

## Improving Fruit Quality and Yield of Zaghoul and Samany Date Cultivars by Spraying with Silicon Nutrient

\*Badran, M. A. F.; Hoda S. H. Aly; O. A. Khalil and A.Y.M. Ahmed

Tropical Fruit Dep. Hort. Res. Inst., Agric. Res. Center

\*E-mail: [dmbadran72@yahoo.com](mailto:dmbadran72@yahoo.com)

### Abstract

The present study carried out during 2011 and 2012 seasons on “Zaghoul” and “Samany” date palm cultivars grown on new reclaimed sandy soil, at New Asuit City. Egypt, to investigate the effect of spraying with two sources of micronutrient Silicon (KSi 10 % (A1) and K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % (A2) on fruit retention, bunch weight, total yield as well as some physical and chemical fruit properties. The two Silicon materials sprayed once, twice and thrice one week after pollination and 60 and 120 days later, respectively.

In general, inflorescences spraying with A1 and A2 sources at 0.8% one time (one week after pollination) caused a significant increase in fruit retention percentages as compared with control treatment in the two studied cultivars during both seasons. Also, extending and repeating spraying times after pollination caused a significant increase in fruit retention, bunch weight, total yield, fruit weight, fruit dimensions and fruit content of TSS, total and reducing sugars in both studied cultivars.

Palms that have been sprayed three times with K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % (A2) produced the highest yield components (fruit retention, bunch weight and total yield), fruit weight and dimensions as compared with other treatments on both cultivars during both seasons. The chemical fruit properties (TSS % as well as total and reducing sugars %) under such treatments were higher than those under KSi 10 % (A1) treatments in “Zaghoul” fruits while the opposite trend observed in “Samany” fruits treated with KSi 10 % (A1) where it was more effective on improving chemical fruit properties than K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % treatments.

No significant differences were found between all silicon treatments and control on seed weight and fruit content of tannins.

Generally, the obtained results concluded that spraying “Zaghoul” and “Samany” inflorescences three times with K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % (A2) as a source of potassium silicate was useful to gave a high yield /palm with high fruit quality and could be consider as a recommended treatment under conditions of this experiment.

**Key words :** Silicon, Nutrient, Zaghoul, Date Palm, Potassium Silicate

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Prof. Farouk M. A. Mostafa

## **Introduction**

Date palm (*Phoenix dactylifera* L) is the most common fruit tree grown in semi arid– regions of the Middle East and North Africa. In Egypt, According to FAO, (2010) Egypt is considered the leading country among the top ten date producers the total area devoted for date palm is 90000 feddan producing about 1,130,000 tones (Kassem, 2012). Economically “Zaghloul” and “Samany” date cultivars are the most important soft cultivars grown in Egypt; they are usually harvested and consumed at khalal stage when fruits reach at full color stage (Marzouk and Kassem, 2011).

Macro and micro elements have an important role on fruit set and retention and cause efficient yield and quality improvement (Singh and Sant Ram, 1983 and Khan *et al.* 1993 on mango, and Khayat *et al.* 2007 and El-Sabagh and Said 2012 on date palm).

Plants in the field are subjected to a large number of stresses include pests, weeds, excessive high or low temperature, soil or water salinity etc..

Silicon (Si) has been reported to improve plant growth, increase resistance to insect attach (Ma and Takahashi 2002 and Ma. and Yamaji 2008) and enhances diseases resistance of horticultural crops (Anderson and Sosa 2001). Therefore, Si applications could improve the post harvest fruit quality of many horticultural crops not only through reducing pests and diseases incidence but also by enhancing certain fruit parameters. The most common form of Si in agriculture commodities currently used is

potassium silicate KSi, although other products, such as calcium (CaSi) and sodium silicate (NaSi) as well as non –tox-silicate are available. However, Si can be added as a soil application or foliar spray, depending on the form of Si fertilizer, potassium silicate is often applied as a foliar spray (Ma 2009).

The main aim of this study was to investigate the effects of spraying some sources of silicon micronutrient on yield and fruit quality of “Zaghloul” and “Samany” date cultivars grown in new reclaimed sandy soil.

## **Materials and Methods**

The present investigation conducted during 2011 and 2012 seasons on “Zaghloul” and “Samany” date palms (soft cultivars) grown in new reclaimed sandy soil, at private orchard located at New Assuit City. Egypt. Twenty one palms of each cultivar at full production stage were uniformly selected and received the regular cultural practices. Selected palms were moderate in pruning (8:1 leaf bunch ratio), only eight bunches of nearly equal size were left on each palm (Badran 2004). The selected bunches were pollinated by using pollen grains from the same parent in both seasons. The experiment considered a factorial experiment with two factors (2 sources of silicon (factor A) x four applications of using silicon spraying (factor B) ), it was designed as compete randomized block design with three replicates (one palm for each replicate).

Spraying two sources of silicon nutrient were studied, the first source was potassium silicate KSi 10 % at 0.8% (A1) formulated by central laboratory of organic agriculture

while the second one (A2) was K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % at 0.8% (EL-Ghanem potassium silicate).

Three palms of each cultivar were treated with one of the following treatments:-

T 1-Control (palms sprayed with water).

T 2- Spraying inflorescences one time with A1 at one week after pollination (time1).

T 3- Spraying inflorescences two times with A1 at time1 and 60 days later (time2).

T 4- Spraying inflorescences with A1 three times at time1, time2 and 120 days later.

T 5- Spraying inflorescences one time with A2 at time1.

T 6- Spraying inflorescences two times with A2 at time1 and time2.

T 7- Spraying inflorescences with A2 three times at time1 and time2 and 120 days later.

After one month from pollination ten female strands per each bunch were randomly taken then fruit set % of T1, T2 and T5 were determined according to the equation:

$$\text{Fruit set \%} = \frac{\text{Number of setting fruits per strand}}{\text{Number of female flowers per strand}} \times 100$$

At harvest fruit retention % were determined according to the equation:

$$\text{Fruit retention \%} = \frac{\text{Number of retained fruits per strand}}{\text{Number of setting fruits per strand}} \times 100$$

At picking time at full color stage, all fruit bunches on each palm were harvested. Average bunch weight and total yield per palm (kg) were recorded.

A sample of 100 fruits was taken at random from each replicate

to determine the following physical and chemical characteristics

#### **Fruit characteristics:**

1-Fresh fruit and seed weight (gm)

2- Fruit height (cm) and diameter (cm) measured by Vernier Caliper

3- Moisture % was determined in about 50 gm chopped flesh sample by drying in oven at 70 c to constant weight.

4- Total soluble solids (TSS)% measured by a hand refractometer

5- Sugar contents including reducing and total sugars were determined according to Lane and Eynon described in A.O.A.C.( 1980)

6- Tannins content obtained according to (Winton and Winton 1958)

Data were subjected to statistical analysis according to Snedecor and Cochran (1990). The treatment means were compared using Least Significant Difference values (LSD) at 5% level.

#### **Results and Discussion**

##### **Yield components (fruit set, fruit retention, bunch weight and total yield):**

The calculated initial fruit set reached 47.32 and 46.85 % for Zaghoul and 45.49 and 45.18 % for Samany for treatment T2 and 51.60 and 51.24 % for Zaghoul and 57.49 and 55.70 % for Samany for T5 comparing with control which gave 44.43 and 44.23 % for Zaghoul 45.23 and 44.78 % for Samany during the two seasons respectively.

The results of both seasons (Tables 1 and 2) revealed that inflorescences spraying with KSi 10 % (A1) or K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % (A2) caused a significant increase in fruit retention as compared with control

treatment in two studied cultivars during both seasons. Extending and repeating spraying times of A1 or A2 caused a significant increase in fruit retention as well as bunch weight and consequently total yield in two studied cultivars during both seasons. Hence palm yield was increased as spraying times increased. Accordingly the higher yield components (fruit retention, bunch weight and total yield) were resulted from spraying three times of A1 or A2 in both seasons.

A2 treatments were more effective as it increased all yield parameters than those of A1 treatments.

Increasing the percentages of fruit retention as well as bunch weight and total yield due to silicon spraying may be attributed to the role of silicon on improving plant growth and its ability to make balance of the nutrient uptake or the general enhancement of nutrient transport and distribution by SI (Elawad *et al.* 1982). Matichenkov *et al.* (2000) concluded that there appears to be a relationship between silicon nutrition and the health of the citrus trees. These results are in harmony with those obtained by Gad-El-Kareem (2012) and El-Wasfy (2013).

**Table 1. Effect of spraying silicon on yield components (fruit retention, bunch weight and total yield) of “Zaghloul” date palm cultivar during 2011 and 2012 seasons**

Frequencies of spraying (B)	Fruit retention %			Bunch weight (kg)			Total yield/ palm (kg)		
	2011								
	Source of silicon (A)*								
	a 1	a 2	Mean	a 1	A 2	Mean	a 1	a 2	Mean
b 0 control	25.32	25.32	25.32	11.20	11.20	11.20	82.21	82.21	82.21
b 1 once	27.42	30.32	28.87	11.50	14.39	12.95	89.29	100.47	94.88
b 2 twice	29.45	30.18	29.82	12.57	14.50	13.54	96.28	107.16	101.72
b 3 thrice	29.53	32.43	31.13	12.86	15.22	14.04	98.23	110.16	104.20
Mean	27.93	29.56		12.03	13.83		91.50	100.00	
L S D at 5%	A 0.03	B 0.05	AB 0.07	A 0.07	B 0.10	AB 0.12	A 0.32	B 0.45	AB 0.62
2012									
b 0 control	24.88	24.88	24.88	11.25	11.25	11.25	86.14	86.14	86.14
b 1 once	27.02	31.10	29.06	12.04	14.88	13.46	91.52	102.24	96.88
b 2 twice	29.22	30.45	29.84	12.50	15.01	13.76	95.23	108.20	101.72
b 3 thrice	30.05	33.01	31.53	12.97	15.45	14.21	98.61	111.30	104.96
Mean	27.79	29.86		12.19	14.15		92.88	101.97	
L S D at 5%	A 0.45	B 0.62	AB 0.89	A 0.12	B 0.17	AB 0.25	A 1.07	B 1.51	AB 2.13

\* a1 : KSi 10 %      a2 : K2O 10%+ SiO2 25 %

**Table 2. Effect of silicon spraying on yield components (fruit retention, bunch weight and total yield) of “Samany” date palm cultivar during 2011 and 2012 seasons**

Frequencies of spraying (B)	Fruit retention %			Bunch weight (kg)			Total yield/ palm (kg)		
	<b>2011</b>								
	Source of silicon (A)*								
	a 1	a 2	Mean	a 1	a 2	Mean	a 1	a 2	Mean
b 0 control	23.87	23.87	23.87	13.08	13.08	13.08	82.89	82.89	82.89
b 1 once	29.25	32.40	30.83	14.69	20.44	17.57	91.00	128.49	109.75
b 2 twice	30.65	34.31	32.48	16.38	21.11	18.75	98.67	137.40	118.04
b 3 thrice	31.40	37.55	34.48	18.31	21.76	20.04	107.61	143.13	125.37
Mean	28.79	32.03		15.62	19.10		95.04	122.98	
L S D at 5%	A 0.37	B 0.52	AB 0.74	A 0.03	B 0.05	AB 0.07	A 2.70	B 3.79	AB 5.35
<b>2012</b>									
b 0 control	23.30	23.30	23.30	13.97	13.97	13.97	90.45	90.45	90.45
b 1 once	29.18	32.45	30.82	14.87	21.04	17.96	93.56	140.20	116.88
b 2 twice	30.51	34.87	32.69	16.03	22.25	19.14	101.45	150.40	125.93
b 3 thrice	31.00	37.92	34.46	17.98	22.89	20.44	112.70	157.50	134.95
Mean	28.50	32.14		15.71	20.04		99.54	134.64	
L S D at 5%	A 0.07	B 0.10	AB 0.12	A 0.07	B 0.11	AB 0.12	A 1.71	B 2.35	AB 3.30

\* a1 : KSi 10 %    a2 : K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 %

### Physical fruit characteristics

The effect of different silicon spraying treatments on physical fruit characteristics of “Zaghloul” and “Samany” date cultivars are presented in Tables 3 and 4. The results of both seasons revealed that spraying the inflorescences with silicon sources significantly improved fruit weight and fruit dimensions comparing with control (untreated), these differences were detected between various treatments of silicon.

Additionally, repeating spraying times of A1 or A2 caused a significant increase in fruit weight and fruit dimensions in the two studied cultivars during both seasons. Spraying with A2 (K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 %) was more effective than using A1 (KSi 10 %) on improving physical fruit characteristics of the two cultivars. Hence, the greatest fruit weight and dimension were obtained by spraying

with K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % (A2) three times in both seasons.

In regard to seed weight the obtained data presented in Tables 3 and 4 showed that there were no significant differences of seed weight between different silicon treatments including the control, this was true in the two cultivars during both seasons. In other words, the increase in fruit weight by silicon treatments could be mainly attributed to the increase in flesh weight without regard to the changes of seed weight. These results are in harmony with those obtained by Gad-El-Kareem (2012) and El-Wasfy (2013) who found that supplying the palms via leaves with silicon and / or royal jelly significantly improved fruit weight. Also Matichenkov *et al.* (2000) found a significant effect between Si application and Valencia orange fruit quality.

**Table 3. Effect of silicon spraying on some physical characteristics of “Zaghloul” dates during 2011 and 2012 season**

Frequencies of spraying (B)	Fruit weight (g)			Fruit length (cm)			Fruit diameter (cm)			Seed weight (g)		
	2011											
	Source of silicon (A)											
	a1	a2	Mean	a1	a2	Mean	a1	a2	Mean	a1	a2	Mean
b 0 control	15.57	15.57	15.57	4.72	4.72	4.72	1.80	1.80	1.80	1.09	1.09	1.09
b 1 once	17.50	19.44	18.47	4.77	5.26	5.02	1.94	2.19	2.07	1.20	1.38	1.29
b 2 twice	18.07	21.13	19.60	4.90	5.43	5.17	2.02	2.23	2.13	1.30	1.42	1.36
b 3 thrice	19.14	23.13	21.14	5.01	5.50	5.26	2.10	2.26	2.18	1.32	1.48	1.40
Mean	17.57	19.82		4.85	5.23		1.97	2.12		1.23	1.34	
L S D at 5%	A 0.05	B 0.07	AB 0.10	A 0.02	B 0.02	AB 0.04	A 0.02	B 0.03	AB 0.05	A 0.01	B NS	AB NS
	2012											
b 0 control	15.52	15.52	15.52	4.77	4.77	4.77	1.78	1.78	1.78	1.11	1.11	1.11
b 1 once	17.52	19.72	18.62	4.82	5.24	5.03	1.92	2.22	2.07	1.22	1.39	1.31
b 2 twice	18.11	21.40	19.76	4.93	5.44	5.19	2.00	2.19	2.10	1.28	1.44	1.36
b 3 thrice	19.60	23.45	21.53	5.10	5.56	5.33	2.13	2.31	2.22	1.33	1.44	1.39
Mean	17.69	20.02		4.91	5.25		1.96	2.13		1.24	1.35	
L S D at 5%	A 0.09	B 0.12	AB 0.17	A 0.05	B 0.07	AB 0.10	A 0.03	B 0.05	AB 0.07	A NS	B NS	AB NS

**Table 4. Effect of silicon spraying on some physical characteristics of “Samany” dates during 2011 and 2012 seasons**

Frequencies of spraying (B)	Fruit weight (g)			Fruit length (cm)			Fruit diameter (cm)			Seed weight (g)		
	2011											
	Source of silicon (A)											
	a1	a2	mean	a1	a2	Mean	a1	a2	Mean	a1	a2	Mean
b 0 control	20.32	20.32	20.32	4.90	4.90	4.90	2.23	2.23	2.23	3.09	3.09	3.09
b 1 once	21.94	24.98	23.46	5.14	5.77	5.46	2.27	2.45	2.36	3.17	3.32	3.25
b 2 twice	22.03	27.80	24.92	5.27	5.78	5.53	2.38	2.50	2.44	3.19	3.41	3.30
b 3 thrice	24.93	28.55	26.74	5.62	5.80	5.71	2.39	2.50	2.45	3.27	3.42	3.35
Mean	22.31	25.41		5.23	5.56		2.32	2.42		3.18	3.31	
L S D at 5%	A 0.03	B 0.05	AB 0.06	A 0.02	B 0.02	AB 0.05	A 0.02	B 0.02	AB 0.05	A 0.02	B NS	AB NS
	2012											
b 0 control	20.48	20.48	20.48	4.93	4.93	4.93	2.24	2.24	2.24	3.09	3.09	3.09
b 1 once	22.01	25.07	23.54	5.17	5.82	5.50	2.29	2.45	2.37	3.16	3.33	3.25
b 2 twice	22.65	27.19	24.92	5.24	5.90	5.57	2.36	2.55	2.46	3.21	3.44	3.33
b 3 thrice	24.77	28.46	26.62	5.67	5.93	5.80	2.41	2.62	2.52	3.25	3.43	3.34
Mean	22.48	25.30		5.25	5.65		2.33	2.47		3.18	3.32	
L S D at 5%	A 0.02	B 0.03	AB 0.04	A 0.02	B 0.20	AB 0.03	A 0.03	B 0.04	AB 0.06	A NS	B NS	AB NS

**Chemical fruit characteristics:**

Tables 5 and 6 showed some fruit chemical characteristics as TSS (total soluble solids) tannins and sugar contents (reducing and total) of “Zaghloul” and “Samany” date palm cultivars as affected by spraying with two materials of silicon (A1 and A2) during the two studied seasons, 2011 and 2012. Data indicated that, total soluble solids (TSS) as well as reducing and total sugars of the two cultivars significantly increased by spraying with different silicon treatments compared with control (untreated) in both seasons. All A2 ( K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 %) treatments resulted in higher percentages of TSS, reducing and total sugars content of “Zaghloul” fruits than those of A1

(KSi 10 %) treatments while the opposite was true on “Samany” cultivar, i.e. A1 treatments were most effective on improving chemical fruit properties than all A2 treatments.

Data also revealed that the differences between silicon treatments in tannins content were not significant in both cvs during the two seasons.

The previous positive effect of the silicon sources on chemical fruit properties are due to their role on stimulating antioxidant systems in plants consequently increasing the resistance of plants to unsuitable conditions (Epstein and Bloom, 2003). The current results are in the same line with those reported by Gad-El-Kareem 2012 and El-Wasfy 2013.

**Table 5. Effect of silicon spraying on some chemical characteristics of “Zaghloul” dates during 2011 and 2012 seasons**

Frequencies of spraying (B)	T S S %			Total sugars%			Reducing sugars%			Tannins %		
	<b>2011</b>											
	Source of silicon (A)											
	a 1	a 2	Mean	a 1	a 2	Mean	a 1	a 2	Mean	a 1	a 2	Mean
b 0 control	26.04	26.04	26.04	21.04	21.04	21.04	18.35	18.35	18.35	0.218	0.218	0.218
b 1 once	27.79	31.06	29.44	22.34	28.47	25.41	19.04	22.47	20.76	0.203	0.203	0.203
b 2 twice	28.30	31.47	29.89	22.36	29.58	25.97	19.80	22.05	20.93	0.205	0.210	0.208
b 3 thrice	32.76	33.34	33.05	30.18	31.65	30.92	23.14	23.26	23.20	0.205	0.210	0.208
Mean	28.72	30.48		23.98	27.69		20.08	21.56		0.207	0.210	
L S D at 5%	A 0.17	B 0.25	AB 0.35	A 0.09	B 0.12	AB 0.17	A 0.05	B 0.07	AB 0.12	A 0.01	B NS	AB NS
	<b>2012</b>											
b 0 control	26.00	26.00	26.00	21.00	21.00	21.00	18.24	18.24	18.24	0.218	0.218	0.218
b 1 once	27.65	31.00	29.33	22.07	29.04	25.55	19.20	22.18	20.69	0.218	0.213	0.216
b 2 twice	28.09	31.28	29.69	22.38	29.65	26.02	20.02	21.98	21.00	0.210	0.203	0.207
b 3 thrice	32.50	33.18	32.84	30.45	31.72	31.09	23.14	23.17	23.16	0.210	0.210	0.210
Mean	28.56	30.37		23.98	27.85		20.15	21.39		0.214	0.211	
L S D at 5%	A 0.37	B 0.52	AB 0.74	A 0.80	B 1.10	AB 1.60	A 0.25	B 0.35	AB 0.50	A NS	B NS	AB NS

**Table 6. Effect of silicon spraying on some chemical characteristics of “Samany” dates during 2011 and 2012 seasons**

Frequencies of spraying (B)	T S S %			Total sugars%			Reducing sugars%			Tannins %		
	2011											
	Source of silicon (A)											
	a1	a 2	Mean	a 1	a 2	Mean	a 1	a 2	Mean	a 1	a 2	Mean
b 0 control	33.26	32.26	32.26	29.49	29.49	29.49	23.61	23.61	23.61	0.178	0.178	0.178
b 1 once	36.18	35.30	35.74	32.02	31.50	31.76	26.00	24.85	25.43	0.154	0.178	0.166
b 2 twice	38.28	35.59	36.94	34.19	32.48	33.34	27.29	25.35	26.32	0.203	0.201	0.202
b 3 thrice	40.18	39.09	39.64	37.38	36.33	36.86	29.39	28.09	28.74	0.203	0.203	0.203
Mean	36.98	35.56		33.27	32.45		26.57	25.48		0.185	0.190	0.188
L S D at 5%	A 0.06	B 0.09	AB 0.13	A 0.01	B 0.02	AB 0.03	A 0.04	B 0.05	AB 0.07	A 0.01	B NS	AB NS
	2012											
b 0 control	33.28	33.28	33.28	29.19	29.19	29.19	22.45	22.45	22.45	0.178	0.178	0.178
b 1 once	36.12	34.75	35.44	32.00	31.47	31.74	25.89	24.19	25.04	0.154	0.201	0.178
b 2 twice	37.98	35.09	36.54	34.72	32.87	33.80	27.45	25.39	26.42	0.154	0.178	0.166
b 3 thrice	39.85	38.79	39.32	37.56	35.45	36.51	30.45	28.16	29.31	0.201	0.187	0.194
Mean	36.81	35.48		33.37	32.25		26.56	25.48		0.172	0.186	
L S D at 5%	A 0.08	B 0.11	AB 0.15	A 0.05	B 0.08	AB 0.11	A 0.05	B 0.07	AB 0.10	A NS	B NS	AB NS

Conclusively, the obtained results give basis to conclude that, Spraying “Zaghloul” and “Samany” date palm inflorescences grown in new reclaimed soil with potassium silicate (KSi 10 %) at 0.8% or K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % at 0.8% had a positive effect on fruit set, yield and fruit quality. The most beneficial treatment in this concern is spraying with K<sub>2</sub>O 10%+ SiO<sub>2</sub> 25 % at 0.8% three times (one week after pollination, 60 days later and 120 days later) which gave a reasonable yield and high fruit weight and dimensions with high content of TSS and sugars and could be considered as a recommended treatment under the conditions of this experiment.

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## تحسين جودة ومحصول صنفى نخيل البلح الزغلول والسمانى باستخدام الرش بعنصر السيلكون

محمد احمد فواد بدران ، هدى سعد حسن على ، عمر عبد الحارس خليل واحمد يسن محمد احمد  
مركز البحوث الزراعية ، معهد بحوث البساتين ، قسم بحوث الفاكهة الاستوائية

### الملخص

تم دراسة تأثير الرش بمصدرين لعنصر السيلكون هما ساليكات البوتاسيوم 10% KSi (A1) والآخر مركب مكون من 10% K<sub>2</sub>O + 25% SiO<sub>2</sub> (A2) وهو مركب من انتاج المعمل المركزى للزراعة العضوية وذلك على المحصول والصفات الثمرية للبلح الزغلول والسمانى والمزروعان فى اراضى حديثة الاستصلاح تحت ظروف محافظة أسبوط بجمهورية مصر العربية وشملت الدراسة ست معاملات مقارنة بالكنترول كما يلي:

- ١- المعاملة القياسية (رش بالماء)
- ٢- رش السباطات بالمركب A1 مرة واحدة بعد اسبوع من التلقيح
- ٣- رش A1 مرتين بعد اسبوع من التلقيح ثم بعد ٦٠ يوم من الرش الاول
- ٤- رش A1 ثلاث مرات بعد اسبوع من التلقيح ثم بعد ٦٠ يوم من الرش الاول ثم ١٢٠ يوم من الرش الاول
- ٥- رش السباطات بالمركب A2 مرة واحدة بعد اسبوع من التلقيح
- ٦- رش السباطات بالمركب A2 مرتين بعد اسبوع من التلقيح ثم بعد ٦٠ يوم من الرش الاول
- ٧- رش السباطات بالمركب A2 ثلاث مرات بعد اسبوع من التلقيح ثم بعد ٦٠ يوم من الرش الاول ثم ١٢٠ يوم من الرش الاول.

تم تقدير نسبة العقد المبدئى للمعاملات الثانية والخامسة والمعاملة القياسية وذلك بعد ثلاثون يوما من التلقيح وتم تقدير العقد النهائى (البستانى) عند جمع المحصول. تم اخذ عينة مكونة من ١٠٠ ثمرة بطريقة عشوائية من كل مكررة وذلك لتقدير بعض الصفات الطبيعية والكيميائية.

### اولا: الصفات الطبيعية:

وكانت وزن وابعاد ( الطول والقطر) الثمرة وكذلك وزن البذرة.

### ثانيا: الصفات الكيميائية:

وكانت نسبة المواد الصلبة الذائبة والمحتوى من السكريات المختزلة والكلية بجانب المحتوى من التانينات وكانت ابرز النتائج المتحصل عليها كما يلي:

ادى الرش بمصدرى السيلكون لسباطات كلا الصنفين مرة واحدة بعد اسبوع من التلقيح الى زيادة معنوية فى نسبة عقد الثمار ونسبة الثمار المتبقية بالمقارنة بالكنترول. وبزيادة مرات الرش زادت نسبة الثمار المتبقية وكذا وزن السباطه وبالتالي المحصول الكلى.

كما أدى الرش بمصدرى السيلكون إلى زيادة معنوية لكل من وزن الثمرة وأبعادها ومحتوها من المواد الصلبة الذائبة والسكريات المختزلة والكلية مقارنة بالكنترول وكانت هذه الزيادة مضطربة بزيادة عدد مرات الرش وذلك فى كلا الصنفين وخلال الموسمين الدراسيين. لم تتأثر معنويا صفة وزن البذرة ومحتوى الثمار من التانينات بالمقارنة بالكنترول وذلك فى كلا الصنفين.

سجلت معاملة الرش بالمركب A2 ثلاث مرات اعلى القيم فى قياسات المحصول (نسبة الثمار المتبقية و وزن السباطه والمحصول الكلى) وايضا وزن الثمرة وأبعادها بالمقارنة بالمعاملات الأخرى فى كلا الصنفين فى موسمي الدراسة. سجلت معاملات الرش بالمركب A2 قيما اعلى فى محتوى الثمار من المواد الصلبة الذائبة والسكريات المختزلة والكلية فى الصنف الزغلول بالمقارنة بمعاملات الرش بـ A1 فى حين كان العكس صحيح فى الصنف السمانى حيث كانت معاملات الرش بـ A1 أكثر تأثيراً فى تحسين الصفات الكيماوية للثمار من الرش بالمركب A2 .

أوصت الدراسة بأن معاملة الرش بالمركب A2 ثلاث مرات تعتبر أنسب المعاملات إذ أعطت أعلى محصول مع جودة عالية لثمار الصنفي الزغلول والسماطي المنزعين في اراضى حديثة الاستصلاح تحت ظروف تلك التجربة.