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Studies on Improving Fruit Yield and Quality of Peach CV. *"Early sweeling"*

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THE present study was undertaken during two successive seasons of 2011 and 2012 to study the effect of $Ca(NO_3)_2$, K-silicate and CPPU at different concentrations either alone or in combinations on some fruit parameters, fruit characteristics and leaf nutrient content of peach tree cv. "Early sweeling" grown under El-Khatatba region condition, Minufiya governorate.

The obtained results revealed that most treatments under study significantly increased both yield measurements kg/tree and (ton/fed.) as well as the other parameter (yield increment % in relation to the control) in the two seasons of study. Moreover, results indicated that, both the most of physical fruit characteristics (fruit weight, size, dimensions, and firmness) and chemical fruit characteristics such as (TSS %, total acidity % and total sugar %) were significantly improved as compared to the control. Additionally, leaf mineral content (N, P, K and Ca) was improved in some spraying treatments. It could be concluded that some of studied treatments resulted in a positive and significant effect on majority of investigated parameter and characteristics. Since, the treatment of $Ca(NO_3)_2$ at rate (20 cm^3/tree) after cytofex at 10 mg/l sprayed was the best and most effective treatment in this concern during both seasons of study.

Peach is one of the most important fruit trees grown in Egypt. In addition to that, Early sweeling is an early cultivar peach that exhibited a high adaptation with the local environmental condition.

Undoubtedly, there are general agreements that many factors affecting the yield and fruit quality of peach trees. Some of the important effective factors which play an excellent role and contribute to tree production in this respect are spraying trees with nutrient elements (Ca and K) and cytofex (CPPU).

Potassium is of almost importance for the water status plant. Uptake of water in tissues is frequently the consequence of active K uptake. Moreover, both K and Ca activate enzymes functions in ammonium assimilation of plant and thus helps prevent accumulation of toxic concentrations of ammonium in plant tissues, which enhanced K and Ca nutrition as they effect especially N uptake then production of organic N compounds, as well as favor translocation of amino acids and carbohydrates in plant (Hagin *et al.,* 1990). Silicon fertilizers have been applied to paddy soils in Japan resulting in a significant increase in rice production (Takahashi *et al.,* 1990). It is considered as one of the important beneficial nutrient for plant growth (Laing *et al.*, 2006). Silicon addition promoted bean growth, increased yield and its measured parameters with increasing Si levels from 300 to 600 mg/l (Abou-Baker *et al.*, 2012).

It is well known that, many studies indicated that spraying some deciduous trees with Ca, K and CPPU either alone or in combination has been used successfully as an applicable mean for enhancing fruiting parameters through increasing fruit set, reducing fruit drop and improving both fruit characteristics and leaf nutritional status, which reflects finally on yield and quality, (Mansour *et al.* (1986) on peach, Greenway and Pitman (1965) and Greene (1996) on apples, Bisal *et al.* (1991) Kiwi fruits, Feng *et al.* (1999), Marwad (2001) and Ben-Arie *et al.* (2008) on seedless and seeded grapes, Tzoutzoukou and Bonranis (1997) on apricot, Moon *et al.* (2000), Guriguis *et al.*(2003) and Kabeel & Fawaaz (2005) on pear trees and Kabeel *et al.* (2005) and Abd El-Fatah *et al.* (2008) on persimmon trees).

Therefore, this investigation was carried out to study the effect of calcium nitrate, potassium silicate and cytofex (CPPU) at different rates either alone or in combination on some fruiting measurements, fruit characteristics and leaf mineral content of Early sweeling peach trees.

Materials and Methods

The present study was conducted through 2011 and 2012 on nine-years-old of "Early sweeling" peach cultivar budded on Okinawa rootstock; irrigated with drip irrigation system, planted at 5 meters in a square system and pruned to the vase shape system. Selected trees were as healthy, nearly uniform as possible in their vigour, grown in El-Khatatba region, Minufiyia Governorate, Egypt and subjected to the similar recommended agricultural practices after fruit set, fruitlets were thinned (15 cm apart on the same branch to leave 500 fruitlets/tree) usually done at this region. For this study, thirty trees were chosen and divided into ten treatments. Different foliar spray treatments used as follows:

- Calcium nitrate {$Ca(NO_3)_2$ at 10 cm^3/tree}.
- Calcium nitrate {$Ca(NO_3)_2$ at 20 cm^3/tree}.
- Potassium silicate (K_2SiO_3) at 10 cm^3/tree.
- Potassium silicate (K_2SiO_3) at 20 cm^3/tree.
- Cytofex (CPPU) at 10 mg/l.
- Calcium nitrate ($Ca(NO_3)_2$ at 10 cm^3/tree) + Cytofex (CPPU) at 10 mg/l.
- Calcium nitrate ($Ca(NO_3)_2$ at 20 cm^3/tree) + Cytofex (CPPU) at 10 mg/l.
- Potassium silicate (K_2SiO_3) at 10 cm^3/tree + Cytofex (CPPU) at 10 mg/l.
- Potassium silicate (K_2SiO_3) at 20 cm^3/tree + Cytofex (CPPU) at 10 mg/l.
- Control (check trees) was sprayed with irrigation water.

Treatments were sprayed twice, the first at full bloom and the second after two weeks in both seasons of study. Moreover, calcium nitrate ($Ca (NO_3)_2$ or potassium silicate (K_2SiO_3) at different rates (2.5 or 5 cm/liter) were sprayed after two days of Cytofex (CPPU) spraying at 10 mg/l. Each tree was sprayed with four liters of spray solutions.

The randomized complete block design was used and each treatment was replicated three times and each replicate was represented by a single tree. The following measurements were determined:

Yield as either kg/tree or ton/fed. and yield increment % in relation to the control

Both average yield as kg/tree and yield as ton per fed. for each treatment was determined at the harvesting time. Furthermore, the yield increment % for each treatment as compared to the control was estimated according to the following equation:

$$\text{Yield increment \%} = \frac{\text{Yield/treatment} - \text{yield/control}}{\text{Yield / control}} \times 100$$

Fruit characteristics: At the time of harvesting (mid May), ten fruits from each replicate were randomly sampled and the following fruit characteristics were determined:

Fruit physical characteristics: including average fruit weight (gm.) fruit size (cm^3), fruit dimensions (length and diameter in cm.), fruit fresh firmness ($Ib/inch^2$) using a Magness and Taylor (1925) pressure tester parameter and seed weight per fruit.

Fruit chemical characteristics: The average fruit juice TSS % was determined by using handy refractometer, fruit juice acidity (%) as malic acid according to A.O.A.C. (1985) and TSS/acid ratio was calculated. Total sugars content was determined colorimetrically using phenol and sulphuric acid according to Dubasit *et al*. (1956).

Leaf mineral content: Leaf content of some macro-nutrients (N, P, K and Ca) were determined by the following procedures: Total N was determined by Micro-Kjeldhal method as Pregl (1945). While, total P determination was carried out colormetrically according to Murphy and Riely (1962). However, both K and Ca were determined as described by Chapman and Pratt (1961).

Statistical analysis

All data obtained through this study were statistically analyzed using the analysis of variance method according to Snedecor and Cochran (1980). The attained means were separated using LSD test at 0.05 level according to Steel and Torrie, (1980).

Results and Discussion

Yield (either as kg/tree or ton/fed.) and yield increment % in relation to the control:

Obtained data represented in Table 1 displayed obviously that, yield estimated as either kg/tree or ton/feddan were responded significantly to some used treatments under study as compared to the control during the two experimental seasons. Moreover the greatest statistically values of both yield measurements were resulted from peach trees being sprayed with CPPU at 10 mg/l followed by Ca $(NO_3)_2$ at

20 cm^3/tree; CPPU at 10 mg/l followed by Ca $(NO_3)_2$ at 10 cm^3/tree; CPPU at 10 mg/l followed by K_2SiO_3 at 20 cm^3/tree and CPPU at 10 mg/l followed by K_2SiO_3 at 10 cm^3/tree treatments, respectively as compared to either the control or any other tested treatments. On the other hand, the opposite trend was detected with water sprayed trees (control) which reflected statistically the lowest values of tree yield as kg/tree and ton/feddan. Furthermore, other investigated treatments gave intermediate values between the aforesaid two extents during both seasons of study.

With respect to the yield increment percentage in relation to the control, data (Table 1) shows clearly that, the response of the yield increment % in relation to the control was typically followed the same trend previously detected with both abovementioned yield parameters (yield as kg/tree and ton/feddan). While, this parameter was responded to all investigated treatments as compared to the control throughout the first and second seasons of this study. The obtained results are in conformity with those previously reported by Hagin *et al.* (1990); Feng *et al.* (1999) and Marwad (2001) on grapevines; Kabeel *et al*. (2005) on persimmon trees; Moon *et al*. (2000), Guirguis *et al*. (2003) and Kabeel & Fawaaz (2005) on pear trees. Moreover, Epstein (1999) said that, maintenance of erect leaves as a result of silicate application can easy account for 10 % increase in the photosynthesis of the canopy and consequently increases in growth and yield. Ma (2004) and Lobato *et al.* (2009) stated that silicon supply improved the structural integrity of crops and promoted the increase of water retention in leaf tissue which allows a higher growth rate that, in turn contributes salt dilution into the plant.

TABLE 1. Effect of spraying some chemical substances on yield and yield increment (%) of "Early sweeling" peach trees during 2011 and 2012.

Treatments	Fruit yield				Yield increment % in relation to the control			
	Tree (kg)		Ton/fed.		Tree (kg)		Ton/fed.	
	2011	2012	2011	2012	2011	2012	2011	2012
$Ca(NO_3)_2$ 10 cm^3/tree	49.97	51.37	8.394	8.966	4.61	1.38	4.63	5.58
$Ca(NO_3)_2$ 20 cm^3/tree	50.97	54.20	8.562	9.106	6.70	6.98	6.73	7.15
K_2SiO_3 10 cm^3/tree	48.10	51.57	8.081	8.663	0.69	1.78	0.70	1.99
K_2SiO_3 20 cm^3/tree	49.23	52.27	8.271	8.781	3.06	3.16	3.09	3.39
Cytophex (CPPU) 10 mg/l	51.07	54.67	8.579	9.184	6.91	7.90	6.95	8.17
$Ca(NO_3)_2$ 10 cm^3/tree + CPPU	56.30	58.23	9.458	9.783	17.88	14.70	17.97	15.27
$Ca(NO_3)_2$ 20 cm^3/tree + CPPU	57.77	60.83	9.705	10.220	20.95	20.08	21.07	20.45
K_2SiO_3 10 cm^3/tree + CPPU	53.00	55.83	8.904	9.380	10.96	10.20	11.02	10.41
K_2SiO_3 20 cm^3/tree + CPPU	55.63	57.50	9.346	9.660	13.13	13.50	16.57	13.81
Control	47.77	50.57	8.025	8.495	0.00	0.00	0.00	0.00
L.S.D. at 5 % :	4.16	3.61	0.364	0.312	0.746	0.559	1.25	1.14

Fruit characteristics

Fruit physical characteristics

Fruit weight and fruit size

Concerning the fruit weight (gm.) and fruit size (cm^3) as affected by the different treatments under study, data tabulated in Table (2) displayed clearly that both fruit measurements were responded to all used treatments as compared to the control during both seasons of study. However, it could be observed from obtained data that the heaviest fruit weight and the biggest fruit size were resulted from the trees sprayed with CPPU at 10 mg/l followed by Ca $(NO_3)_2$ at 20 cm^3/tree, CPPU at 10 mg/l, Ca $(NO_3)_2$ at 10 cm^3/tree; CPPU at 10 mg/l, K_2SiO_3 at 20 cm^3/tree and CPPU at 10 mg/l and K_2SiO_3 at 10 cm^3/tree, respectively. On the contrary, the opposite trend was showed with water sprayed trees (control) which produced significantly the lightest weight and the smallest size of fruits. Furthermore, the other treatments were in between the abovementioned two extents during the two seasons of study.

Fruit dimensions (fruit length and diameter)

With respect to fruit dimensions (fruit length and diameter in cm) in response to different spray treatments under study, data represented in Table (2) disclosed obviously that, both fruit parameters were increased by all used treatments as compared with the control but the increases was significantly in some cases only during the two seasons. Moreover, it is obvious that the trees sprayed with tap water (control) was gave the least values of both fruit length and diameter in both seasons of study. On the other hand, foliar spray treatments of CPPU at 10 mg/l + $Ca(NO_3)_2$ at 20 cm^3 per tree was statistically the superior, while, both fruit length and diameter was induced significantly, followed by CPPU at 10 mg/l+Ca $(NO_3)_2$ at 10 cm^3/tree, CPPU at 10 ppm + K_2SiO_3 at 20 cm^3/tree and CPPU at 10 ppm+K_2SiO_3 at 10 cm^3/tree, respectively in the two seasons of study. However, the other treatments were in between above mentioned the two extents. Those trends were the same during the two experimental seasons

Fruit firmness

Data in Table 2 showed clearly that, an obvious decrease fruit flesh firmness was generally exhibited with most of tested treatments under study as compared to the control, while $Ca(NO_3)_2$ at rates either 20 or 10 cm^3/tree treatments induced fruits having firmer flesh texture than the other treatments including control and the differences were insignificant. Moreover, Cytofex (CPPU) at 10 mg/l treatment produced the least value and the most softened fruit as compared to all other treatments. Such trends were true during both seasons of study.

Seed weight (gm.)

Tabulated data in Table 2 shows that, seed weight (gm.) per fruit responded so slight to some studied treatments either by increase or decrease as compared to the control treatment (trees sprayed with irrigation water only). Anyhow, variations between all treatments concerning their seed weight per fruit were relatively very slight, whereas the differences did not reach level of significance with comparing the control treatment in all investigated treatments during both the first and second experimental seasons.

TABLE 2. Effect of spraying some chemical substances on some fruit physical characteristics (fruit weight, seed weight, fruit length and diameter, fruit size and fruit firmness) of "Early sweeling" peach trees during 2011 and 2012 seasons.

Treatments	Fruit weight (g)		Fruit size (cm^3)		Fruit diameter (cm)		Fruit length (cm)		Fruit firmness ($Ib/inch^2$)		Seed weight (g.)	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
$Ca(NO_3)_2$ 10 cm^3/tree	99.90	102.60	89.67	91.00	5.500	5.510	5.703	5.767	12.330	12.600	6.070	6.633
$Ca(NO_3)_2$ 20 cm^3/tree	101.90	104.10	91.00	92.67	5.540	5.533	5.750	5.800	13.500	13.700	6.627	6.767
K_2SiO_3 10 cm^3/tree	96.20	99.13	86.67	88.67	5.450	5.470	5.620	5.667	9.800	9.867	6.743	6.633
K_2SiO_3 20 cm^3/tree	98.43	100.50	87.67	90.00	5.470	5.490	5.667	5.733	10.270	10.230	6.570	6.667
Cytophex (CPPU) 10 mg/l	102.10	105.10	93.00	94.33	5.517	5.527	5.600	5.667	8.033	7.600	6.737	6.700
$Ca(NO_3)_2$ 10 cm^3/tree + CPPU	112.60	112.00	101.70	101.70	5.733	5.750	5.817	5.820	11.070	11.330	6.483	6.367
$Ca(NO_3)_2$ 20 cm^3/tree + CPPU	115.50	116.90	105.00	105.70	5.757	5.763	5.867	5.900	11.470	12.000	6.673	6.800
K_2SiO_3 10 cm^3/tree + CPPU	106.00	107.40	95.00	97.33	5.613	5.710	5.780	5.833	8.933	9.633	6.357	6.530
K_2SiO_3 20 cm^3/tree + CPPU	111.20	110.50	100.30	99.33	5.717	5.727	5.790	5.860	9.400	9.700	6.783	6.700
Control	95.50	97.23	84.33	86.67	5.427	5.467	5.530	5.567	11.060	11.230	6.603	6.633
L.S.D. at 5 %:	10.22	9.11	9.54	9.25	0.109	0.097	0.133	0.153	3.040	2.952	0.312	0.282

The present data concerning the effect of the various studied treatments on some fruit physical characteristics were supported by the findings of many investigators Mansour *et al*. (1986) on peach trees; Bisal *et al*. (1991) on Kiwi fruits; Greene (1996) on apples, Feng *et al*. (1999) and Marwad (2001) on grapevines; Moon *et al*. (2000), Guirguis *et al*. (2003) and Kabeel & Fawaaz (2005) on pear trees, Kabeel *et al*. (2005) and AbdEl-Fatah *et al*. (2008) on persimmon of fruits.

However, Robertson *et al*. (1990) showed that, fruits from trees sprayed with K or/and Ca were firmer and better quality than control. Moreover, better fruit characters were obtained by K and Ca spray on plum trees (El-Sherif *et al.* 2008 and Abdel-Hafeez *et al*., 2010). Also, Ansari and Bowling (1972) stated that K is the most important action not only in regard to its content in plant tissues but also with respect to its physiological and biochemical function where it is very mobile element in the plant since it is transported directly towards the meristematic tissues and acts as stimulators of various enzymatic systems.

Fruit chemical characteristics

Fruit juice total soluble solids %

With respect to the response of fruit juice TSS % of studied treatments, data in Table 3 disclosed clearly that, TSS % responded significantly to the calcium nitrate and potassium silicate treatments without CPPU especially at the higher concentrations in the two seasons of study. However the richest fruits in their content of TSS % was induced by trees treated with K_2SiO_3 at 20 cm^3/tree followed by potassium silicate at 10 cm^3/tree and $Ca(NO_3)_2$ at 20 cm^3/tree, respectively. While $Ca(NO_3)_2$ at 10 cm^3/tree treatment showed an increase values in TSS % as compared to the control but insignificant in the two seasons of study. On the other hand, an obvious significantly decrease in TSS % was generally exhibited with the other remained treatments which resulted significantly in the least values in fruit TSS % as compared to the control treatment. Such trends were detected during both seasons of study.

Fruit juice total acidity %.

Data obtained in the same Table reveals obviously that there was an opposite trend regarding the total acidity % to those found with fruit juice TSS %, however, an obvious increase in fruit juice total acidity % was generally exhibited with trees treated with CPPU either alone or in combined. Data indicated that trees sprayed with CPPU alone had produced fruits containing the highest significantly values of acidity % as compared to other treatments. On the other hand, the least significant values in this concern was recorded from treatments of both Ca $(NO_3)_2$ and K_2SiO_3 alone either 10 or 20 cm^3/tree. This trend was true during the first and second seasons of study.

TSS/acid ratio.

Data in Table 3 shows obviously that, trees sprayed with CPPU either alone or before $Ca(NO_3)_2$ and potassium silicate at any concentration under study decreased significantly the fruit TSS/acid ratio as compared to the control in the two experimental seasons. Moreover, data pointed out that, the highest significant decrease of fruit TSS/acid ratio was always in concomitant to CPPU treatment during the first and second seasons. On the other hand, the opposite trend was observed with the other remained treatments. Whereas, both $Ca(NO_3)_2$ and K_2SiO_3 either 10 cm^3 or 20 cm^3/tree were the most effective treatments regarding the increasing of fruit TSS/acid ratio. Since potassium silicate at 20 cm^3/tree treatment resulted in statistically the highest values in this concern as compared to all tested treatments. Those trends were coincided during seasons of study.

Total sugar %.

Data in Table 3 displayed clearly that, treated trees with both $Ca(NO_3)_2$ and K_2SiO_3 either at 10 cm^3 or 20 cm^3/tree treatments resulted in an insignificant increase in total sugars % except with K_2SiO_3 at 20 cm^3/tree treatment which was statistically the superior as exhibited significantly the highest value of total sugar % as compared to other treatments. Moreover, the opposite trend was observed with other remained treatments especially with CPPU which was statistically the inferior as exhibited the least significantly values of total sugars %. Such trends were detected during both 2011 and 2012 seasons of study.

These present data concerning the effect of the various studied treatments on some fruit physical characteristics were supported the findings of many investigators Greene (1996) and Woolley *et al.* (2008) on apples, Feng *et al.* (1999) and Marwad (2001) on grapevines, Moon *et al.* (2000), Guirguis *et al.* (2003) and Kabeel &Fawaaz (2005) on pear trees; Kabeel *et al.* (2005) and Abd El-Fatah *et al.* (2008) on persimmon of fruits. CPPU successfully enhanced the yield and majority of fruit characteristics of Florida Prince peach. Yet it had draw backs concerning increasing firmness and acidity and decreasing TSS and anthocyanin *i.e.*, retarding maturity (Stino *et al.*, 2010).

TABLE 3. Effect of spraying some chemical substances on some fruit chemical characteristics (TSS %, total acidity, TSS/acid ratio and total sugar %) of "Early sweeling" peach trees during 2011 and 2012.

Treatments	TSS (%)		Acidity (%)		TSS/acidity		Total sugars %	
	2011	2012	2011	2012	2011	2012	2011	2012
$Ca(NO_3)_2$ 10 cm^3/tree	13.00	12.90	0.90	0.95	14.40	13.58	15.00	15.33
$Ca(NO_3)_2$ 20 cm^3/tree	13.33	13.09	0.90	0.93	14.80	13.93	15.33	15.67
K_2SiO_3 10 cm^3/tree	13.33	13.20	0.90	0.93	14.81	14.15	15.67	15.67
K_2SiO_3 20 cm^3/tree	13.42	13.47	0.80	0.85	16.78	15.85	16.70	17.00
Cytophex (CPPU) 10 mg/l	11.92	12.10	1.40	1.27	8.51	9.55	9.00	9.33
$Ca(NO_3)_2$ 10 cm^3/tree + CPPU	12.00	12.20	1.30	1.20	9.23	10.17	10.00	10.00
$Ca(NO_3)_2$ 20 cm^3/tree + CPPU	12.00	12.37	1.10	1.10	10.91	11.25	11.33	11.67
K_2SiO_3 10 cm^3/tree + CPPU	12.50	12.50	1.00	1.05	12.50	11.91	11.67	12.33
K_2SiO_3 20 cm^3/tree + CPPU	12.50	12.50	1.07	1.03	11.72	12.10	12.33	12.43
Control	12.83	12.83	1.00	1.00	12.83	12.83	14.33	14.00
L.S.D. at 5 %:	0.321	0.254	0.094	0.077	1.542	1.355	2.486	2.341

Leaf mineral content

It is quite evident as shown from data presented in Table 4 that, some leaf macro-nutrients content (N, P, K and Ca) were responded and resulted in a significant increase in their leaf contents to majority of treatments in this study as compared to the control in most cases during the first and second seasons of study.

Concerning the leaf nitrogen content, data indicated that treated trees with $Ca(NO_3)_2$ at 20 cm^3/tree + CPPU at 10 mg/l treatment induced significantly the greatest values of leaf N content followed by $Ca(NO_3)_2$ at 10 cm^3/tree + CPPU at 10 mg/l , $Ca(NO_3)_2$ at 20 cm^3/tree, $Ca(NO_3)_2$ at 10 cm^3/tree and CPPU at 10 mg/l, respectively. On the other hand, the opposite trend was detected with leaves produced from trees treated with tap water only (control) which exhibited statistically the least value of leaf nitrogen content. Moreover, the other investigated treatments were in between the abovementioned two extents.

With respect to leaf phosphorus content, the richest leaves in their phosphorus content was significantly and closely related to trees treated with potassium silicate at 20 cm^3/tree + CPPU at 10 mg/l and K_2SiO_3 at 10 cm^3/tree + CPPU at 10 mg/l followed by both $Ca(NO_3)_2$ at 20 cm^3/tree + CPPU at 10 mg/l and $Ca(NO_3)_2$ at 10 cm^3/tree + CPPU at 10 mg/l treatments; respectively as compared to the control and other remained tested treatments which exhibited statistically the least values of phosphorus content in leaves during both 2011 and 2012 seasons of study.

Regarding the leaf potassium content, data showed that, responded significantly effect to all treatments under study as compared to both the control and $Ca(NO_3)_2$ at 10 cm^3/tree, which exhibited the least significant values and the poorest leaves in their K content during the two seasons of study.

As for leaf calcium content obtained data displayed obviously that, both $Ca(NO_3)_2$ at 20 cm^3/tree + CPPU at 10 mg/l and $Ca(NO_3)_2$ at 10 cm^3/ tree + CPPU at 10 mg/l treatments were the superior with leaf Ca content which reflected statistically the greatest leaf Ca content followed by $Ca(NO_3)_2$ at 10 cm^3/tree and $Ca(NO_3)_2$ at 10 cm^3/tree + CPPU at 10 mg/l treatments which resulted in a significant values in leaf Ca content, respectively in the two seasons of study. On the contrary, treated trees with irrigation water (control) were significantly the inferior during both seasons as exhibited the poorest leaves in their Ca content. Moreover, the other treatments came in between the aforesaid two extents with so slight increase to be investigated. Such trends were detected during the two experimental seasons.

The obtained results regarding the response of leaf mineral content to the different investigated treatments under were in general agreement with that previously reported by Evans & Sorger (1966), Tzoutzoukou & Bouranis (1997), Moon *et al*., (2000), Cherel (2004), Kabeel *et al*. (2005), Kabeel & Fawaaz (2005), Wojcik (2001), Abd El-Fatah (2008), Ben-Arie *et al*. (2008), Yanhai *et al*. (2008) and Woolley *et al*. (2008). The physiological effect of potassium nitrate was declared to play an important role in balancing membrane, potential and turgor activating enzymes, regulating osmotic pressure, stomata movement and tropisms (Cherel, 2004 and Yanhai *et al*., 2008). Whereas, the physiological effect of CPPU was to increase the amount of carbon allocated to fruit growth and produces a stimulation of both cell division and cell expansion (Woolley *et al*., 2008). Moreover, NPK fertilizers and compost tea effectively increased peach leaf content of macro nutrients that probably resulted in higher photosynthetic activity which might be the cause of the enhancements achieved.

TABLE 4. Effect of spraying some chemical substances on the leaf content of some macro-elements (N, P, K and Ca %) of "Early sweeling" peach trees during 2011 and 2012.

Treatments	N (%)		P (%)		K (%)		Ca %	
	2011	2012	2011	2012	2011	2012	2011	2012
$Ca(NO_3)_2$ 10 cm^3/tree	1.97	2.00	0.217	0.217	1.30	1.30	1.75	1.77
$Ca(NO_3)_2$ 20 cm^3/tree	2.00	2.03	0.240	0.233	1.35	1.36	1.83	1.83
K_2SiO_3 10 cm^3/tree	1.70	1.70	0.187	0.180	1.47	1.45	1.56	1.54
K_2SiO_3 20 cm^3/tree	1.77	1.80	0.193	0.183	1.52	1.50	1.57	1.58
Cytophex (CPPU) 10 mg/l	1.90	1.87	0.230	0.227	1.50	1.51	1.47	1.70
$Ca(NO_3)_2$ 10 cm^3/tree + CPPU	2.03	2.03	0.292	0.293	1.45	1.46	1.69	1.70
$Ca(NO_3)_2$ 20 cm^3/tree + CPPU	2.10	2.13	0.297	0.270	1.46	1.45	1.79	1.81
K_2SiO_3 10 cm^3/tree + CPPU	1.57	1.80	0.307	0.297	1.56	1.55	1.59	1.60
K_2SiO_3 20 cm^3/tree + CPPU	1.77	1.83	0.350	0.347	1.59	1.60	1.58	1.59
Control	1.60	1.63	0.197	0.193	1.11	1.12	1.35	1.33
L.S.D. at 5 %:	0.237	0.203	0.094	0.077	0.24	0.23	0.27	0.28

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دراســة علــى تحسيــن المحصــول وجـودة ثمــار الخــوخ "إيرلى سويلنج"

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أجريت هذه الدراسة خلال عامين متتاليين هما ٢٠١١، ٢٠١٢ لدراسة وتقييم تأثير الرش ببعض المواد الكيماوية (نترات الكالسيوم – سليكات البوتاسيوم – السيتوفكس) بتركيزات مختلفة سواء كانت منفردة أو مخلوطة فيما بينها حيث تم الرش مرتين الأولى عند العقد والثانية بعد شهر من الرش الأولى) على بعض صفات الثمار والمحتوى المعدنى لأوراق أشجار الخوخ صنف "إيرلى سويلنج" النامية تحت ظروف منطقة الخطاطبة – محافظة المنوفية .

ولقد أوضحت النتائج المتحصل عليها أن بعض المعاملات المختبرة تحت الدراسة أدت إلى زيادة معنوية لقياسات المحصول (كجم/شجرة أو طن/فدان) وكذلك النسبة المئوية للزيادة فى المحصول مقارنة بمحصول المقارنة (الكنترول) وذلك خلال موسمى الدراسة .

كذلك أشارت النتائج إلى أن معظم صفات الثمار سواء الطبيعية مثل (وزن الثمرة – حجم الثمرة – أبعاد الثمرة – صلابة الثمرة) أو الكيماوية مثل (النسبة المئوية للمواد الصلبة الذائبة الكلية – النسبة المئوية للحموضة الكلية – محتوى الثمار من السكريات الكلية) قد تحسنت معنوياً نتيجة لمعاملات الرش تحت الدراسة بالمقارنة بالكنترول – إضافة إلى ذلك فإن محتوى الورقة من العناصر الغذائية (نتروجين – فوسفور – بوتاسيوم - كالسيوم) قد تحسن نتيجة للرش ببعض المعاملات المختبرة من الوجهة الإحصائية خلال موسمى التجربة ٢٠١١، ٢٠١٢.

والخلاصة أثبتت الدراسة أن بعض المعاملات أدت إلى تأثير معنوى وإيجابى لمعظم القياسات والصفات تحت الدراسة. وكانت معاملتى الرش بكل من نترات الكالسيوم وسليكات البوتاسيوم بمعدل (٢٠ سم^{٣}/شجرة) عقب الرش بالسيتوفكس بتركيز ١٠ جزء فى المليون أفضل وأكثر المعاملات تأثيراً خلال موسمى ٢٠١١، ٢٠١٢ فى هذا الأتجاه .