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EFFECT OF P AND K ON FRUIT YIELD AND MINERAL CONTENT OF PEACH TREES IRRIGATED WITH MAGNETIZED WATER

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ABSTRACT

The effect of P and K on fruit yield and mineral content of Florida Peach trees irrigated with magnetized water which investigated in two successive seasons (2010 and 2011). This study was carried out at Sadat City zone in North Egypt between longitude 30°40' and 21.41"E and latitudes 30°18' and 41.16"N. Fertilizer rates were of 150, 225, 300 g P_2O_5/tree and 250, 500, 750 g K_2O/tree, beside control treatment (without PK). Phosphorus was mixed with organic manure (25 kg/tree) and supplied in Mid-October, whereas K was applied in three equal doses in October, November and February of each season. Magnetic water irrigation and non-magnetic were used at previous rates of P and K fertilizers. The results indicated that the application of 225 g P_2O_5 and 500 g/ K_2O/tree increased economic fruit yield and mineral content of leaves with a high availability of P and K in soil orchard. Also, a significant positive effect was obtained of magnetized water irrigation for all fertilization rates. So, the results in this study showed that the optimum fertilizer treatment (P_2K_2) achieved the highest fruit yield and plant mineral content as well as mineral content of the studied soil. Moreover, it could be using magnetized irrigation water as a technology, which may be one of the factors contributing to the increase in the nutrients availability for Florida peach trees grown in newly reclaimed soils conditions.

Keywords: magnetized water, P, K fertilizers, peach trees, fruit yield, mineral content.

INTRODUCION

Phosphorus (P) and Potassium (K), as two essential mineral nutrients, are required in relatively large amounts to maintain growth and play a central role in improving crop yield and quality, Steffen, *et. al*., (2002). Optimal nutrient supply for trees should take into account the vigor of the tree growth, the level of yielding as well the nutrient content in the soil and in the plant, Adam, *et.al*, (2009).

Peach is one of the most important deciduous fruit trees grown with high economic potentiality in Egypt and harvested area reached 33017 ha, producing 273256 tons (FAO, 2010). Peach cv. Florida prince is an early cultivar that exhibited a high adaptation with the local environmental conditions. It records superior yield and fruit quality in comparison with the other peach cvs (Kanwar et al., 2000). However, Peach trees require large amounts of nutrient elements for normal plant growth and development, Xie and Cummings, (1995). Almaliotis. *et.al*, (2002) indicated that, increased soil content of P, Fe and Cu had a positive effect on peach yield, whereas, soil K content values higher than 540 ppm increased fruit yield significantly.

In semi-arid areas, magnetic field technology has been used for hard water improvement, and led to increasing water use efficiency (WUE) associated with crop production is a way for arid and semi-arid areas to increase their agricultural production where there is little or no prospect for expansion of water resources, Horst. *et. al*. (2005). In this method, nothing is added to or extracted from water but the presence of a magnetic field, which causes the configuration of water molecules' electrical charge will be changed (Ahmadi and Niknia., 2011). These modified water molecules can change the content of ions in the soil and using cheap magnetic energy to improve the properties of soil and water quality, Ashrafi. *et. al*. (2012). Also, Tai *et. al*. (2008) observed that on subjecting water to magnetic field, it leads to modification of its properties, as it becomes more energetic and more able to flow. Mulook. *et.al*. (2011) indicated that, the essential elements except sodium were increased significantly in plants irrigated with magnetically treated water compared to their control. In addition to, Ma Wei, *et.al*. (2000) studied the effects and mechanism of magnetic field on the form and structure of phosphate, who found that the effect of magnetic field on the crystallization process prompt the separation of tiny particles and Kelvin effect increases the solubility of the phosphate and also, conductivity and surface tension of the solution decreased. And the consistence of phosphorus increased 2.2 times higher than that without magnetic field. However, magnetic field improved the soil nutrient availability. Also, (Sadeghipour and Aghaei, 2013) indicated that, the impact of magnetic water may be ascribed to the increasing of root growth and stomatal conductance which increase absorption and assimilation of nutrients.

Under Egyptian conditions, the studies on the application of this technology in agriculture are still limited. So, the present work aim to study the effect of P and K on fruit yield and mineral content of peach trees irrigated with magnetized water under field condition.

MATERIALS AND METHODS

The present study was carried out during the two successive seasons 2010 and 2011 on Florida prince Peach at Sadat City zone in North of Egypt, between longitude 30°40' and 21.41"E and latitudes 30°18' and 41.16"N, to study the effect of P and K on fruit yield and mineral content of peach trees irrigated with magnetized water under field conditions. The experiment soil is sandy loam in texture with low fertility status, as shown in Table, 1).

Table (1): Some soil properties and fertility status of the investigated soil

Soil depth (cm)	pH	OM %	EC dS/m	$CaCO_3$ %	Sand %	Silt %	Clay %	Texture	Available macronutrients (mg/Kg^{-1})		
									N	P	K
0-30	7.65	1.06	3.21	8.63	78.15	15.21	6.64	S L	23.0	2.96	52.0
30-60	7.42	0.93	2.84	6.33	76.34	15.46	8.20	S L	12.0	1.29	25.0

Five-year-old Florida prince peach trees were similar in growth vigor, planted on 5×6 m square spacing were chosen for the experiment and irrigated by drip irrigation system from the well groundwater. A magnetron model A 400 of 4 inch diameter was used for magnetizing water. At the experiment start, two samples of water from irrigation water source were taken before and after passing through the magnetic device used in experiment. The water samples were analyzed directly to the chemical properties.

Fertilizer rates were of 150, 225, 300 gm P_2O_5/tree and 0, 250, 500, 750 gm K_2O/tree, beside control treatment (without PK). Magnetized and non-magnetized water irrigation was used at previous rates of P and K fertilizers. The experimental treatments were arranged in a randomized complete block design, with 16 treatments, each with three replicates. P was applied in the form of calcium superphosphate (15% P_2O_5) and K as potassium sulphate (50% K_2O). The P fertilizer was mixed with organic manure and applied annually in the second week of October. The K fertilizer was applied in three equal splits in late October, mid-November and early February of each season. In addition to, all trees were fertilized once at rate 25 kg/tree organic manure with P fertilizer. Also, all trees were received of N fertilizer (700g N/tree) with micronutrients (i.e., mixture of Fe, Mn and Zn at the ratio 1:1:1). Nitrogen and micronutrients fertilizers were applied at the same times previous of K fertilizer.

In both seasons, the fruit yield of each tree was harvested at maturity stage in Mid-April and recorded in kg/tree. For determination of P and K mineral contents in dry leaves samples, which collected at mid-July of each season and were taken of sixth node from the base of current shoots (Abd El-Razek and Saleh, 2012). The leaf samples were washed with tap water, rinsed twice in distilled water and air dried in an oven at 70°C for 72 hr. Leaf mineral content of P and K were determined according to A.O.A.C. methods (1985).

In mid- July of each season, compost soil sample was taken from main directions in the root zone of each tree at 0-30 and 30-60 cm depth and air-dried and ground to pass a 2-mm sieve. Available N, P and K were determined according to Black *et al,* (1982).

The obtained results in the two studied seasons (2010-2012) were subjected to analysis of variance (ANOVA) to verify the differences among the effects of magnetized water treatments. The least significant difference (LSD) was recruited as to significant differences among treatment means at the 5% level of significance, Gomez and Gomez (1984).

RESULTS AND DISCUSSION

Irrigation water

Date presented in Table 2, showed that the effect of magnetic field on irrigation water did not effect on pH or EC. On other hand, magnetic field had a slightly increased in the solubility of Ca, Mg, K ions, also, SO_4 and P anions. In this respect, Kai-Tai and Cheng, (2006) indicated that the structure of the water is more stable and the ability of the water molecules to form hydrogen bonds is enhanced when a magnetic field is applied. Also, Magnetic treatment of water has been reported to change some of the physical and chemical properties of water, mainly hydrogen bonding, polarity, surface tension, and solubility of salts, Chang and Weng, (2008).

Table (2): Some chemical properties of the irrigation water used before and after magnetizing

Water properties	Non-magnetized water	Magnetized water
pH	7.53	7.53
EC dS/m	1.35	1.35
Ca^{++}	4.21	4.22
Mg^{++}	3.42	3.43
K^{+}	0.25	0.26
Na^{+}	9.56	9.56
Cl^{-}	7.63	7.63
$SO_4^{=}$	3.12	3.14
HCO_3^{-}	4.50	4.50
$CO_3^{=}$	Non	Non
Soluble P (mg/L $^{-1}$)	0.32	0.34

Peach fruit yield

Data in Table (3) reveal that the effects of application of P and K with magnetized irrigation water or non -magnetized water on fruit yield of Florida peach trees had a significantly increased over the control treatment. As can be seem, the application of P with K together at the lowest level of each enhance peach fruit yield significantly increased compared with the application of both P and K alone. Increasing the rate of P with the lowest rate of K (P_2K_1) greatly increased fruit yield per tree than the (P_1K_1). Also, the application of P_1 to K_2 (P_1K_2) was similar to the application of P_2 and K_1 (P_2K_1) in enhancing fruit yield per tree. In this respect, application of P with K together at the second rate (225 gm P_2O_5 and 500 gm K_2O/tree) was gave a highest significant improvement in fruit yield, when compared with (P_1K_1), and (P_2K_1) with or without magnetized water irrigation used.

On other hand, applied of P and K at highest rates (P_3K_3) or (P_3K_2) enhanced peach fruit yield but no significantly compared with the application of (P_2K_2) in case of magnetized or non- magnetized irrigation water used. The greatest fruit yield per tree was recorded with P and K at the second rates of application. This may be due to the balanced effect of P and K in plant. Magnetized irrigation water enhanced the raised the soil total content of P or K, hence increased the availability of this elements and efficiency used by peach trees. In respect to, P developed more extensive root system, which helps the absorption of nutrients from the soil and also, K has a role for physiological especially in transporting metabolites in the plant system, Bhadoria, *et.al*. (1997). Similar results were obtained by (Almaliotis, *et.al*. 2002 on peach trees; Abou-Amer, 2007) on olive; Michael, 2009 on pecan; Muhammad and Manzoor, 2010 on citrus).

Table (3): Effect of P and K fertilization on Florida peach fruit yield irrigated by magnetized irrigation water

Treatment	Florida peach fruit yield (Kg/tree)					
	First season			Second season		
	Non magnetic	Magnetic	Mean	Non magnetic	Magnetic	Mean
Control	12.93	12.94	12.94	12.79	12.82	12.80
P_1	14.52	15.36	14.94	15.42	16.12	15.77
K_1	15.24	16.12	15.68	16.45	17.21	16.83
P_1K_1	16.28	17.20	16.74	17.23	18.19	17.71
P_2K_1	17.39	18.33	17.86	18.21	19.28	18.75
P_2K_2	19.10	20.12	19.61	20.52	21.83	21.18
P_3K_2	19.20	20.23	19.71	20.62	21.94	21.28
P_3K_3	19.26	20.30	19.78	20.78	22.03	21.41
Mean	16.74	17.58		17.75	18.68	
L S D 5 %						
Magnetic		0.122			0.120	
Treatment		0.245			0.239	
Interaction		0.346			0.338	

With regard to, the use of magnetized irrigation water, results indicated that, enhance increased fruit yield of trees than the non-magnetized water. The favorable effect of magnetized irrigation water on production may be attributed to change in plant metabolism and increasing root growth and stomatal conductance which increase absorption and assimilation of nutrients Also, some physical and chemical properties changes of water that may be causing changes in plant characteristics, growth and production (Sadeghipour, 2013).In this respect, (Moussa, 2011) showed that through treatments with magnetic field the plant metabolism is changed and it is possible to induce some phenotypic and genotypic effects able to stimulate the plant productivity and also, availability of P and K in soil and plant uptake was increased.

In this direction, the effect of magnetized water irrigation on yield crops has been studied by (Hozayn and Abdul Qados, 2010 on wheat; Zepeda *et al*., 2011 on Maize; Abou El-Yazied. *et*. *al*., 2011 on tomato and Radhakrishnan and Kumari, 2012 on soybean). Moreover, the interactions among the three factors indicated that the application of P and K fertilizer with the magnetized water gave the highest yield for peach trees. Similar trends were obtained in the second season with different magnitude which fruit yield was higher than the first season.

Leaf mineral content

Phosphorus content

Results in Table (4) showed that, the application of P fertilizer significantly enhanced P content at lower rate than the control treatment. At the same time, the application of P with K, both at the first level of each, enhanced increase the P content in leaf when compared with P alone. However, P and K at the second rate together each is increased P content than that of the P at the first rate together each treatment. The application of

P and K at the higher level together was insignificantly increased than that of the P and K at the second rate. The favorite effect of K may be due to the activation of many enzyme systems, cell enlargement and triggering the growth of young tissues.

Table (4): Effect of Effect of P and K fertilization on leaf P of Florida peach trees irrigated by magnetized irrigation

Treatment	Leaf P (%)					
	First season			Second Season		
	Non magnetic	Magnetic	Mean	Non magnetic	Magnetic	Mean
Control	0.123	0.124	0.124	0.122	0.123	0.122
P1	0.163	0.166	0.165	0.173	0.178	0.176
K1	0.124	0.125	0.125	0.123	0.124	0.123
P1K1	0.168	0.175	0.172	0.174	0.183	0.179
P2K1	0.205	0.212	0.209	0.216	0.228	0.222
P2K2	0.211	0.225	0.218	0.226	0.240	0.233
P3K2	0.213	0.226	0.219	0.227	0.241	0.234
P3K3	0.213	0.226	0.220	0.227	0.241	0.234
Mean	0.178	0.185		0.186	0.195	
L S D 5 %						
Magnetic		0.001			0.001	
Treatment		0.002			0.002	
Interaction		0.003			0.002	

These results are in agreement with (Abou-Amer, 2007 and Higazi, *et. al*. 2011). Moreover, magnetized water irrigation was enhanced to increase P content in peach leaves to sufficient level when compared to non-magnetized water. This effect of magnetic water may be attributed to the increasing root growth which increases absorption and assimilation of nutrients. (Sadeghipour and Aghaei, 2013) showed that magnetized water had the greatest effect on root weight. It suggests that enhancement the growth of stem and leaves was related to increasing root growth which improved water and ions absorption. Similar trends of previous season were observed in the second season, and the effect of P and K were more pronounced. In addition, the effect of magnetized water irrigation was higher significantly than the first season for content of P in peach leaves. These results are in agreement with obtained by (Hilal. *et. al*. 2002) they found the increase in P content of citrus leaves by magnetically treated water, also (Abou El-Yazied. *et. al.,* 2011) reported an increase in nutrient uptake by magnetic treatment in tomato plants.

Potassium content

With respect to K content in peach leaves, data presented in Table (5) indicated that, generally, K in leaves increased by increasing the application of K and P with magnetized water irrigation than the non-magnetized water. In addition, K with P, both at lower level of each, led to increasing K in peach than the control or K alone. In addition, the application of K and P together each at the second rates seemed to have a higher effect on K in leaves. On the other side, increasing K and P together of each at the higher rates increased of K in peach leaves but without significance than the (P_2K_2) treatment. In this respect, (Abdul Qados and Hozayn, 2010 b) who found the stimulatory effect of magnetized water on growth parameters may be attributed to the induction of cell metabolism and mitosis.

Table (5): Effect of Effect of P and K fertilization on leaf K of Florida peach trees irrigated by magnetized irrigation

Treatment	Leaf K (%)					
	First season			Second Season		
	Non magnetic	Magnetic	Mean	Non magnetic	Magnetic	Mean
Control	0.73	0.73	0.73	0.72	0.73	0.73
P1	0.75	0.75	0.75	0.74	0.75	0.75
K1	1.11	1.14	1.13	1.15	1.20	1.18
P1K1	1.16	1.19	1.17	1.20	1.25	1.23
P2K1	1.25	1.28	1.27	1.26	1.31	1.29
P2K2	1.27	1.32	1.29	1.29	1.35	1.32
P3K2	1.28	1.33	1.31	1.31	1.36	1.34
P3K3	1.28	1.33	1.31	1.31	1.36	1.34
Mean	1.10	1.13		1.12	1.16	
L S D 5 %						
Magnetic		0.008			0.006	
Treatment		0.014			0.010	
Interaction		0.020			0.015	

The same trend was maintained in second season though much pronounced for all treatments. In addition, the highest increase of K content in peach leaves was recorded in the treatment of K and P together each at the second rate with magnetized water irrigation. This response may be due to the deficiency of available K in the orchard soil. These results are in agreement with those by (Abou-Amer, 2007; Hussein, 2008, and El-Sonbaty, *et. al*. 2012) on olive trees

Availability of P and K in experimental soil

Available soil P

From the results in Table (6) it was clear that P application to the soil enhance increased P content when applying lower rate of P fertilizer with magnetized water irrigation compared to non-magnetized water or control. This may be due to the low content of P in soil experiment, Table 1. Also, soil P increased as compared to P alone due to application P with K at the lower rate of each. In addition, the application of the P and K together each at the second rate to soil, led to a higher positive effect on soil P content. Also, the effect of magnetized irrigation water on P fertilizer at lower or higher rates increased the soil P content when compared with without magnetized water. In this respect, Basant., *et.al*. (2009) observed that a decrease in soil pH after harvest of celery and snow peas under magnetically treated water treatment. It is speculated that there may be a relatively greater soil acidification due to the release of greater organic acids in the rhizosphere by plants irrigated with magnetically treated water compared with plants irrigated without magnetic water. Organic acids released in rhizosphere may be responsible for desorption of P and K, and thus making these nutrients more available to plants. However, magnetically treated water also suggested an improved availability, uptake, assimilation and mobilization of these nutrients within plant system and may have contributed in improving the productivity of plants with magnetic treatment of water. Also, Ahmed and Bassem, (2013) concluded that, irrigation with magnetized water helps an important role in increasing P solubility and availability**.** This indicated that magnetized water plays an important role in increasing the availability of soil phosphorus.

Table (6): Effect of Effect of P and K fertilization on soil available P of Florida peach trees irrigated by magnetized irrigation

Treatments	Soil P (mg/Kg^{-1})							
	First season				Second Season			
	Non magnetic		Magnetic		Non magnetic		Magnetic	
	Surface	Sub-surface	Surface	Sub-surface	Surface	Sub-surface	Surface	Sub-surface
Control	1.95	0.95	1.96	0.96	1.94	0.94	1.95	0.94
P1	6.19	1.12	6.37	1.14	6.43	1.18	6.75	1.19
K1	1.96	0.96	1.96	0.96	1.95	0.95	1.96	0.95
P1K1	6.29	1.16	6.58	1.18	7.50	1.28	7.83	1.28
P2K1	6.58	1.21	6.90	1.23	7.65	1.30	8.00	1.32
P2K2	7.10	1.24	7.43	1.25	8.12	1.34	8.58	1.35
P3K2	7.19	1.24	7.53	1.26	8.19	1.35	8.65	1.36
P3K3	7.25	1.25	7.60	1.26	8.23	1.35	8.69	1.36
Mean	5.56	1.14	5.79	1.16	6.25	1.21	6.55	1.22
L S D 5 %								
Magnetic			0.100	n.s.			0.062	n.s.
Treatment			0.201	0.093			0.124	0.069
Interaction			n.s.	n.s.			0.176	n.s.

In the second season, similar trends as that of the first season were observed. Soil P was increased significantly in soil as a result of the application of P fertilizer. However, the highest increased of soil P content recorded in combination treatment of P and K in the two season of study. On the other hand, soil P content was lowest content in soil subsurface layer as compared to surface layer, this due to slow mobility of P from soil surface to subsurface. Also, no significantly was obtained to the effect of magnetized water irrigation on soil P in subsurface layer.

Available soil K

Regarding soil K content, data in Table (7) showed that application of K increased the soil K with magnetized water irrigation compared to non-magnetized water or control. At the same time, K with P, both at the lower rate of each tended to increase soil K compared with the treatment previously mentioned. However, the application of K and P together each at the second rate were significantly effective on soil K. On the other hand, no significant effect was obtained when application of P with K at the higher rate on K soil content than the second rate of each. In this respect, Noran, *et. al*. (1996) observed (under drip irrigation system) differences in the contents of P and K in soil irrigated with magnetically treated water when compared those with normal water. Also,(Ahmed and Bassem, 2013) how indicated that, the using of magnetized irrigation water resulted in significant increase in soluble P and

K contents as compared with normal water. Similar trends of previous season were observed in the second season. In addition, soil K was increased significantly in soil by magnetized water irrigation of all treatments than the non- magnetized water.

On the other side, clearly show that, due to the slow movement of K in the soil profile has been found that the K content in subsurface layer is less than the surface layer. Also, there are no significantly effects of magnetized water to K content in the soil subsurface layer. Also, no significantly was observed to the effect of magnetized water irrigation on soil K in subsurface layer.

Table (7): Effect of Effect of P and K fertilization on soil available K of Florida peach trees irrigated by magnetized irrigation

Treatments	Soil K (mg/Kg^{-1})							
	First season				Second Season			
	Non magnetic		Magnetic		Non magnetic		Magnetic	
	Surface	Sub-surface	Surface	Sub-surface	Surface	Sub-surface	Surface	Sub-surface
Control	29.10	18.64	29.15	18.64	28.49	18.60	28.52	18.60
P1	29.10	18.65	29.16	18.65	28.50	18.61	28.53	18.62
K1	50.56	20.27	51.42	20.58	52.32	20.85	53.52	21.35
P1K1	52.35	20.80	53.36	20.95	55.24	22.29	56.50	22.60
P2K1	55.00	22.82	56.39	22.94	58.00	24.38	60.32	24.42
P2K2	60.64	23.65	62.53	23.72	62.29	25.19	64.68	25.23
P3K2	60.82	23.86	62.65	23.90	62.34	25.38	64.73	25.46
P3K3	61.12	24.03	63.00	24.08	62.60	25.53	65.00	25.60
Mean	49.84	21.59	50.96	21.68	51.22	22.60	52.73	22.74
L S D 5 %								
Magnetic			0.375	n.s.			0.250	n.s.
Treatment			0.750	1.118			0.501	1.036
Interaction			n.s.	n.s.			0.708	n.s.

CONCLUSION

The present study have shown that the optimum fertilizer treatment of P_2K_2 (225 g P_2O_5 and 500 g/ K_2O/tree) achieved the highest fruit yield and plant mineral content as well as mineral content of the studied soil. Moreover, it could be using magnetized irrigation water as a technology, which may be one of the factors contributing to the increase in the nutrients availability for Florida peach trees grown in newly reclaimed soils conditions. However, there is still a need to make a many of extensive research for soil nutrient availability, as well as other crops.

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تأثير الفوسفور والبوتاسيوم على المحصول والمحتوى المعدنى لأشجار الخوخ المروية بالمياه الممغنطة

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أجريت تجربة حقلية في منطقة مدينة السادات خلال عامى 2010 - 2011 (عند الاحداثيات 40°30' "21.41 شرقا و 30°18' "41.16 شمالا) لدراسة تأثير التسميد بالفوسفور والبوتاسيوم على المحصول والمحتوى المعدنى لأشجار الخوخ (صنف فلوريدا) المروية بالمياه الممغنطة.

تضمنت المعاملات لأشجار الخوخ اضافة الفوسفور عند أربع مستويات وهى صفر ،150 ،225 300 جرام / P_2O_5 شجرة و كذلك إضافة البوتاسيوم عند أربع مستويات وهى صفر ،250 500، 750 جرام / K_2O شجرة). تمت إضافة معاملات الفوسفورعلى دفعة واحدة مع السماد العضوى بمعدل 25 كيلو جرام / شجرة فى منتصف شهر أكتوبر. بينما تمت إضافة البوتاسيوم على ثلاث جرعات متساوية على مدار الموسم فى أكتوبر- نوفمبر وفبراير. كما تم اضافة السماد النتروجينى بمعدل 700 جم نتروجين سنويا وكذلك العناصر الصغرى (الحديد والمنجنيز والزنك بنسبة 1:1:1) لجميع المعاملات وذلك فى نفس مواعيد اضافة السماد البوتاسى السابق ذكرها . وقد وزعت المعاملات في تصميم كامل العشوائية مع ثلاث مكررات لكل معاملة.

وقد أظهرت النتائج إستجابة أشجار الخوخ معنويا لجميع معاملات التسميد مقارنة بمعاملة الكنترول فى زيادة محصول الثمار وكذلك المحتوى المعدنى للنبات والتربة. وكانت افضل معاملة لأشجار الخوخ (P_2K_2) عند معدلات 225 جم P_2O_5 و 500 جم K_2O/شجرة سنويا حيث أعطت أفضل النتائج لمحصول الأشجار من الثمار المحتوى المعدنى للنبات والتربة.

كما أشارت النتئج الى وجود تأثير ايجابى عند استخدام مياه الرى الممغنط على تيسر الفوسفور والبوتاسبوم لجميع المعاملات والذى انعكس بدوره على زيادة محصول الثمار و المحتوى المعدنى للاشجار والتربة من العناصر تحت الدراسة مقارنة باستخدام مياه الرى بدون مغنطة.

نتائج هذة الدراسة توصى باستخدام معدلات الفوسفور والبوتاسيوم عند المعاملة السمادية المثلى (P_2K_2) لأشجار الخوخ (فلوريدا) في الأراضى المستصلحة تحت ظروف منطقة الدراسة مع إستخدام تقنية مغنطة مياه الرى وكذلك بالمناطق المشابهة لها فى جمهورية مصر العربية .

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