

## Effect of Some Chemical Thinning Agents on Fruit Quality and Oil Content of Manzanillo and Eggizi Shami Olive Cultivars

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### ABSTRACT

The present investigation was conducted for two successive seasons (2009-2010) on two olive cultivars (Manzanillo and Eggizi Shami) at a private orchard in the Alex desert road. The aim of study is to investigate the effect of some chemical thinning agents GA3 at concentrations (100,150 and 200 p.p.m), NAA at (100,150 and 200 p.p.m) and Urea at (4, 6, 8 and 10%) on fruit characteristics (fruit length, diameter and weight) and oil content. Chemicals were sprayed at full bloom, five days after full bloom, ten days after full bloom and fifteen days after full bloom. The obtained results showed that chemical thinning agents GA3, NAA and Urea are effective in improving fruit quality and oil content in both studied cultivars. It is applicable to spray Urea as a chemical thinning agent at 4% at ten days after full bloom because it is cheap, effective and as a source of nitrogen supply.

**Keywords:** Olive, Thinning, NAA, GA3, Urea, Fruit Characteristics and Oil content

### INTRODUCTION

In Egypt, olive cultivation increased considerably and olive production reached about 600,000 tons produced from acreage 240,000 Feddan and most of which are processed mainly as table olive and the rest is extracted as olive oil, (Statistics of Ministry of Agriculture and Land Reclamation, 2015).

Thinning of olive fruits in intensively irrigated orchards is a necessary to obtain high fruit quality especially in on years (heavy cropping years). Olive growers are advised to do fruit thinning during "on" year crop to reduce the occurrence of alternate bearing (Abu-Zahra and Al-Dmoor, 2013).

Alternate bearing is found in some olive cultivars. The condition of heavy crop load results in limb breakage, and produces fruits of low quality. The year following excessive production might be so depressed that harvest wouldn't be economical, (Martin *et al.*, 1980), on cv. Manzanillo olives. Hartmann, (1952) stated that naphthalene acetic acid (NAA) was effective in thinning olive fruits. Different cultural methods are commonly applied in order to decrease alternate bearing and improve fruit quality in olive as well as in some fruit cultivars. These methods summarized as breeding, fertilization, pruning, girdling, thinning, applying of some plant growth regulators and using suitable harvest (Hartmann *et al.*, 1980, Monselise and Goldschmidt 1982, Poli 1987).

Elizabeth, (2013) found that NAA is an effective thinning agent of olive fruits resulting in a reduction in final fruit set, increase in size and quality of the remaining fruit and improvement in return bloom.

Using various concentrations (2, 4 and 6%) of Urea as a chemical thinner reduced by about 50% as compared to the control plants (Barattà *et al.* 1990).

The present investigation aimed to study, the effect of some chemical thinning agents (GA3, NAA and Urea) used at full bloom, five days, ten days and fifteen days after full bloom on fruit characteristics and oil content. Also, to determine the suitable time and concentration of spraying these chemical compounds.

### MATERIALS AND METHODS

This work was carried out through the period (2009 – 2010) on 13 years old of two olive

cultivars (Eggizi Shami and Manzanillo cvs.) in sandy soil of a private orchard 50 kilometer at the Alex desert road. The trees were planted at 4x5 meters and subjected to the normal agricultural practices such as fertilization, irrigation, pruning and pest control.

Three trees had been selected for every treatment; on every tree 10 branches were labeled. The flowers had been counted on the branches which had been selected, before spraying the experiment materials; the leaves had been counted on the branches before spraying to make sure no burning leaves after spraying. All trees that has been selected in (on - year) bearing.

#### Table 1. Chemical materials used in the experiment:

Materials	Concentrations
Gibberellic acid(GA3)	100 ,150 and 200 p.p.m
Naphthalene acetic acid(NAA)	100 ,150 and 200 p.p.m
Urea	4,6,8 and 10%
Control	Water sprayed

**Time of application:** The used chemical has been sprayed at

- 1-Full bloom (FB): when 50-70% of flowers were opened.
- 2- Five days after full bloom.
- 3-Ten days after full bloom.
- 4-Fifteen days after full bloom.

#### Measurements:

- 1-Fruit length (cm): Fruit length was measured using Vernier scale.
- 2-Fruit diameter (cm): Fruit diameter was measured using Vernier scale.
- 3-Fruit weight (g): Fruit weight was measured using the digital balance.
- 4-Fruit oil content was determined by means of the Soxhlett fat extraction apparatus using hexane of 60-80°C boiling point as described by (A.O.A.C,1975). Oil was extracted from samples using mixture of Chlorophorme: Methyl alcohol (2:1, V/V) according to the method of Kates, (1972).

#### Experimental design:-

The experiment was laid out as a randomized complete design with three factors (cultivars \* dates \* treatments) used for analysis, all data with three replications. The treatment means were compared by least significant difference (L.S.D.) test as significance level of 0.05 as given by Snedecor and Cochran (1980) by using Mstat-C program (1989).

**RESULTS AND DISCUSSION**

**Effect of thinning agents on fruit length of Manzanillo and Eggizi Shami olive cvs.:-**

Data obtained in the first season (2009), showed that fruit length was significantly higher (2.91 cm) in fruits treated with Urea 6%, while it was the lowest (2.83 cm) in fruits treated with NAA 100 p.p.m (Table 2). It was also observed that the fruit length was significantly higher (3.11 cm) in Eggizi Shami cv. compared with Manzanillo cv. which recorded (2.62 cm).Fruit length was significantly higher (2.92 cm) with treatments sprayed at (FB +10 day). While, it was the lowest (2.82 cm) with treatments sprayed at (FB+15 days).

Fruit length was the highest (3.53 cm) in control treatment of Eggizi Shami cv. at (FB+10 days), while it was the lowest (2.44 cm) with treatment NAA 150 p.p.m with Manzanillo cv. at (FB+5 days).

In the second season (2010), fruit length was significantly higher (2.94 cm) in treatment with GA3

150 p.p.m. while, it was the lowest (2.78 cm) in control treatment (Table 3).Fruit length was significantly higher (3.06 cm) in Eggizi Shami cv. compared with Manzanillo cv. which recorded (2.65 cm).

Fruit length was significantly higher (2.89 cm) with treatment sprayed at (FB +10 days) while, it was the lowest (2.83 cm) in treatment sprayed at (FB).

Fruit length was the highest (3.18 and 3.19 cm) with treatment Urea 6% with Eggizi Shami cv. at (FB and FB+10 days), while it was the lowest (2.42 cm) with treatment NAA 200 p.p.m with Manzanillo cv. at (FB+5 days).

**Effect of thinning agents on fruit diameter of Manzanillo and Eggizi Shami olive cvs.:-**

In the first season (2009), it was observed that fruit diameter was significantly higher (2.42 cm) in treatment with NAA 150 p.p.m while, it was the lowest (2.27 cm) in treatment with GA3 100 p.p.m (Table 4).

**Table 2. Effect of thinning agents on fruit length (cm) of Manzanillo and Eggizi Shami olive cvs. season (2009).**

Cultivars	Dates	Treatments										Mean	
		GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%		Control
Manzanillo	FB	2.80	2.48	2.74	2.71	2.76	2.65	2.65	2.78	2.70	2.61	2.60	2.68
	FB + 5	2.68	2.62	2.57	2.51	2.44	2.58	2.69	2.56	2.55	2.55	2.53	2.57
	FB +10	2.65	2.70	2.50	2.59	2.68	2.66	2.75	2.75	2.63	2.53	2.68	2.65
	FB +15	2.70	2.54	2.62	2.57	2.60	2.53	2.64	2.56	2.58	2.57	2.57	2.59
Mean		2.71	2.58	2.61	2.59	2.62	2.60	2.68	2.66	2.61	2.56	2.59	2.62
Eggizi Shami	FB	2.96	3.01	3.11	3.07	3.13	3.15	3.20	3.33	3.18	3.00	2.90	3.09
	FB + 5	3.19	3.26	3.20	3.06	3.04	3.11	2.89	3.10	3.19	3.17	3.07	3.12
	FB +10	3.01	3.21	3.22	3.20	3.27	2.94	3.12	3.24	3.11	3.24	3.53	3.19
	FB +15	3.07	3.17	3.12	2.96	3.03	3.10	3.02	2.98	2.99	3.24	3.00	3.06
Mean		3.06	3.16	3.16	3.07	3.12	3.07	3.05	3.16	3.12	3.16	3.12	3.11
FB		2.88	2.74	2.93	2.89	2.95	2.90	2.92	3.05	2.94	2.80	2.75	2.89
FB + 5		2.93	2.94	2.89	2.79	2.74	2.84	2.79	2.83	2.87	2.86	2.80	2.84
FB + 10		2.83	2.95	2.86	2.89	2.97	2.80	2.93	2.99	2.87	2.88	3.11	2.92
FB + 15		2.89	2.86	2.87	2.76	2.81	2.82	2.83	2.77	2.78	2.90	2.78	2.82
Mean		2.88	2.87	2.89	2.83	2.87	2.84	2.87	2.91	2.87	2.86	2.86	2.86

LSD value at 0.05: Cultivar (C): 0.0302, Dates (D): 0.0428, C&D: 0.0605, Treatments (T): 0.0709, C&T: 0.1003, D&T: 0.1419, C&D&T: 0.2006

**Table 3. Effect of thinning agents on fruit length (cm) of Manzanillo and Eggizi Shami olive cvs. season (2010).**

Cultivars	Dates	Treatments										Mean	
		GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%		Control
Manzanillo	FB	2.57	2.64	2.66	2.65	2.53	2.69	2.54	2.78	2.63	2.72	2.56	2.63
	FB+5	2.61	2.78	2.69	2.70	2.57	2.42	2.62	2.70	2.61	2.64	2.61	2.63
	FB+10	2.62	2.75	2.59	2.64	2.77	2.59	2.75	2.62	2.74	2.72	2.65	2.67
	FB+15	2.65	2.73	2.69	2.65	2.70	2.64	2.72	2.68	2.53	2.70	2.66	2.67
Mean		2.61	2.73	2.66	2.66	2.64	2.59	2.65	2.69	2.63	2.69	2.62	2.65
Eggizi Shami	FB	3.12	3.12	3.16	2.95	3.00	3.05	3.00	3.19	3.18	2.90	2.74	3.04
	FB+5	3.04	3.07	2.88	3.07	3.07	3.02	3.09	3.08	3.18	3.17	3.08	3.07
	FB+10	3.02	3.08	3.20	3.17	3.11	3.16	2.82	3.18	3.01	3.24	3.12	3.10
	FB+15	3.00	3.32	3.01	2.95	3.10	3.07	3.08	2.99	2.96	3.12	2.83	3.04
Mean		3.05	3.15	3.06	3.03	3.07	3.07	3.00	3.11	3.08	3.11	2.94	3.06
FB		2.85	2.88	2.91	2.80	2.77	2.87	2.77	2.99	2.90	2.81	2.65	2.83
FB + 5		2.83	2.93	2.79	2.88	2.82	2.72	2.85	2.89	2.90	2.90	2.84	2.85
FB + 10		2.82	2.92	2.89	2.91	2.94	2.87	2.79	2.90	2.87	2.98	2.88	2.89
FB + 15		2.82	3.03	2.85	2.80	2.90	2.86	2.90	2.83	2.74	2.91	2.74	2.85
Mean		2.83	2.94	2.86	2.85	2.86	2.83	2.83	2.90	2.85	2.90	2.78	2.85

LSD value at 0.05: Cultivar (C): 0.0292, Dates (D): 0.0413, C&D: 0.0585, Treatments (T): 0.0686 C&T: 0.0970, D&T: 0.1371, C&D&T: 0.1939

It was also observed that the fruit diameter was significantly higher (2.48 cm) in Eggizi Shami cv. compared with Manzanillo cv. which recorded (2.20 cm).Fruit diameter was significantly higher (2.37 cm) in

treatment sprayed at (FB +5 days) while, it was the lowest (2.33 cm) with treatments sprayed at (FB and FB+10 days). It was illustrated that the fruit diameter was the highest (2.65 cm) in treatment with NAA 150 p.p.m in Eggizi Shami cv. sprayed at (FB+5 days), while it was the lowest (1.55 cm) in treatment with GA3 100 p.p.m in Manzanillo cv. at (FB).

In the second season (2010), fruit diameter was significantly higher (3.03 cm) in treatment with GA3 200 p.p.m while, it was the lowest (2.26 cm) in control treatment (Table 5).

Fruit diameter was significantly higher (2.55 cm) in Eggizi Shami cv. compared with Manzanillo cv. which recorded (2.26 cm).It was also observed that the fruit diameter was significantly higher (2.60 cm) in

treatment sprayed at (FB +10 days) while, it was the lowest (2.32 and 2.33 cm) in treatments sprayed at (FB and FB+15 days).

Fruit diameter was the highest (2.61 cm) in treatment of Urea 6% in Eggizi Shami cv. at (FB), while it was the lowest (2.13 and 2.14 cm) in Urea treatment 8% and NAA 200 p.p.m on Manzanillo cv. at (FB+15 and FB +5 days).

**Effect of thinning agents on fruit weight (g) of Manzanillo and Eggizi Shami olive cvs.:-**

The results obtained in the first season (2009), showed that fruit weight was significantly higher (9.21g) after Urea treatment at 6%. While, it was the lowest (7.82 g) in NAA treatment 100 p.p.m (Table 6).

**Table 4. Effect of thinning agents on fruit diameter (cm) of Manzanillo and Eggizi Shami olive cvs. season (2009).**

Cultivars	Dates	Treatments										Mean	
		GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%		Control
Manzanillo	FB	1.55	2.16	2.31	2.26	2.32	2.27	2.26	2.36	2.31	2.29	2.19	2.21
	FB+ 5	2.28	2.23	2.26	2.15	2.21	2.14	2.32	2.18	2.12	2.18	2.09	2.19
	FB+10	2.28	2.36	2.24	2.16	2.17	2.17	2.21	2.22	2.20	2.18	2.14	2.21
	FB+15	2.26	2.17	2.23	2.31	2.26	2.21	2.16	2.14	2.16	2.15	2.19	2.20
Mean		2.09	2.23	2.26	2.22	2.24	2.20	2.24	2.22	2.20	2.20	2.15	2.20
Eggizi Shami	FB	2.42	2.55	2.48	2.39	2.38	2.54	2.53	2.72	2.32	2.50	2.24	2.46
	FB +5	2.55	2.61	2.48	2.41	3.10	2.41	2.37	2.45	2.61	2.52	2.53	2.55
	FB+10	2.43	2.57	2.51	2.65	2.43	2.33	2.26	2.60	2.37	2.53	2.38	2.46
	FB+15	2.37	2.45	2.55	2.54	2.54	2.55	2.45	2.42	2.51	2.47	2.32	2.47
Mean		2.44	2.54	2.50	2.50	2.61	2.46	2.40	2.55	2.45	2.50	2.37	2.48
FB		1.99	2.35	2.40	2.32	2.35	2.40	2.40	2.54	2.31	2.39	2.22	2.33
FB + 5		2.41	2.42	2.37	2.28	2.65	2.27	2.34	2.31	2.36	2.35	2.31	2.37
FB + 10		2.35	2.46	2.37	2.40	2.30	2.25	2.24	2.41	2.29	2.35	2.26	2.33
FB + 15		2.32	2.31	2.39	2.42	2.40	2.38	2.30	2.28	2.33	2.31	2.25	2.34
Mean		2.27	2.39	2.38	2.36	2.42	2.33	2.32	2.38	2.32	2.35	2.26	

LSD value at 0.05: Cultivar (C): 0.0380, Dates (D):0.0537; C&D: 0.0760, Treatments (T): 0.0891C&T: 0.1260, D&T: 0.1782, C&D&T: 0.2520

**Table 5. Effect of thinning agents on fruit diameter (cm) of Manzanillo and Eggizi Shami olive cvs. season (2010).**

Cultivars	Dates	Treatments										Mean	
		GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%		Control
Manzanillo	FB	2.17	2.28	2.23	2.36	2.23	2.31	2.19	2.25	2.27	2.33	2.17	2.25
	FB +5	2.24	2.37	2.35	2.29	2.16	2.14	2.28	2.32	2.16	2.26	2.20	2.25
	FB+10	2.24	2.33	2.23	2.41	2.27	2.19	2.23	2.35	2.31	2.23	2.18	2.27
	FB+15	2.24	2.25	2.29	2.19	2.35	2.22	2.37	2.27	2.13	2.21	2.30	2.26
Mean		2.22	2.31	2.27	2.31	2.25	2.21	2.27	2.30	2.22	2.26	2.21	2.26
Eggizi Shami	FB	2.52	2.41	2.36	2.24	2.44	2.29	2.45	2.61	2.56	2.36	2.16	2.40
	FB +5	2.42	2.44	2.54	2.47	2.46	2.33	2.48	2.42	2.55	2.51	2.42	2.46
	FB+10	2.54	2.40	7.81	2.52	2.43	2.51	2.19	2.50	2.36	2.56	2.52	2.94
	FB+15	2.46	2.54	2.42	2.22	2.43	2.45	2.53	2.48	2.35	2.40	2.12	2.40
Mean		2.49	2.44	3.78	2.36	2.44	2.39	2.41	2.50	2.45	2.46	2.30	2.55
FB		2.35	2.34	2.29	2.30	2.33	2.30	2.32	2.43	2.41	2.34	2.16	2.32
FB + 5		2.33	2.40	2.44	2.38	2.31	2.23	2.38	2.37	2.35	2.39	2.31	2.35
FB + 10		2.39	2.36	5.02	2.47	2.35	2.35	2.21	2.43	2.34	2.39	2.35	2.60
FB + 15		2.35	2.39	2.35	2.20	2.39	2.33	2.45	2.37	2.24	2.30	2.21	2.33
Mean		2.35	2.37	3.03	2.34	2.34	2.30	2.34	2.40	2.33	2.36	2.26	

LSD value at 0.05: Cultivar (C): 0.2376 Dates (D): 0.3360, C&D: 0.4751, Treatments (T): 0.5571, C&T: 0.7879, D&T: 1.1143, C&D&T: 1.5758

It was also observed that fruit weight was significantly higher (8.78 g) in fruits sprayed at (FB +10 days) while, it was the lowest (8.32 g) with fruits sprayed at (FB+15 days).

It was also noticed that fruit weight was significantly higher (10.02 g) in Eggizi Shami cv. compared with Manzanillo cv. which recorded (7.76 g).

In the second season (2010), fruit weight was significantly higher (8.81 and 8.94 g) in fruits treated with GA3 150 p.p.m and Urea 6%, respectively. While, it was the lowest (8.08 g) in treatment of NAA 200 p.p.m (Table 7). Fruit weight was significantly higher (9.38 g) in Eggizi Shami cv. compared with Manzanillo cv. which recorded (7.47 g).

Fruit weight was generally higher (8.66 g) in fruits sprayed at (FB +10 days) while, it was the lowest (8.23 g) in fruits sprayed at (FB).Fruit weight was the highest(11.18 and 11.49 g) in treatments GA3 150 p.p.m and Urea 6 % in Eggizi Shami cv. at (FB+10 days), while it was the lowest (6.38 and 6.40 g) with treatment Urea 8% with Manzanillo cv. sprayed at (FB+15 and FB+5 days),respectively.

These results are in line with Crous and Steyn (2015) who found that the use of Naphthalene acetic acid (NAA) on ‘Barouni’ and ‘Manzanilla’, cvs. NAA decreased the fruit number per tree, thereby improving fruit size in both cultivars. Thinning did not affect return bloom in ‘Barouni’, possibly due to the low level of thinning achieved, whereas adverse climatic conditions during flower development may be to blame for the lack of return bloom in ‘Manzanilla’.

Also Nafea and Abdulfatah (2014) found that GA3 (100, 125) mg.l<sup>-1</sup> in combination with NAA (50,100) mg.l<sup>-1</sup> gave maximum value of most physical characteristics , fruit set , yield and oil of olive trees cv.

Barone et al. (2013) found that spraying NAA at 200 p.p.m treatment on 'Nocellara del Belice' olive cv. applied on the earliest of the dates selected (8 and 12) days after full bloom increased fruit weight by reducing crop density and enhancing the leaf to fruit ratio, without reducing yield.Taghipour et al. (2011) found that NAA at 20 and 40 mg L<sup>-1</sup>increased fruit weight, while Urea was effective at all concentrations in both years.

El Sherkawy et al. (2010) found that spraying NAA at100 p.p.m, 150 p.p.m and Urea at 2%, 3% at 15 days after full bloom in on-years of biennial bearing cycle of Picual olive cv. reduce alternate bearing severity as compared with untreated trees during the four seasons of study.

Taghipour et al. (2011) using three levels of boric acid (0, 50, and 100 mg/l) and Urea (0, 500, and 1000 mg/l). The results showed that application of Urea mixed with boric acid significantly increased fruit weight.

Barattà et al. (1990) found that the crop load and fruit characteristics were affected by treatments when using Urea 6% as chemical thinner.

Various concentrations (2, 4, and 6%) of Urea as chemical thinner were applied to ‘Nocellara del Belice’ olive cv. at full bloom (FB), FB+10, FB+20. Crop load and fruit characteristics were affected by treatments (Barattà et al. 1990). When Urea was applied 20 days after full bloom, crop load and the number of small drupes decreased and fruit weight increased with increasing concentrations of Urea.

El Kassas, (1982) on study at the effect of different spray solutions of GA3 at 100,150, and 200 p.p.m., on shoots of Chemlali olive cv., 15 days after full bloom, stated that fruit set was not affected significantly in comparison between, GA3, and untreated control treatments. However, the GA3 treatments proved to increase, the average fruit weight, percentage of pulp, dry weight and crude oil content compared to the untreated control.

**Effect of thinning agents on oil content of Manzanillo and Eggizi Shami olive cvs.:-**

The obtained results in the first season (2009), showed that oil content recorded higher percentage with thinning treatments compared with control such as (20.99 %) with Urea 4% at FB+10 on Manzanillo olive cv. but recorded (15.35 %) at same time and cultivar(Table 8).Similar results were noticed on Eggizi Shami olive cv. with thinning treatments which was higher compared with control.

In the second season,similar trend was observed for oil % on Manzanillo and Eggizi Shami cvs. (Table 9).

These results are in line with findings of Nafea and Abdulfatah (2014) who found that foliar application on the trees with (GA3) (75, 100 and 125) mg.l<sup>-1</sup>, (NAA) (50, 100) mg.l<sup>-1</sup> in addition of control was done after 15 days after fruit set for two season 2009-2010, 2010-2011, fruit harvested at mid- October. The effect of growth regulators (GA3 and NAA) was not uniform in different treatments. However, GA3 (100, 125)mg.l<sup>-1</sup> in combination with NAA (50,100) mg.l<sup>-1</sup> gave maximum value of oil of olive trees cv.

**Table 6. Effect of thinning agents on fruit weight (g) of Manzanillo and Eggizi Shami olive cvs. season (2009).**

Cultivars	Dates	Treatments										Mean	
		GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%		Control
Manzanillo	FB	7.99	6.27	7.72	7.53	8.42	7.36	6.83	8.15	8.45	6.92	7.33	7.54
	FB + 5	7.48	7.63	7.38	6.64	7.21	6.71	7.37	6.69	6.50	6.48	6.06	6.92
	FB+10	7.45	8.35	7.16	6.45	6.43	6.65	7.03	7.38	7.25	6.55	6.80	7.04
	FB+15	7.63	6.73	6.69	7.21	7.16	6.36	6.59	6.49	6.52	6.56	6.39	6.76
Mean		7.63	7.24	7.23	6.96	7.30	6.77	6.95	7.18	7.18	6.63	6.64	7.07
Eggizi Shami	FB	8.97	9.21	10.75	9.36	9.16	10.65	10.67	13.56	9.54	9.77	8.56	10.02
	FB+5	10.84	11.67	10.79	9.48	8.90	7.72	9.75	10.55	10.99	10.86	10.02	10.14
	FB+10	9.51	10.75	10.62	11.99	10.27	8.71	8.74	11.44	9.03	10.46	8.83	10.03
	FB+15	9.33	11.29	10.56	10.06	10.49	9.64	9.49	9.45	9.48	10.46	8.55	9.89
Mean		9.66	10.73	10.68	10.22	9.71	9.18	9.66	11.25	9.76	10.39	8.99	10.02
	FB	8.48	7.74	9.24	8.44	8.79	9.01	8.75	10.85	8.99	8.34	7.95	8.78
	FB + 5	9.16	9.65	9.08	8.06	8.05	7.21	8.56	8.62	8.75	8.67	8.04	8.53
	FB + 10	8.48	9.55	8.89	9.22	8.35	7.68	7.89	9.41	8.14	8.50	7.81	8.54
	FB + 15	8.48	9.01	8.62	8.64	8.82	8.00	8.04	7.97	8.00	8.51	7.47	8.32
	Mean		8.65	8.99	8.96	8.59	8.50	7.97	8.31	9.21	8.47	8.51	7.82

LSD value at 0.05: Cultivar(C): 0.1001 Dates (D):0.1416; C&D: 0.2002, Treatments (T): 0.2348C&T: 0.3321, D&T: 0.4696, C&D&T: 0.6641

**Table 7. Effect of thinning agents on fruit weight (g) of Manzanillo and Eggizi Shami olive cvs. season (2010).**

Cultivars	Dates	Treatments										Control	Mean
		GA3 100	GA3 150	GA3 200	NAA 100	NAA 150	NAA 200	Urea 4%	Urea 6%	Urea 8%	Urea 10%		
Manzanillo	FB	6.71	7.54	7.44	8.33	6.73	7.54	6.43	7.61	8.36	7.33	6.64	7.33
	FB + 5	7.02	8.49	7.88	7.86	7.15	6.31	8.11	7.66	6.40	7.62	6.70	7.38
	FB + 10	7.36	8.35	7.66	8.61	7.70	6.50	7.42	8.54	7.73	7.36	6.60	7.62
	FB + 15	7.64	7.40	7.47	6.53	8.49	7.19	8.36	7.43	6.38	7.30	8.33	7.50
Mean		7.18	7.95	7.61	7.83	7.52	6.88	7.58	7.81	7.22	7.40	7.07	7.46
Eggizi Shami	FB	10.28	8.68	8.51	7.80	9.30	8.51	9.51	11.49	11.06	8.48	6.72	9.12
	FB+5	9.42	9.69	9.63	8.33	9.78	8.08	8.71	9.70	10.51	10.48	9.47	9.44
	FB+10	9.34	9.17	10.37	10.49	9.58	11.07	7.31	9.76	8.68	10.62	10.40	9.71
	FB+15	9.31	11.18	9.09	8.18	9.72	9.47	10.14	9.35	8.76	9.49	7.37	9.28
Mean		9.59	9.68	9.40	8.70	9.59	9.28	8.92	10.08	9.75	9.77	8.49	9.38
	FB	8.50	8.11	7.98	8.06	8.01	8.02	7.97	9.55	9.71	7.91	6.68	8.23
	FB + 5	8.22	9.09	8.75	8.09	8.47	7.20	8.41	8.68	8.45	9.05	8.09	8.41
	FB + 10	8.35	8.76	9.01	9.55	8.64	8.78	7.37	9.15	8.21	8.99	8.50	8.66
	FB + 15	8.47	9.29	8.28	7.35	9.10	8.33	9.25	8.39	7.57	8.39	7.85	8.39
	Mean	8.38	8.81	8.50	8.26	8.55	8.08	8.25	8.94	8.48	8.58	7.78	

LSD value at 0.05: Cultivar(C): 0.0894, Dates (D):0.1265, C&D: 0.1789, Treatments (T): 0.2098C&T: 0.2967, D&T: 0.4195, C&D&T: 0.5933

The obtained results are in parallel with Taghipour *et al.* (2011) who found that the treatment (acid boric at 100 mg/l and Urea at 500 mg/l) resulted in the highest oil content of olive.

El Sherkawy *et al.* (2010) studied different chemical compounds (NAA, ethrel and Urea) with different concentrations and found that spraying NAA at 100 p.p.m, 150 p.p.m and Urea at 2%, 3% at 15 days after full bloom in on-years of biennial bearing cycle of Picual olive cv. reduce alternate bearing severity as compared with the control during the four seasons of study through thinning fruits of on-years (2006&2008) and increasing flowering and fruiting in off-years (2007&2009) and improved fruit quality. In addition, the treatment produced fruits with good quality sincerity increased fruit weight, flesh/stone ratio, fruit dimensions

and oil content, The most effective treatments were, ethrel at 300 p.p.m and NAA at 150 p.p.m.

El Kassas (1982) found that spraying GA3 at 100,150, and 200 p.p.m., sprayed on Chemlali olive cv., 15 days after full bloom increase oil content compared to the untreated control.

**From this investigation it could be concluded that:**

- 1-Using chemical thinning agents GA3, NAA and Urea are effective in improving fruit quality and oil content in both studied olive cultivars (Manzanillo and Eggizi Shami).
- 2-The highest conc. of each chemical thinning agent was more effective compared to lower conc.
- 3-It is applicable to spray Urea as chemical thinning agent at 4% at ten days after full bloom as a cheap and an effective thinning agent and as a source of nitrogen.

**Table 8. Effect of thinning agents on oil % of Manzanillo and Eggizi Shami olive cvs. Season (2009).**

Dates	Treatments										control
	GA3 100 p.p.m	GA3 150 p.p.m	GA3 200 p.p.m	NAA 100 p.p.m	NAA 150 p.p.m	NAA 200 p.p.m	Urea 4%	Urea 6%	Urea 8%	Urea 10%	
Manzanillo											
FB	17.68	16.69	17.58	16.42	16.90	17.07	18.72	16.96	17.54	16.40	15.79
FB+5	17.58	17.67	16.87	16.05	16.79	17.48	16.48	16.53	20.22	17.48	15.94
FB+10	16.35	16.40	16.93	16.96	18.76	16.11	20.99	15.32	16.77	18.9	15.35
FB+15	17.80	16.15	17.01	17.18	18.63	19.38	18.04	16.99	20.66	17.37	15.21
Eggizi Shami											
FB	7.59	7.38	7.63	8.61	7.29	8.97	7.03	7.84	8.35	8.56	6.14
FB+5	6.70	6.32	7.24	6.62	6.83	7.71	7.48	7.48	7.17	7.47	5.10
FB+10	7.06	7.85	7.85	6.29	6.53	7.69	8.16	7.04	8.13	7.39	5.92
FB+15	7.40	6.25	7.16	7.12	7.49	6.10	7.48	7.55	6.63	8.00	5.02

**Table 9. Effect of thinning agents on oil % of Manzanillo and Eggizi Shami olive cvs. season (2010).**

Dates	Treatments										control
	GA3 100 p.p.m	GA3 150 p.p.m	GA3 200 p.p.m	NAA 100 p.p.m	NAA 150 p.p.m	NAA 200 p.p.m	Urea 4%	Urea 6%	Urea 8%	Urea 10%	
Manzanillo											
FB	16.38	16.17	17.91	18.91	17.05	16.97	18.43	15.10	16.40	17.21	15.69
FB+5	17.29	16.05	16.25	17.15	18.10	18.38	17.58	19.33	20.87	16.69	15.22
FB+10	18.27	16.41	15.61	18.77	16.69	17.46	20.45	17.44	17.27	19.54	14.50
FB+15	17.18	16.27	19.26	17.14	16.12	18.90	18.79	17.44	19.11	17.17	15.70
Eggizi Shami											
FB	6.68	7.38	7.71	8.07	7.98	7.67	6.49	7.94	7.34	6.23	6.00
FB+5	7.23	7.41	7.55	7.21	6.75	7.93	7.15	6.16	7.87	7.23	5.21
FB+10	7.99	6.35	6.78	7.84	6.71	6.78	7.04	7.97	7.67	7.53	6.44
FB+15	7.15	6.13	8.25	6.01	7.85	7.31	6.42	7.26	7.24	7.57	6.79

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### تأثير بعض مركبات الخف الكيماويه على جودة ثمار الزيتون ومحتواها من الزيت لاصنفى المانز انيللو والعجيزى الشامى السعيد صادق حجازى, أيمن عبد المؤمن حجازى و داليا محمد الخولى قسم بساتين الفاكهه - كلية الزراعة - جامعة القاهرة

أجريت هذه الدارسة خلال موسمى (٢٠٠٩-٢٠١٠) على صنفى الزيتون المانز انيللو والعجيزى الشامى) فى مزرعه خاصه بطريق مصر اسكندريه الصحراوى. كان الهدف من الدارسة هو ملاحظه تأثير بعض مركبات الخف الكيماويه: حمض الجبريلليك بتركيز (١٠٠، ١٥٠، ٢٠٠ جزء فى المليون) و نفتالين حمض الخليك بتركيز (١٠٠، ١٥٠، ٢٠٠ جزء فى المليون) والبوريا بتركيز (٤، ٦، ٨%) على مواصفات الثمار (طول، قطر، وزن الثمار) وكذلك نسبة الزيت بها. أجريت عملية رش هذه المركبات فى مرحلة اكتمال التزهير، ٥ أيام بعد اكتمال التزهير، ١٠ أيام بعد اكتمال التزهير، ١٥ يوم بعد اكتمال التزهير. أظهرت النتائج المتحصل عليها أن مركبات الخف المستخدمه لها تأثير كبير على تحسين مواصفات جودة الثمار ونسبة الزيت فى كلا صنفى الدارسة. يمكن التوصيه من الناحيه التطبيقيه برش مركب البوريا بتركيز ٤% وذلك بعد ١٠ أيام من اكتمال التزهير وذلك لأنه مركب رخيص الثمن (اقتصادى) ومؤثر بشكل كبير فى الخف الكيماوى وكذلك أيضا كمصدر للنيتروجين.