبەرا زبلێ KNO_3 و ترشێ هیومیك هۆکارێ پێدانا بهایەکێ مەزنە لگەشا کەسك .تێکەل کرنا KNO_3 و ترشێ هیومیك و چورێ I 18 کاریگەری یاهەی بشێوەکێ پشوەری ل هەمی خەسلّەتێت وەرگرتی (گەشا کەسك، بەلێ تێکەل کرن لناڤبەرا زبلێ KNO_3و ترشێ هیومیك دگەل چەشنێ کەسکی بو هۆکارێ زێدەبونا بلندیا نەمامکێ، درێژیا تاکێت تەنیشتا.

تأثير الرش الورقي بـ KNO_3 وحامض الهيوميك في النمو ومحتوى أوراق شتلات الزيتون(*Olea europaea* L.) صنفي الخضيري و I18.

الخلاصة:

تنفذت هذه التجربة خلال موسم النمو ۲۰۱۲ في محطة مشتل بكرجو في محافظة السليمانية/ اقليم كردستان /العراق.

بداءت التجربة في(۱۵ آذار ۲۰۱۲) حيث تم زراعة الشتلات في أكياس النايلون سعة (۵ كغم) تم ملئها بالرمل. لدراسة تأثير ثلاثة تراكيز منKNO_3(صفر، ۱۰۰، ۲۰۰ملغم. لتر$^{-1}$) و ثلاث تركيز من حامض الهيوميك (۰، ۱۵۰ ، ۳۰۰ ملغم . لتر$^{-1}$) و تداخلاتها لغرض معرفة تأثيراتها على محتوى الأوراق من العناصر لشتلات صنفي الزيتون الخضيري و I 18 .تم تنفيذ تجربة عاملية بواقع ثلاث مكررات حسب تصميم القطاعات العشوائية الكامله (RCBD) و ذلك بزراعة خمسة شتلات لكل وحدة تجريبية وتم الرشKNO_3 و حامض الهيوميك في ۱۵ نيسان و كررت عملية الرش بنفس التراكيز في ۱۵مايس.KNO_3 و حامض الهيوميك:للرش الورقي ب KNO_3 و حامض الهيوميك تفوقا معنويا في محتوى الاوراق من العناصر. صنف I 18 ساد معنويا على صنف الخضيري في محتوى الاوراق من العناصر Zn, K , P في الاوراق. التداخل بين الصنف I 18 مع KNO_3 زاد معنويا في تراكيز Fe, K , P في الاوراق. التداخل بين الصنف الخضيري و حامض الهيوميك تسبب في اعطاء قيم مرتفعة في محتوى الاوراق من التراكيز Zn, Fe, K, .بينما التداخل بين KON_3 و حامض الهيوميك مع صنف الخضيري أدى الى زيادة تراكيز Fe, K, P, N.