Impact of Using Oils of Rocket and Nigella Seeds as Partial Replacement of Dormex on Breaking Dormancy and Improving Yield of Superior Grapevines Under Minia Region Conditions

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Abstract: During 2015 and 2016 seasons, Superior grapevines were subjected once (10-11 Jan.) to dormex at 4 % alone, rocket oil at 5 %, nigella oil at 5 %, rocket + nigella oils at 5 % and/or dormex at 1 to 2 %. The merit was detecting the effect of these treatments on bud behavior, ABA, total phenols, total indoles and total soluble sugars of the buds, growth aspects, pigments and NPK in the leaves, berry setting %, yield, shot berries % and berries quality. Exposing the vines once (10 – 11 Jan.) to dormex at 4 % alone, rocket seed oil at 5 %, nigella seed oil at 5 % and rocket + nigella seed oil each at 5 % and / or dormex at 1 to 2 % materially was very effective in enhancing percentages of bud burst and fruiting buds, total indoles and total soluble sugars in the buds, growth aspects, pigments and NPK in the leaves, berry setting %, yield and berries quality and decreasing durations of bud burst and blooming, ABA and total phenols in the buds and shot berries % relative to the control. Combined applications of dormex at 1 to 2 % and both oils of rocket and nigella seed at 5 % had an announced effect on the aforementioned parameters compared to using each material alone. No major differences on the investigated characteristics were observed among the application of dormex at 4 % alone and the use of dormex at 2 % plus both rocket and nigella seed oils each at 5 %. It is advised to use dormex at 2% plus oils of rocket and nigella seeds each at 5 % (once on 10-11 Jan.) instead of using dormex at 4 % alone for breaking dormancy and improving yield and berries quality of Superior grapevines grown under Minia region conditions.

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1. Introduction

Normal winter weather in most temperate regions typically provides adequate chilling, but grapevines grown in warm climates may receive inadequate chilling resulting in delayed and erratic bud break. Insufficient chilling can be overcome by application of dormex (hydrogen cynamide). Dormex is highly toxic, it cause a great contamination with illegal pesticide residues, coitosive effects to eyes and skin, expensive price, unability to storage. So, take great care to follow all safety guidelines. Nowadays, many trails were performed to find out new natural plants as complete or partial substitute of dormex for breaking dormancy and inducing bud burst uniformity for overcoming the previous disadvantages of dormex on polluting our environment.

Dormex is usually applied for breaking dormany and enhancing harvesting date and yield in various grapevine cvs (**Osman, 2014; Ahmed *et al.* 2014; Rizkalla, 2016; Akl *et al.* 2016; Ibrahiem-Rehab, 2017; Ahmed *et al.* 2017; El-Samman, 2017; Ahmed-Sara, 2018 and Sayed-Hewayda, 2018).**

Recently a lot of natural plant extracts were applied for achieving of the same goals of using dormex without causing pollution in our environment (**Osman, 2014; Ahmed *et al.* 2014; Rizkalla, 2016; Akl *et al.* 2016; Ibrahiem-Rehab, 2017; Ahmed *et al.* 2017; El-Samman, 2017; Ahmed-Sara, 2018 and Sayed-Hewayda, 2018).**

Growth, vines nutritional status and productivity of different grapevine cvs were remarkably enhanced in response to exposing to plant extracts (**Abdelaal and Aly, 2013; Uwakiem, 2014; Sabry-Gehan *et al.*, 2014; Abada, 2014; Wassel *et al.* 2016; Khalil, 2017; Ibrahim-Asmaa, 2017; Farag-Rana, 2017; Abdelaal *et al.*, 2017; Abdelaziz *et al.*, 2017; El-Salhy *et al.*, 2017; Abd El-Hafeez, 2017; Ahmed-Fatma, 2018 and Ebrahiem, 2018).**

The target of this study was identifying the effect of rocket and nigella seed oils as partial replacement of dormex on breaking dormancy, bud behaviour, berry setting %, shot berries %, yield and quality of Superior grapes grown under Minia region conditions.

2. Materials and Methods

This study was carried out during the two consecutive seasons of 2015 and 2016 on 78 uniform in vigour 10-years old Superior grapevines grown in a private vineyard located at El-Hawarta Village, Minia district, Minia Governorate where the soil texture is clay and well drained water since water table depth is not less than two meters. The chosen vines are planted at 2 x 3 meters apart. Cane pruning system was followed at the first week of Jan. leaving 84 eyes per vine (on the basis of six fruiting canes x 12 eyes plus six renewal spurs x two eyes) with the assistance of Gable shape supporting system. The vines were irrigated through surface irrigation system using Nile water.

The target of this study was elucidating the effect of using oils of Nigella and Rocket seeds as natural alternative compounds replacement of Dormex on behavior of buds, vegetative growth, vine nutritional status, yield and berries characteristics of Superior grapevines.

Table (1): Analysis of the tested soil

Constituents	Values
Particle size distribution	
Sand %	5.5
Slit %	27.6
Clay %	66.9
Texture %	Clay
pH (1:2.5 extract)	7.7
O.M. %	2.50
$CaCO_3$ %	1.92
Total N%	0.10
Available P (Olsen method, ppm)	6.3
Available K (ammonium acetate, ppm)	490
EDTA extractable micronutrients (ppm):	
Zn	2.2
Fe	2.4
Mn	2.5

All the chosen vines received regular and horticultural practices that already applied in the vineyard except those dealing with the application of natural and chemical rest breakages. These practices included hoeing, pest control management, irrigation and fertilization with 20m^3 farmyard manure (0.3% N, 0.4% P_2O_5 and 1.2% K_2O), 200 kg ammonium sulphate (20.6% N), 250 kg calcium triple superphosphate (37.5% P_2O_5) and 250 kg potassium sulphate (48% K_2O). Farmyard manure was added once at the first week of Jan. in both seasons. Ammonium sulphate was added at four unequal batchs 30% at the first week of Feb. 10% at the first week of Mar. 30% at the first week of Apr. 20% at one month later (1st week of May) and 10% after harvesting. Phosphate fertilizer was added twice at two equal batches, the first with farmyard manure and the second at the first week of Mar. Potassium fertilizer was applied at two equal batches, the first at the first week of Feb. and the second at the first week of Apr. Soil analysis was done according to **Wilde *et al*., (1985)** and the obtained data are shown in **Table (1)**.

This study included the following thirteen treatments from two naturals (oils of Nigella and Rocket seeds) and Dormex:

1- Control (sprayed with water vines).
2- Spraying Dormex at 4%
3- Spraying Rocket oil at 5%
4- Spraying Nigella oil at 5%
5- Spraying Rocket + Nigella oils each at 5%
6- Spraying Dormex at 1%
7- Spraying Dormex at 1% + Rocket oil at 5 %
8- Spraying Dormex at 1% + Nigella oil at 5 %
9- Spraying Dormex at 1% + Rocket + Nigella oils each at 5 %
10- Spraying Dormex at 2%
11- Spraying Dormex at 2% + Rocket oil at 5 %
12- Spraying Dormex at 2% + Nigella oil at 5 %
13- Spraying Dormex at 2% + Rocket + Nigella oils each at 5 %

Each treatment was replicated three times, two vine per each. All natural and dormex were sprayed once (10 and 11th Jan.) when the vines received 130 and 135 chilling hours at equal or below 7.2 ^oC during both seasons, respectively in the periods from Nov. 1st till Jan. 12th and 10th. These accumulated chilling hours (130 or 135) at equal or below 7.2 ^oC was calculated by using data of Minia Airport Meteorogical station.

Chemical composition of oils of Nigella nad Rocket seeds are shown in Tables (2 and 3).

Table 2: Chemical composition of Nigella seed oil (according to Bourgou *et al*., 2010)

Compounds	Values %
Myristic acid %	1.0
Palmitic acid%	13.1
Palmatolic acid %	0.2
Stearic acid%	2.3
Oleic acid %	23.8
Linoleic acid%	58.5
Linolenic %	0.4
Archaic acid%	0.5
Saturated fatty acid %	16.8
Unsaturated fatty acid %	82.9
Moisture %	8.1
Proteins %	23.3
ASH%	9.9

Table 3: Chemical composition of Rocket seeds oil (according to Nail *et al.*, 2017)

No.	Seed compositions	Results%
1	Oil content	20.0
2	moisture content	3.64
3	Crude protein (defatted sample)	32.0
4	Crude fibers (defatted sample)	17
5	Total ash	4.33
6	Total Carbohydrates	23.07

A randomized complete block design (RCBD) was followed where this experiment included thirteen treatments each treatment replicated three times, two vines per each.

1 Measurements of behavior of buds.

1-1 Percentage of bud burst

It was calculated by dividing the number of bursted buds (2^{nd} week of April) by total number of buds left per vine and multiplying the product by 100.

1-2 Percentage of fruiting buds

It was recorded by dividing the number of fruiting buds per vine (i.e. the buds which gave at least one cluster) by total number of bursted buds and multiplying the product by 100.

1-3 Dates of start and end of bud burst

1-4 Durations of bud burst and blooming (in days).

2- Determination of soluble sugars, indoles, ABA and total phenols in the buds.

Just before bud burst, five buds of each vine were selected for determination of soluble sugars, total indoles, ABA and total phenols (mg/100f F.W) according to the procedures of **Gordon and Weber (1951) and Forcat *et al.,* (2008)** for showing the seasonal changes and the effect of these breakages.

3- Measurements of vegetative growth characters:

At the first week of May, during both seasons, twenty mature leaves were picked from the opposite side to the basal clusters on the shoots for calculating the leaf area using the following equation outlined by **Ahmed and Morsy (1999)**.

Leaf area ($cm^{2)}$ = 0.45 (0.79 x diameter ^{2}) + 17.77.

The average leaf area was recorded. Average main shoot length (cm) was recorded as a result of measuring the length of the ten shoots per vine (cm) and the average shoot length was recorded. Number of leaves per shoot was also recorded. Dynamic of wood ripening coefficient was calculated by dividing the length of the ripened part of shoot that had brownished colour by the total length of the shoots (green colour) in the ten shoots/ vine (last week of Oct.) according to **Bouard (1966)**. Weight of prunings (kg.)/ vine was recorded just after carrying out winter pruning by weighing the removal one year old wood (1^{st} week of Jan.). Average cane thickness (cm) was estimated in the five basal internodes of ten canes per vine by using a vernier caliper.

4- Measurements of total chlorophylls:

Five leaves from the same previously leaves taken for measuring the leaf area from each vine were cut into small pieces and a known sample (0.5g) from each sample was taken, homogenized and extracted using 25% acetone with the assistance of little amounts of Na_2CO_3 and cleaned sand then filtrate. Filtration was washed several times with acetone till the filtrate was colorless. Acetone was used as a blank. In the filtrates, the optical density was determined using spectrophotometer at the weave length of 662 and 644 nm to determine chlorophylls a and b, respectively. The following equations were used for determination of these plant pigments according to **von- Wettstein (1957) and Bruinsma (1963)**.

Chl.a= (9.784 – E622) – 0.99 – E644)= mg/I

Chl.b= (21.426 – E644) – (4.65 – E662) + mg/I

Total chl. = chl.A + chl.B

Where E = optical density at a given wave length. Calculations were estimated as mg/100 g F.W.

5- Measurements of leaf content of N, P and K:

Petioles of the same leaves that were taken for measuring the leaf area according to **Balo *et al.*, (1988)** were washed several times with water and distilled water and then oven dried at 70°C and grounded, then 0.5 g weight of each sample was digested using H_2SO_4 and H_2O_2 until clear solution (**Chapman and Pratt, 1975**). In the digested solutions, the following nutrients were determined:

1- Percentage of N by the modified microkjeldahle method as described by **Wilde *et al.*, (1985).**

2- Percentage of P by using Olsen method as reported by **Chapman and Pratt (1975)**.

3- Percentage of K by using Flame photometer apparatus as outlined by **Wilde *et al.*, (1985).**

6- Measurements of berry setting %:

It was calculated by caging five clusters / vine in perforated paper bags before blooming stage. The bages were removed at the end of berry setting stage. The number of attached and dropped berries as well as total number of flowers per vine were recorded (dropped + attached berries). Percentage of berry setting was estimated by dividing number of attached berries by total number of flowers per cluster and multiplying the product by 100.

7. Measurements of harvesting date:

It was recorded when T.S.S./ acid reached 25: 1 in the juice of all treatments (**Weaver,1976 and Bacha, 1984)**.

8. Measurements of yield as well as physical and chemical characteristics of the berries:

Harvesting was conducted according to the investigated treatments. The yield of each vine was recorded in terms of weight of cluster (g.) and number of clusters/vine. Five clusters per each vine were taken for determination of the following physical and chemical characteristics of the berries:

1- Custer dimensions (length and shoulder in cm).

2- Percentage of shot berries by dividing number of small berries by total number of berries/cluster and multiplying the product by 100.

3- Average berry weight (g.) and dimensions (longitudinal and equatorial (in cm).

4- Percentage of total soluble solids in the juice by using handy refractometer.

5- Percentage of total acidity in the juice (as g tartaric acid/100 ml juice) by titration against 0.1 N NaOH using phenolphthalein indicator (**A.O.A.C., 2000**).

6- The ratio between T.S.S. and acid.

7- The percentage of reducing sugars in the juice (**Lane and Eynon, 1965**) as described by **A.O.A.C. (2000)**.

Statistical analysis was done and different treatment means were compared using new L.S.D. at 5% (**Mead *et al*., 1993**).

3. Results

Behavior of buds:

3.1. Bud burst start:

Data in Table (4) found that Bud burst started on 14 Feb. in the first season and 17 Feb. in the second one on the vines that treated with dormex at 4 % as well as those vines treated with dormex at 2 + rocket and nigella each at 5 %. In most dormex and oil treatments bud burst start was ranged from 15 Feb. to 6 March in the first season and from 17 Feb. to 8 March in the second one.

3.2.Bud burst end:

It was ranged from 27 Feb to 26 March in the first season and from 2 March to 30 March in the second one. Vines received dormex at 4 % or dormex at 2 % + rocket and nigella oils each at 5 % ended bud burst on 27 Feb. in the first season and on 2 March in the second one. The untreated vines ended bud burst in 26 and 30 March during both seasons, respectively. Table (4).

3.3. Bud burst durations:

Bud burst durations were significantly varied among the thirteen dormex and crop seed sprout treatments. In the first season, it ranged from 12 days to 20 days and from 13 days to 22 days in the second one. It was reduced with increasing dormex concentrations. Using rocket seed oil had the lowest values compared with using nigella seed oils. Using of both materials together with Dormex at 1 to 4 % reduced bud burst duration compared to using each material alone with dormex. The lowest bud burst duration (12 & 13 days) were observed on the vines that treated with dormex at 4 % alone and those vines treated with dormex at 2 % + rocket and nigella oils each at 5 % during both seasons, respectively. Untreated vines produced the highest bud burst duration (20 & 22 days) during both seasons, respectively. (Table 4).

3.4. Percentages of bud burst and fruiting buds:

The obtained data in Table (4) show that percentages of bud burst and fruiting were varied significantly among the thirteen treatments. Using dormex at 1 to 2 % plus rocket and / or nigella each at 5 % significantly enhanced percentages of bud burst and fruiting buds compared to the application of dormex at 1 to 2 % alone. Using rocket oil was superior than using nigella oil in enhancing such two percentages. Combined application of both oils with dormex at 1 to 2 % was significantly favourable than using each any oil alone with dormex. The promotion on the percentages of bud burst and fruiting was significantly related to the increase in dormex concentrations. The highest percentages of bud burst (98 & 91 %) and fruiting buds (60 & 61 %) were recorded on the vines that received dormex at 4 % alone during both seasons, respectively. The untreated vines produced the lowest bud burst % (85.0 & 85.0 %) and fruiting buds (41 & 42 %) during both seasons, respectively. These results were true during both seasons.

2. Blooming duration:

It is clear from the given data in Table (5) that treating the vines once with dormex at 4 %, dormex at 1 to 4 % and/or rocket and nigella seed oils at 5 % significantly reduced blooming duration than the control treatment. Increasing concentrations of dormex from 1 to 4 % caused a significant reduction on blooming duration. Using rocket and nigella seed oils with dormex at 1 to 2 % caused significant reduction on blooming duration than using dormex at 1 to 2 % alone. The same values were recorded on the vines received dormex at 4 % alone and vines that received dormex at 2 % plus rocket and nigella seed oils at 5 %. The lowest blooming duration (12 & 11days) were recorded on the treatments namely dormex at 4 % and dormex at 2 % + both crop seed sprouts at 5 %. The highest values (16 & 17 days) were recorded on the untreated vines during 2015 and 2016 seasons, respectively.

3. Start and end of berry setting stage:

The data in Table (5) obtained that using dormex at 4 %, dormex at 1 to 2 % alone or in combinations with rocket and nigella seed oils at 5 % materially advanced start and end of berry setting stage compared to the control.

Berry setting stage started on 15 April to 25 April in the first season and started on 14 April to 26 April in the second one. End of berry setting was ranged from 30 April to 19 May in 2015 season and from 1 April to 20 May in 2016 season. Using rocket and nigella seed oils each at 5 % besides dormex at 1 to 2 % advanced start and end of berry setting stage. Start and end of berry setting was greatly advanced in dormex at 4 % treatment. The earliest berry setting start (15 & 14 April) and berry setting end (30 & 29 April) were recorded on the vines received dormex at 4 % alone. The untreated vines produced the latest start (25 April and 26 April) and end (19 May & 20 May) of berry setting stage during both seasons, respectively.

4. Total indoles, ABA, total phenols and total sugars in the buds after bud burst:

The obtained data in Table (5) exhibit that treating the vines once with dormex at 4 % as well as dormex at 1 to 2 % either alone or in combination with rocket and nigella seed oils each at 5 % significantly enhanced both total indoles and total soluble sugars and reducing total phenols and ABA in the buds relative to the control. The effect either in increase or reduction was significantly associated with increasing dormex concentrations. Using rocket seed oil was significant superior than using nigella seed oil in this respect. Using rocket and/or nigella oil each at 5 % with dormex at 1-2% significantly increased total phenols and total soluble sugars and reduced both total phenols and ABA compared to using dormex at 1 to 2 % alone. The highest values of total indoles (1.01 & 1.11 mg/1 g F.W) and total soluble sugars (1.69 & 1.78 mg/1 g F.W) and the lowest values of ABA (0.12 & 0.06 mg/1 g F.W) were recorded on the vines treated with dormex at 4 % alone. Using dormex at 2 % + both oils (rocket and nigella) each at 5% occupied the second position. The untreated vines produced the minimum total indoles (0.22 & 0.30 mg/1g F.W) and total soluble sugars (0.59 & 0.64 mg/1g F.W) and the maximum ABA (0.55 & 0.49 mg/1 g F.W) and total phenols (0.62 & 0.52 mg/g F.W) during both seasons, respectively.

5. Some vegetative growth characteristics:

It is clear from the obtained data in table (6) that subjecting the vines to dormex at 4 % and dormex at 1 to 2 % either alone or in various combinations with rocket and nigella oils each at 5 % had significant stimulation on the six growth aspects namely main shoot length, number of leaves/shoot, leaf area, wood ripening coefficient, pruning wood weight and cane thickness rather than non-application. The promotion on these growth aspects was significantly correlated with increasing dormex concentrations. Using dormex at 1 to 2 % and/or rocket and nigella oils each at 5 % was significantly associated with promoting these growth aspects than using dormex at 1 to 2 % alone. The maximum values were recorded on the vines that treated with dormex at 4 % alone. Using dormex at 2 % plus both oils (rocket and nigella) ranked the second position after the use of dormex at 4 % alone in increasing growth aspects. The lowest values were recorded on the untreated vines. Similar trend was noticed during both seasons.

6. Leaf chemical composition:

Data in Table (7) show that chlorophylls a & b, total carotenoids, N, P and K in the leaves were significantly enhanced in response to treating the vines once with dormex at 4 % and dormex at 1 to 2 % with or without oils of rocket and nigella each at 5 % compared to the control. There was a gradual and significant promotion on these chemical components with increasing dormex concentrations. Using dormex at 1 to 2 % and/or oils of rocket and nigella had significant stimulation on these parameters than using dormex alone at 1 to 2 %. Using rocket oil was significantly superior than using nigella oil in enhancing these chemical components. Using both oil types together significantly enhanced these plants pigments and nutrients than using each oil type alone with or without using dormex. The maximum values were recorded on the vines that treated with dormex alone at 4 % followed by those vines received dormex at 2 % along with rocket and nigella oils each at 5 %. The untreated vines produced the lowest values. These results were true during both seasons.

7. Harvesting date:

It is noticed from the obtained data in Table (8) that treating the vines with dormex at 4 % alone, dormex at 1 to 2 % with or without using oils of nigella and rocket each at 5 % and the use of the rocket and/or nigella oil had an obvious advancement in harvesting date relative to the control. The hastening in harvesting date was materially related to the increase in dormex concentrations as well as the use of rocket + nigella, rocket and nigella, in descending order. An obvious advancement was observed on harvesting date with using dormex at 1 to 2 % along with nigella and/or rocket oils each at 5 % compared to using dormex at 1 to 2 % alone. Harvesting date of the vines received one spray of dormex at 4 % alone was 27 & 28 March in the first and second seasons, respectively. Vines treated with dormex at 2 % + rocket and nigella oils each at 5 % harvested on 27 May during both seasons. The untreated vines harvesting on 25 and 27 June during both seasons, respectively. These results were true during both seasons.

8. Percentage of berry setting, yield and cluster aspects:

The obtained data in Tables (9 & 10) clearly show that percentage of berry setting, yield expressed in weight and number of clusters/vine as well as weight, length and shoulder of cluster were significantly improved due to treating the vines with dormex at 4 %, dormex at 1.0 to 2.0 % alone or with rocket and nigella oils at 5 % and oils of rocket and/or nigella compared with the control. Increasing concentrations of dormex caused a significant promotion on the percentage of berry setting, yield and cluster weight and dimensions. Using rocket oil at 5 % was significantly preferable than using nigella oil at the same concentration. Using both oil species significantly surpassed the application of each material alone. Using dormex at 1 to 2 % besides rocket and/or nigella oil each at 5 % significantly enhanced these parameters compared to using dormex at 1 to 2 % alone. The best results with regard to yield were recorded on the vines that received dormex at 4 % (10.6 & 14.9 kg) followed by the treatment that included the application of dormex at 2 % + rocket and nigella oils each at 5 % (10.0 & 14.9 kg) during both seasons, respectively. The untreated vines produced yield reached 8.1 & 8.6 kg during both seasons, respectively. The percentage of increment on the yield due to using the best treatment (dormex at 4 % alone) over the control treatment reached 30.9 and 73.3 during both seasons, respectively. In addition, the percentage of increment on the yield due to using dormex at 2 % plus both oils species over the control reached 23.5 and 73.3 % during both seasons, respectively. These results were true during both seasons.

Table (4): Effect of using oils of rocket and nigella seed as partial replacement of Dormex on start and end of bud burst, bud burst duration, bud burst %, fruiting buds, blooming duration and start and end of berry setting of Superior grapevines during 2015 and 2016 seasons

Treatments	Bud burst start		Bud burst end		Bud burst duration (days)		Bud burst %		Fruiting buds %		Blooming duration (days)		Berry set start		Berry set end	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Control	6Mar.	8Mar.	26Mar.	30Mar.	20	22	85	85	41	42	16	17	25Apr.	26Apr.	19May	20May
Dormex at 4 %	15Feb.	17Feb.	27Feb.	2Mar.	12	13	90	91	60	61	12	11	15Apr.	14Apr.	30Apr.	29Apr.
Rocket seed oil at 5 %	2Mar.	4Mar.	19Mar.	23Mar.	17	19	89	91	46	47	15	14	22Apr.	25Apr.	10May	11May
Nigella seed oil 5 %	4Mar.	6Mar.	22Mar.	26Mar.	18	20	89	91	45	46	15	14	20Apr.	20Apr.	13May	14May
Rocket + Nigella seed oils at 5 %	28Feb.	2Mar.	16Mar.	20Mar.	16	18	90	91	48	49	15	14	19Apr.	25Apr.	11May	12May
Dormex at 1 %	25Feb.	27Feb.	13Mar.	17Feb.	16	18	90	91	52	53	16	15	18Apr.	21Apr.	6May	6May
Dormex at 1 % + Rocket seed oil at 5 %	20Feb.	22Feb.	6Mar.	10Mar.	14	16	90	91	56	58	15	14	19Apr.	8Apr.	3May	4May
Dormex at 1 % + Nigella seed oil at 5 %	22Feb.	24Feb.	9Mar.	13Mar.	15	17	90	91	54	55	15	14	18Apr.	9Apr.	4May	5May
Dormex at 1 % + Rocket + Nigella seed oils at 5 %	17Feb.	19Feb.	3Mar.	7Mar.	14	16	90	91	57	58	14	13	17Apr.	18Apr.	3May	3May
Dormex at 2 %	22Feb.	24Feb.	8Mar.	12Mar.	14	16	90	91	56	57	14	13	16Apr.	18Apr.	3May	4May
Dormex at 2 % + Rocket seed oil at 5 %	18Feb.	20Feb.	2Mar.	6Mar.	12	14	90	91	59	60	13	12	17Apr.	15Apr.	30Apr.	1May
Dormex at 2 % + Nigella seed oil at 5 %	20Feb.	22Feb.	5Mar.	9Mar.	13	15	90	91	57	58	13	12	16Apr.	16Apr.	1May	1May
Dormex at 2 % + Rocket + Nigella seed oils at 5 %	15Feb.	17Feb.	27Feb.	2Mar.	12	13	90	91	60	61	12	11	15Apr	15Apr.	30Apr.	30Apr.
New L.S.D at 5%	-------	-------	-------	-------	**2.0**	**2.0**	**1.9**	**2.0**	**1.8**	**1.7**	**1.0**	**1.0**	-------	-------	-------	-------

Table (5): Effect of using oils of rocket and nigella seed as partial replacement of Dormex on bud content of total indoles, ABA, total phenols and total soluble sugars just before bud burst of Superior grapevines during 2015 and 2016 seasons

Treatments	Bud total indoles (mg/1.0 g F.W)		Bud ABA (mg/1.0 g F.W)		Bud total phenols (mg/1.0 g F.W)		Bud total soluble sugars (mg/1.0g F.W)	
	2015	2016	2015	2016	2015	2016	2015	2016
Control	0.22	0.30	0.55	0.49	0.62	0.52	0.59	0.64
Dormex at 4 %	1.01	1.11	0.12	0.06	0.19	0.09	1.69	1.78
Rocket seed oil at 5 %	0.47	0.58	0.37	0.31	0.44	0.34	1.28	1.32
Nigella seed oil 5 %	0.40	0.50	0.40	0.34	0.46	0.38	1.21	1.25
Rocket + Nigella seed oils at 5 %	0.51	0.61	0.35	0.29	0.62	0.32	1.37	1.41
Dormex at 1 %	0.73	0.84	0.30	0.24	0.38	0.27	1.45	1.50
Dormex at 1 % + Rocket seed oil at 5 %	0.86	0.97	0.22	0.18	0.30	0.21	1.55	1.60
Dormex at 1 % + Nigella seed oil at 5 %	0.80	0.91	0.25	0.19	0.31	0.22	1.50	1.55
Dormex at 1 % + Rocket + Nigella seed oils at 5 %	0.91	1.01	0.20	0.14	0.27	0.17	1.59	1.64
Dormex at 2 %	0.85	0.95	0.21	0.15	0.28	0.18	1.60	1.70
Dormex at 2 % + Rocket seed oil at 5 %	0.97	1.06	0.15	0.09	0.21	0.12	1.60	1.68
Dormex at 2 % + Nigella seed oil at 5 %	0.91	1.01	0.18	0.12	0.24	0.15	1.62	1.73
Dormex at 2 % + Rocket + Nigella seed oils at 5 %	1.01	1.11	0.13	0.07	0.20	0.10	1.68	1.77
New L.S.D at 5%	**0.06**	**0.05**	**0.03**	**0.03**	**0.03**	**0.03**	**0.04**	**0.05**

9. Percentage of shot berries:

It is clear from the obtained data Table (10) that treating Superior grapevines once with dormex at 4 %, dormex at 1 to 2 % with or without rocket and nigella oils and/or both crop oil significantly was accompanied with reducing shot berries % over the control treatment. The reduction was significantly correlated with increasing dormex concentrations. Using rocket and / or nigella oil each at 5 % significantly reduced shot berries over the control. Using rocket and/or nigella each at 5 % plus dormex at 1 to 2 % significantly was superior in reducing shot berries % than using dormex at 1 to 2 % alone. The lowest values of shot berries (3.0 & 2.9 %) were recorded on the vines that treated with dormex at 4 % alone. Using dormex at 2 % + rocket and nigella oil each at 5 % ranked the second position in reducing shot berries (3.1 & 3.0 %) during both seasons, respectively. The untreated vines produced the highest values (8.0 & 7.9 %) during both seasons, respectively. These results were true during both seasons.

10. Physical and chemical characteristics of the berries:

It is clear from the obtained data in table (10) that subjecting Superior grapevines to dormex at 4 %, dormex at 1 to 2 % with or without rocket and nigella oils at 5 % and rocket and/or nigella oils each at 5 % significantly was accompanied with improving quality of the berries in terms of increasing berry weight and dimensions, T.S.S. %, reducing sugars and T.S.S./acid and decreasing total acidity % over the control. The promotion on quality of the berries was significantly associated with increasing concentrations of dormex. Using rocket oil was significantly preferable than using nigella oil in enhancing quality of the berries. Combined application of rocket and nigella oils each at 5 % significantly was superior than using each material alone. Using dormex at 1 to 2 % plus rocket and/or nigella oils had significant effect on quality of the berries than using dormex at 1 to 2 % alone. The best results with regard to quality of the berries were obtained due to using dormex at 4 % alone or when dormex was used at 2 % plus rocket and nigella oils each at 5 %. Untreated vines gave unacceptable effects on both physical and chemical characteristics of the berries. These results were true during both seasons.

Table (6): Effect of using oils of rocket and nigella seed as partial replacement of Dormex on some vegetative growth characteristics of Superior grapevines during 2015 and 2016 seasons

Treatments	Main shoot length		No. of leaves/shoot		Leaf area $(cm)^2$		Wood ripening coefficient		Pruning wood weight kg/vine		Cane thickness (cm)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Control	100.0	101.1	14.0	15.0	101.0	102.0	0.51	0.51	1.71	1.80	0.94	0.96
Dormex at 4 %	126.0	127.2	27.0	28.0	126.0	126.3	0.91	0.92	2.99	3.08	1.41	1.43
Rocket seed oil at 5 %	112.0	113.1	19.0	20.0	116.1	119.0	0.81	0.83	2.00	2.09	1.00	1.01
Nigella seed oil 5 %	110.0	111.1	17.1	18.5	117.0	118.0	0.78	0.80	1.841	1.90	1.05	1.06
Rocket + Nigella seed oils at 5 %	115.0	116.0	22.9	24.0	120.9	122.0	0.85	0.87	2.10	2.10	1.10	1.12
Dormex at 1 %	113.0	141.2	19.0	20.3	118.0	119.0	0.77	0.79	2.69	2.78	1.20	1.22
Dormex at 1 % + Rocket seed oil at 5 %	117.0	148.2	21.0	22.0	121.0	122.0	0.83	0.86	2.77	2.85	1.30	1.33
Dormex at 1 % + Nigella seed oil at 5 %	115.0	116.3	19.1	20.1	119.7	120.7	0.81	0.83	2.71	2.80	1.25	1.27
Dormex at 1 % + Rocket + Nigella seed oils at 5 %	120.0	121.3	24.1	25.1	122.4	123.4	0.87	0.89	2.80	2.89	1.35	1.37
Dormex at 2 %	118.0	119.0	20.0	21.3	120.0	121.0	0.81	0.84	2.91	2.90	1.25	1.26
Dormex at 2 % + Rocket seed oil at 5 %	121.0	122.2	22.4	23.5	123.9	125.0	0.86	0.88	2.91	3.01	1.35	1.36
Dormex at 2 % + Nigella seed oil at 5 %	119.9	121.0	21.2	22.3	121.9	123.0	0.84	0.86	2.86	2.95	1.30	1.31
Dormex at 2 % + Rocket + Nigella seed oils at 5 %	126.0	126.4	26.0	27.1	125.0	126.1	0.90	0.92	2.96	3.06	1.40	1.42
New L.S.D at 5%	**1.0**	**0.9**	**1.0**	**1.0**	**1.1**	**1.3**	**0.02**	**0.02**	**0.05**	**0.06**	**0.04**	**0.05**

Table (7): Effect of using oils of rocket and nigella seed as partial replacement of Dormex on some pigments and N, P and K (as %) in the leaves of Superior grapevines during 2015 and 2016 seasons

Treatments	Chlorophyll a (mg/1g F.W)		Chlorophyll b (mg/1g F.W)		Total Chlorophyll (mg/1g F.W)		Leaf N %		Leaf P %		Leaf K %	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Control	2.1	2.0	1.7	1.8	3.8	3.8	1.41	1.42	0.141	0.142	1.11	1.12
Dormex at 4 %	5.1	5.4	3.1	3.2	8.2	8.6	1.79	1.80	0.179	0180	1.49	1.50
Rocket seed oil at 5 %	3.8	4.1	1.9	2.5	5.7	6.6	1.64	1.65	0.165	0.166	1.34	1.33
Nigella seed oil 5 %	3.4	3.7	2.1	2.3	5.5	6.0	1.59	1.60	0.160	0.160	1.29	1.30
Rocket + Nigella seed oils at 5 %	4.0	4.3	2.6	2.7	6.6	7.0	1.69	1.70	0.167	0.170	1.39	1.40
Dormex at 1 %	3.5	3.8	2.2	2.3	5.7	6.1	1.64	1.65	0.164	0.165	1.34	1.35
Dormex at 1 % + Rocket seed oil at 5 %	4.1	4.4	2.6	2.7	6.7	7.1	1.69	1.71	0.169	0.171	1.39	1.41
Dormex at 1 % + Nigella seed oil at 5 %	3.8	4.1	2.4	2.5	6.2	6.6	1.63	1.66	0.162	0.161	1.33	1.31
Dormex at 1 % + Rocket + Nigella seed oils at 5 %	4.5	4.8	2.8	2.9	7.3	7.7	1.74	1.75	0.173	0.175	1.44	1.45
Dormex at 2 %	4.0	4.3	2.4	2.5	6.4	6.8	1.64	1.65	0.169	0.166	1.34	1.35
Dormex at 2 % + Rocket seed oil at 5 %	4.6	4.9	2.8	2.9	7.4	7.8	1.72	1.73	0.171	0.174	1.42	1.43
Dormex at 2 % + Nigella seed oil at 5 %	4.3	4.6	2.6	2.7	6.9	7.3	1.67	1.69	0.163	0.169	1.37	1.39
Dormex at 2 % + Rocket + Nigella seed oils at 5 %	5.0	5.3	3.1	3.1	8.1	8.4	1.78	1.79	0.178	0.180	1.48	1.49
New L.S.D at 5%	**0.3**	**0.4**	**0.2**	**0.2**	**0.2**	**0.2**	**0.03**	**0.03**	**0.002**	**0.002**	**0.03**	**0.04**

Table (8): Effect of using oils of rocket and nigella seed as partial replacement of Dormex on berry setting %, harvesting date, yield as well as weight and length of cluster of Superior grapevines during 2015 and 2016 seasons

Treatments	Berry setting %		No. of clusters/vine		Harvesting date		Yield/vine (kg)		Av. Cluster weight (g.)		Av. Cluster length (cm)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Control	10.0	10.9	23.0	24.0	27June	27June	350.0	360.0	8.1	8.6	19.0	19.1
Dormex at 4 %	16.0	17.0	24.0	33.0	27May	28May	441.0	451.0	10.6	14.9	26.2	26.3
Rocket seed oil at 5 %	13.0	12.8	23.0	31.30	8June	8June	424.0	434.0	9.5	13.5	23.0	22.9
Nigella seed oil 5 %	12.0	12.0	23.0	29.0	11June	12June	411.0	421.0	9.5	12.2	22.5	22.7
Rocket + Nigella seed oils at 5 %	14.0	13.1	23.0	31.0	29May	30May	429.0	440.0	9.9	13.6	24.0	24.2
Dormex at 1 %	13.0	13.0	23.0	29.0	24May	24May	411.0	421.0	9.5	12.2	23.0	23.2
Dormex at 1 % + Rocket seed oil at 5 %	14.1	14.4	29.0	31.0	26May	27May	426.0	436.0	9.8	13.5	24.0	24.1
Dormex at 1 % + Nigella seed oil at 5 %	13.8	13.5	23.0	31.0	31May	31May	421.0	431.0	9.7	13.4	23.5	23.6
Dormex at 1 % + Rocket + Nigella seed oils at 5 %	14.4	16.2	23.0	32.0	25May	26May	430.0	440.0	9.9	14.1	25.0	24.9
Dormex at 2 %	14.0	15.0	23.0	31.0	20May	20May	421.0	431.0	9.7	13.4	24.0	24.3
Dormex at 2 % + Rocket seed oil at 5 %	15.8	16.2	23.0	32.0	22May	23May	436.0	446.0	10.0	14.3	25.0	25.3
Dormex at 2 % + Nigella seed oil at 5 %	15.0	15.7	23.0	32.0	24May	27May	431.0	441.0	9.9	14.1	24.5	24.6
Dormex at 2 % + Rocket + Nigella seed oils at 5 %	15.9	16.9	23.0	33.0	27May	28May	440.0	450.0	10.0	14.9	26.0	26.1
New L.S.D at 5%	**0.8**	**0.7**	**NS**	**1.0**	------	-------	**10.0**	**9.9**	**0.2**	**0.3**	**0.4**	**0.4**

Table (9): Effect of using oils of rocket and nigella seed as partial replacement of Dormex on average cluster shoulder, percentage of shot berries as well as berry weight and dimensions of Superior grapevines during 2015 and 2016 seasons

Treatments	Av. Cluster shoulder (cm)		Shot berries %		Av. Berry weight (g)		Av. Berry longitudinal (cm)		Av. Berry equatorial (cm)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Control	8.8	9.0	8.0	7.9	3.11	3.12	2.00	2.01	1.90	1.89
Dormex at 4 %	14.0	14.2	3.0	2.9	4.41	4.50	2.90	2.89	2.60	2.59
Rocket seed oil at 5 %	10.5	10.7	5.5	5.4	3.41	3.50	2.39	2.40	2.24	2.23
Nigella seed oil 5 %	10.0	10.0	5.9	5.8	3.31	3.40	2.30	2.31	2.20	2.19
Rocket + Nigella seed oils at 5 %	11.0	11.2	4.9	4.8	3.51	3.61	2.46	2.47	2.30	2.31
Dormex at 1 %	11.0	11.4	4.8	4.7	4.08	4.17	2.40	2.41	2.31	2.32
Dormex at 1 % + Rocket seed oil at 5 %	12.5	12.5	3.8	3.7	4.20	4.29	2.57	2.55	2.42	2.43
Dormex at 1 % + Nigella seed oil at 5 %	11.6	11.8	4.4	4.3	4.14	4.23	2.47	2.48	2.36	2.37
Dormex at 1 % + Rocket + Nigella seed oils at 5 %	12.9	13.1	3.5	3.4	4.25	4.34	2.70	2.71	2.49	2.48
Dormex at 2 %	12.9	13.1	4.4	4.3	4.18	4.27	2.60	2.61	2.41	2.41
Dormex at 2 % + Rocket seed oil at 5 %	13.5	13.7	3.5	3.4	4.30	4.39	2.71	2.72	2.52	2.52
Dormex at 2 % + Nigella seed oil at 5 %	13.2	13.2	4.0	3.9	4.24	4.33	2.65	2.66	2.46	2.46
Dormex at 2 % + Rocket + Nigella seed oils at 5 %	14.0	14.2	3.1	3.0	4.38	4.47	2.88	2.86	2.59	2.58
New L.S.D at 5%	**0.3**	**0.3**	**0.3**	**0.3**	**0.06**	**0.05**	**0.05**	**0.06**	**0.04**	**0.04**

Table (10): Effect of using oils of rocket and nigella seed as partial replacement of Dormex on physical and chemical characteristics of Superior grapevines during 2015 and 2016 seasons

Treatments	T.S.S. %		Total acidity %		T.S.S. / acidity		Reducing sugars %	
	2015	2016	2015	2016	2015	2016	2015	2016
Control	18.1	18.1	0.724	0.730	25.0	24.8	16.3	16.3
Dormex at 4 %	21.0	21.0	0.551	0.557	38.1	38.0	18.9	18.9
Rocket seed oil at 5 %	17.5	17.4	0.610	0.516	28.7	30.7	15.6	15.7
Nigella seed oil 5 %	17.0	16.9	0.630	0.637	27.0	26.5	15.3	15.2
Rocket + Nigella seed oils at 5 %	17.7	17.7	0.600	0.607	29.5	29.2	16.0	15.9
Dormex at 1 %	18.0	18.0	0.620	0.625	29.0	28.8	16.2	16.2
Dormex at 1 % + Rocket seed oil at 5 %	18.6	18.5	0.580	0.588	32.1	31.5	16.7	16.7
Dormex at 1 % + Nigella seed oil at 5 %	18.3	18.2	0.600	0.606	30.5	30.0	16.5	16.4
Dormex at 1 % + Rocket + Nigella seed oils at 5 %	20.0	19.9	0.570	0.576	35.1	34.5	18.0	18.0
Dormex at 2 %	19.0	19.0	0.600	0.607	31.7	31.3	17.1	17.1
Dormex at 2 % + Rocket seed oil at 5 %	19.6	19.6	0.560	0.566	35.0	34.6	17.6	17.6
Dormex at 2 % + Nigella seed oil at 5 %	19.3	19.2	0.580	0.585	33.3	32.7	17.4	17.3
Dormex at 2 % + Rocket + Nigella seed oils at 5 %	21.0	20.9	0.550	0.559	38.2	37.4	18.9	18.8
New L.S.D at 5%	**0.3**	**0.3**	**0.014**	**0.013**	**0.4**	**0.5**	**0.3**	**0.4**

4. Discussion

1. Effect of chemical agents:-

The positive action of chemical rest breakages especially Dormex on breaking bud dormancy as well as improving percentages of bud burst and fruiting buds, yield and fruit quality of Superior grapevines might be attributed to one or more of the following reasons.

1- Removing bud scales by their caustic effect (**Faust *et al.*, 1997**).

2- Transferring of bound water to free one (**Dokoozlian *et al.*, 1998**).

3- Changes the balance between promoters (IAA, GA_3 and cytokinins) and inhibitors (ABA) in favour of termination of rest as well as gen expression (**Or *et al.*, 2000 and Wood, 2000**).

4- Retarding total phenols, ABA, the activity of catalase (**Shulman *et al.*, 1983 and Nir, 1996**), and glutathione on the early phase of rest and then increased at final of rest (**Siller-Cepeda *et al.*, 1992**).

5- Enhancing the soluble sugars, amino acids, total indoles, oxidative stress, H_2O_2, peroxidase, total free polyamines puterscine, proline, cudaverine, Spermidine and Sperimine (**Grappal and Benvides, 2008**).

6- Changing respiratory key enzymes activities such as phosphohexase isomerase, acidehydrogenase and glucose-6- phosphate dehydrogenase in favour of termination of bud dormancy (**Dong-Mei *et al.*, 2011**).

7- Perception of a signaly the plant upon exposure to chilling and breakages and the transduction of this signal via a cascade of biochemical events to the stage where it release expression of bud meristematic activity, consequently the identification of gene products was facilitated products of these genes might mediate the transduction of a dormancy release signal and recently, a transcript for a grape dormancy breaking related, protein kinase was identified (**Or *et al.*, 2002 and Pinto *et al.*, 2007**).

8- A transient increase in H_2O_2 levels precedes the release of endo dormancy in buds of grapevines. The H_2O_2 peak could act as a signal triggering the expression of genes related to endodormancy release. Moreover, the early peak in the treated buds could be due to the inhibitory of catalase and could be the cause of dormancy shortening and of earlier by break response (**Perez and Lira, 2005**).

9- After accumulation of H_2O_2, it subjects to deintoxication through a sequence of reactions connected to the pentose phosphate pathway, leading to an increase of reduced nucleotides (NAPPH), raising the metabolism and the induction of dormancy termination bud burst and rapid growth accordingly increased kinase that plays a key role in the transduction signal system for enddormancy end of buds (**Wood, 1983 and Shulman *et al.*, 1986**).

These results regarding the effect of chemical dormancy breaking agents on bud burst, growth aspects, leaf chemical composition, yield and quality of the berries are in harmony with those obtained by **Osman, (2014); Ahmed *et al.* (2014); Rizkalla, (2016); Akl *et al.* (2016); Ibrahiem-Rehab, (2017); Ahmed *et al.* (2017); El-Samman, (2017); Ahmed-Sara, (2018) and Sayed-Hewayda, (2018).**

2. Effect of natural agents:-

There is a strong evidence that plant oils as Rocket seeds had active substances such as sulfur-containing compounds with an ally1- group (CH_2-CH-CH_2), especially dially1 mono –di-tri- and tetra-sulfides (**Koch and Lawson, 1996**). Exposing the vines to these volatiles was the most effective treatment in promoting bud break. In addition, sulphur is a constitute of the amino-acids cysteine, cysteine and methionine and hence proteins (**Kubota *et al.*, 1999**). Theses amino acids are considered precursors of after sulfur-containing compounds such as coenzymes and secondary plant products (**De-Kok and Studen, 1993**). Cysteine, the first stable product of the precursor for the synthesis of all other organic compounds containing reduced sulfur as well as for other biosynthetic pathways such as the formation of ethylene (**Semit and Burrnett., 1986; and Miyazak and Yang, 1987**). Sulfate reduction in the leaves leads to export in the phloem of reduced sulfur compounds mainly as glutathione to sites demand for protein synthesis (**Rennenber, 1989**). Sulfolipids may also be involved in the regulation of ion transport across biomembranes (**Erdei *et al.*, 1980; and Stuiver *et al*, 1981**). Nigella oil from Myristic acid, Palmitic acid, Palmatolic acid, Stearic acid, Oleic acid, Linoleic acid, Linolenic, Archaic acid, Saturated fatty acid, Unsaturated fatty acid, Moisture, Proteins, ASH **Bourgou *et al.*, (2010)**

The promoting effect of these substances on the biosynthesis of GA_3 could result in enhancing bud breaking suggested that water and nutrients may be also be mobilized to the growing points. The transition of buds from the dormant stage to the bursting process is related to an increase in the water content in the tissues, mobilization of nutrients and activation of hydrolytic enzymes and intensification of respiration. The stimulating effect of garlic on total carbohydrates may be directly or indirectly due to certain enzymes which activate the anabolic processes leading to the accumulation of these substances. **Kubota *et al.*, (2000)** stated that sulfur compounds enhances hydrolytic enzymes that analysis starch to soluble sugars. Using garlic extracts increased cysteine, cysteine and methionine in the buds as well as most nutrients.

The reduction in free phenols and the increase in indoles were ascribed to using garlic extract as well as the decrease in phenols and peroxidase activity and the increase on the biosynthesis of IAA. The beneficial effects of using garlic on increasing $GA_3$and IAA was investigated. The constituents of plant extracts participate in the metabolic process which increase synthesis of carbohydrates, sugars, total free amino acids and plant hormones could explain the present results.

The promoting effects of plant extracts on breaking dormancy, growth characteristics, yield and berries quality are in agreement with those obtained by **Abdelaal and Aly, (2013); Osman, (2014); Ahmed *et al.* (2014); Uwakiem, (2014); Sabry-**

gehan *et al*., (2014); Abada, (2014); Wassel *et al*. (2016); Rizkalla, (2016); Akl *et al*. (2016); Khalil, (2017); Ibrahim-Asmaa, (2017); Farag-Rana, (2017); Abdelaal *et al*., (2017); Abdelaziz *et al*., (2017); El-Salhy *et al*., (2017); Abd El-Hafeez, (2017); Ibrahiem-Rehab, (2017); Ahmed *et al*. (2017); El-Samman, (2017); Ahmed-Sara, (2018) and Sayed-Hewayda, (2018); Ahmed-Fatma, (2018) and Ebrahiem, (2018).

Conclusion

For improving bud burst, fruiting buds, growth, yield and berries quality of Superior grapevines grown under Minia conditions, it is necessary to spray the vines once at 10-11 Jan. with dormex at 4 % alone or dormex at 2 % + oils of rocket and nigella seeds each at 5 %.

References

1. Abada, M.A.M. (2014): A comparative study for the effect of green tea extract and some antioxidants on Thompson seedless grapevines. International Journal of Plant & Soil Science 3 (10): 1333-1342.
2. Abd El- Hafeez, G.N. (2017): Response of Flame seedless grapevines to some plant extracts and summer pruning. Ph.D. Thesis Fac. of Agric Assiut Univ. Egypt.
3. Abdelaal A. M.H.A. and Aly, M.M. (2013): The synergistic effects of using turmeric with some antioxidants on growth, vine nutritional status and productivity of Ruby seedless grapevines. Hort. Science Journal of Suez Canal Univ. Vol. 1: 305-308.
4. Abdelaal, A. H. M.; Abada, M. A. M. and Abd El-Rahman, M. A. Kh (2017): Response of Flame seedless grapevines to spraying boron and moringa extract. Proc. Of 7th Inter. Conf. for Sustainable Agric. Develop. 6-8 March 1-14.
5. Abdelaal, A.H.M.; Abada, M.A.M. and Khalil, M.A.A. (2017): Response of Flame seedless grapevines to spraying boron and moringa extract. Proc. Of 7th Inter. Conf. For sustainable Agric. Develop. 6-8 Mar. 1-14.
6. Ahmed, F. F and Morsy, M. H. (1999): A new method for measuring leaf area in different fruit species. Minia. J. of Agric.Rec. & Dev.19: 97 - 105.
7. Ahmed, F.F.; Abd El-Hameed, M.M.; Aly-Mervat, A. and El-Saman, A.Y.E. (2017): Behaviour of Superior grapevines to application of some rest breaking agents and winter pruning 1- the effect of some breaking agents. Fayoum 1. Agric., Res., & Dev., 31(2): 123-134.
8. Ahmed, F.F.; Ibrahim, M.I.H., Abada, M.A.M. and Osman, M.M.M. (2014): Using plant extracts and chemical rest breakages for breaking and dormancy and improving productivity of Superior grapevines growing under hot climates. World. Rural Observ.:6 (3): 8-18.
9. Ahmed-Fatma, F.G. (2018): Effect of some plant extracts on growth and nutritional status of Flame seedless grapevine transplants. M.Sc. Fac. of Agric. Minia Univ.
10. Ahmed-Sara, M.H. (2018): Effect of varying number of chilling hours as well as some breakages on behavior of buds and productivity of Superior grapevines grown under Minia region. MSc. Thesis Fac. of Agri. Minia Univ. Egypt.
11. Akl, A.M.A.; Ahmed, F. F.; Abdelaal, A. M. K. and Ibrahiem- Rehab, G. (2017): Studies on breaking endormancy in Superior grapevines by application of some natural extracts. J. Biol. Chem. Environ. Sci. 11(4): 453-469.
12. Association of Official Agricultural Chemists (A.O.A.C.) (2000): Official Methods of Analysis (A.O.A.C), 12th Ed., Benjamin Franklin Station, Washington D.C., U.S.A. pp. 490-510.
13. Bacha, M.A.A. (1984). Fundamentals of Fruit Trees. Dar El- Matbout, El-Gadida, pp.227-316.
14. Balo, E.; Prilesszky, G.; Happ, I.; Kaholami, M. and Veag. L. (1988): Soil improvement and the use of leaf analysis for forecasting nutrient requirements of grapes. *Potash Review* (Subject 9, 2nd suite, No. 61: 1-5).
15. Bouard, J. (1966): Recharches, physiologiques sur la vigen at en particulier sur laoudment des serments. Thesis Sci. Nat. Bardeux France, p.34.
16. Bourgou, S., Bettaieb, I., Saidani, M, and Marzouk, B. (2010): Fatty Acids, Essential Oil, And Phenolics Modifications of Black Cumin Fruit under NaCl Stress Conditions. J. Agric. Food Chem. 58 (23), 12399-12406.
17. Bourgou, S., Bettaieb, I., Saidani, M, and Marzouk, B. (2010): Fatty Acids, Essential Oil, And Phenolics Modifications of Black Cumin Fruit under NaCl Stress Conditions. J. Agric. Food Chem. 58 (23), 12399-12406.
18. Bruinsma, J. (1963): The quantitative analysis of Chlorophylls a and b in plant extracts, Phytochem Phytobiol. 2. 241.
19. Chapman, H.D. and Pratt P.F. (1975): Methods of Analysis for Soil. Plant and Water. Univ. of California. Division of Agric., Sci. pp. 172-173.
20. De- Kok, I.J. and Studen, I. (1993): Role of glutathione in plants under oxidative stress.

Sulfur nutrition and assimilation in higher plants. SPB Academic Publishing. Netherlands pp. 125-138.
21. Dokoozlian, N.K. Ebisuda, N.C. and Neja, R.A. (1998): Surfactants Improve the Response of Grapevines to Hydrogen Cyanamide. Hort. Science 33(5):857-859.
22. Dong-Mei, L.I.; Ling, L.I.; Yue, T.; Xiu-de, C.; Hai-sen, Z.; Dong-sheng, G. and Jin L.I. (2011): Effect of photoperiod on key enzyme activities of respiration in nectarine buds during dormancy induction Agric. Sci. in China 10(7): 1026-1031.
23. Ebrahiem, R.H. (2018): behavior of Superior grapevines to application of some plant extracts via leaves. M.Sc. Thesis Fac. of Agric. Minia Univ. Egypt.
24. Ebrahim-Rehab, G.O. (2017): Studies on breaking endormancy in Superior grapevines by application of some natural extracts. Ph. D. Thesis Fac. of Agric. Minia Univ. Egypt.
25. El-Salhy, A.M.; Ibrahim, R.H.; Megawer, M.A. and Abd El-Hafiz, G.N. (2017): Effect of plant extracts spraying on growth and fruiting of Flame seedless grapevines. Assiut J. Agric. Sci., 48(3): 188-197.
26. El-Samman, A.Y.E. (2017): New Techniques For Breaking Endodormancy And Pruning In Superior Grapevines. Ph. D. Thesis Fac. of Agric. Minia Univ. Egypt.
27. Erdei, L., Stuiver, B. and Kuiper, P. J. C. (1980): The effect of salinity on lipid composition and on activity of Ca2+- and Mg2+-stimulated ATPases in salt-sensitive and salt-tolerant Plantago species. Physiologia Plantarum, 49: 315–319.
28. Farag-Rana. S.R. (2017): Effect of spraying turmeric and Roselle extracts on yield and quality of Superior grapevines. M.Sc. Thesis. Fac. of Agric. Minia. Univ., Egypt.
29. Faust, M.; Erez, A; Rowland, L.J.; Wang, S.Y. and Norman, H.A. (1997): Bud dormancy in perennial fruit trees: physiological basis for dormancy induction, maintenance and release. Hort. Science 32: 623-629.
30. Forcat S, Bennett M.H.; Mansfield, J.W.; Grant, M.R. (2008): A rapid and robust method for simultaneously measuring changes in the phytohormones ABA, JA and SA in plants following biotic and abiotic stress. Plant Methods 4: 16–23.
31. Gordon, S. A., and Weber, R. P. (1951). Colorimetric estimation of indoleacetic acid. Plant Physiology, 26(1), 192–195.
32. Grappal, M.D. and Benvides, M.P. (2008): Polyamines and abiotic stress. Recent Advances Amino Acids 34, 35-45.
33. Ibrahim- Asmaa, A. (2017): Effect of foliar application of moringa oleifera extract on fruiting of Superior grapevines. J. Biol. Chem. Environ. Sci. 12(1): 559-576.
34. Khalil; M.A.A. (2017): Response of flame seedless grapevines to foliar application of Moringa extract and boron. M.Sc. Thesis fac. Of Agric. Al-Azhar Univ. Assiut branch, Egypt.
35. Koch Hp, Lawson LD (1996) *Garlic:* The Science and Therapeutic Application of Allium sativum L. and Rekated Species (2nd Ed) Williams and Wilkins, Baltimore, pp 37-108.
36. Kubota, N.; Matthews, M.A.; Takahagi, T. and Kliewer, W.M. (2000): Budbreak with garlic preparations. Effect of garlic preparations and of.calcium and hydrogen cyanamide on budbreak of grapevines grown in greenhouses. Am. J. Enol. Vitic. 51 (4): 409- 414.
37. Kubota, N.; Yamane, Y.; Toriu, K.; Kawazu, K.; Higuchi, T. and Nishimura, S. (1999): Identification of active substances in garlic responsible for breaking bud dormancy in grapevines. Journal of the Japanese Society for Horticultural Science 68, 1111-1117.
38. Lane, J. H. and Eynon, L. (1965): Determination of reducing sugars by means of Fehlings solution with methylene blue as indicator A.O.AC. Washington D.C.U.S.A. pp.490- 510.
39. Mead, R.; Currnow, R. N. and Harted, A. M. (1993): Statistical Methods in Agricultural and Experimental Biology. 2nd Ed. Chapman and Hall, London pp. 10- 44.
40. Miyazak, J.H. and Yang, S.F. (1987): The methionine selvage pathway in relation to ethylene and polyamine synthesis. Phyiologia planetarium 69: 366-370.
41. Nail, T.N.A., Ali, M.M. and Salim, E.R.A., 2017. Phytochemical Studies on Sudanese Rocket (Eruca sativa) Seeds and Oil constituents. *American Journal of Phytomedicine and Clinical Therapeutics*, *5*(1).
42. Nir, G. (1996):Changes in the Activity of Catalase (EC 1.11.1.6) in Relation to the Dormancy of Grapevine (*Vitis vinifera* L.) Buds. Plant Physiology, Waterbury, V.81, N.4, p.1140-1142, 1996.
43. Or, E.; Belausov, E.; Popilevsky, I.; & Bental, Y. (2000): Changes in endogenous ABA level in relation to the dormancy cycle in grapevines grown in a hot climate. The Journal of Horticultural Science and Biotechnology,75(2), 190-194.

44. Osman, M.M. (2014): Response of Superior grapevines grown under hot climates to rest breakages. M. Sc. Thesis Fac. of Agric. Minia Univ., Egypt.
45. Perez, F.J.P and lira, W. (2005): Possible role of catalase in post- dormancy bud break in grapevine. J. of plant physiology 162: 301-308.
46. Pinto, M.; Lira, V.; Ugalde, H. and Perez, F. (2007): Fisiologia de la laten cia de las yemasde vid hipotesis actuals. Universidad de chile, Santiago, p.16.
47. Rennenber, H. (1989): Synthesis and emission of hydrogen sulfide by higher plants. Biogenic Sulfur in the Environment. ACS Symp. Series, 3226, pp. 44-57, Washington, D.C.
48. Rizkalla, M.K. (2016): Effect of spraying natural camphor and garlic oils as bud fertility, yield and fruit quality of Flame seedless and White Banaty (Thompson seedless) grape cultivars. Ph.D. Thesis Fac. of Agric. Assuit Univ. Egypt.
49. Sabry- Gehan, H.; Hammouda, A.M.A and Nahed A. A. (2014): Improving yield, fruit quality and storability of Black monukka and Fiesta grape cvs. by using some plant extracts. A- maturation and fruit quality. Egypt. J. of Appl. Sci., 29 (12); 562-575.
50. Sayed-Hewayda, R.F. (2018): Trails for reducing concentrations of dormex applied for breaking dormancy in Superior grapevine cv by using garlic and onion oils. Ph.D. Thesis Fac. of Agric. Minia Univ. Egypt.
51. Semit, J. and Burrnett, J. J., (1986): The use of cyanamide as a dormancy breaker in vines in South Africa. Table Grapes, pp-1-3.
52. Shulman, Y., Nir, G., Fanberstein, L and Lavee, S. (1983): The effect of cyanamide on the release from dormancy of grapevine buds. Scientia hortic. 19, 97-104.
53. Siller-Cepeda, J. H., Fuchigami, L. H., and Chen, T. H. H. (1992): Glutathione content in peach buds in relation to development `Redhaven' peach buds. Hort. Sci. 27(8):874-876.
54. Stuiver, C. E. E., Kuiper, P. J. C., Marschner, H. and Kylin, A. (1981): Effects of salinity and replacement of K+ by Na+ on lipid composition in two sugar beet inbred lines. Physiologia Plantarum, 52: 77–82.
55. Uwakiem, M.Kh. (2014): The synergistic effect of spraying some plant extracts with some macro and micro nutrients of Thompson seedless grapevines. International Journal of Plant & Soil Science 3(10): 1290-1301.
56. Von- Wettstein, D.Y. (1957): Clatale und der Submikro Skopisne formwechsel de plastids. Experimental Cel Research, 12: 427.
57. Wassel, A.M.M.; Abada, M..M. and Ebrahiem, R.H. (2016): Behavior of Superior grapevines to foliar application of some plant extracts. J. Biol. Chem. Environ. Sci. 11(4): 417-426.
58. Weaver, R.J. (1976). Grape Growing, A Wiley Interscience Publication John Wiley & Davis, New York, London, Syndney, Trontc pp. 160-175.
59. Wilde S. A.; Corey, R. B.; Lyer, I. G. and Voigt, G. K. (1985): Soil and Plant Analysi's.[4]for Tree Culture. 3rd Oxford & 113H publishing Co., New Delhi, pp. 1 – 218.
60. Wood, R. (2000): Winter dormancy of grapevines. The Australian Grape grower & Winemaker. Annual Technical issue: 41-44.

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