Альхасан Мохаммад Сааид
научный сотрудник главного управления научных сельскохозяйственных исследований. Центр Хомса Сирии
Телли Гассан
первый научный руководитель, профессор кафедры садоводства, факультет сельского хозяйства, университет Аль-Баас Сирия, г.Хомс
Альфозо Талал
второй научный руководитель, ведущий научный сотрудник Центра сельскохозяйственных научных исследований в Хомсе.

ОПРЕДЕЛЕНИЕ УРОВНЯ ГИББЕРЕЛЛИНА GA3 НА РАЗНЫХ СТАДИЯХ ГОДОВОГО ЦИКЛА РОСТА ДЛЯ СОРТОВ ОЛИВОК СУРАНИ И ДЭБЛИ И ИХ РОЛЬ В АЛЬТЕРНАТИВНОМ ПЛОДОНОШЕНИИ

Аннотация: *В исследовании проведено оливковых деревьев из Сорани, им 18 лет. Сорта Дэбли в течение двух сельскохозяйственных сезонов (2017-2018 гг.), (2018-2019 гг.) исследование направлено на определение уровня гормона гиббереллина GA3 в листьях и плодах на различных этапах годового цикла роста, чтобы знать его роль в чередовании плодоношения и его влияние на трансформацию цветения.*

Полученные результаты показали изменение концентрации гиббереллина на стадиях роста оливкового дерева. Мы обнаружили, что гиббереллин постепенно явно увеличивается после завязывания плодов, пока ядро не затвердеет, чтобы постепенно уменьшаться. Таким образом, средняя концентрация гиббереллина в сорте Сурани в течение исследуемых сезонов была на уровне завязывания плодов (157.49 ppm), и упрочнение ядра (213.21 ppm), в то время как у сорта Дэбли он

был в узлах (174,02 ppm), когда ядро затвердело (274.64 ppm). Эти результаты подтверждают, что гиббереллин значительно увеличился после оседания плодов и образования зародыша. Его концентрация в Дэбли была намного больше и колеблется из года в год, что объясняет одну из причин его альтернативной опоры.

Ключевые слова: *Оливки, альтернативный подшипник, количество продукции.*

Agr.Mohammad Saeed Al-Hassan

Researcher at the General Authority for Scientific Agricultural Research. Homs Center.

Dr.Ghassan Telly

Professor in the Department of Horticulture. Faculty of Agriculture. Al Baath University.

Dr.Talal Al-Fozo. Leading Researcher at the Center for Scientific Agricultural Research in Homs.

DETERMINATION LEVEL OF GIBBERELLIN GA3 IN VARIOUS STAGES OF THE ANNUAL GROWTH CYCLE FOR THE SOURANI AND DAEBLI OLIVE VARIETIES AND THEIR ROLE IN THE ALTERNATE BEARING

Annotation*: The study has conducted on 18-year-old olive trees of the Sourani. Daebli varieties during two agricultural seasons (2017-2018), (2018-2019) the research aims to determine the level of the hormone gibberellin GA3 in the leaves and fruits in the various stages of the annual growth cycle to know its role in alternate bearing and its effect on the flowering transformation.*

The obtained results showed the change of gibberellin concentration during the growth stages of the olive tree. We found that the Gibberellin gradually increases clearly after the fruit setting until the nucleus hardens to decrease progressively. Hence, the average concentration of Gibberellin in the Sourani variety during the study seasons was at the fruit setting (157.49 ppm) and the hardening of the nucleus (213.21 ppm), while in the Daebli variety, it was at the nodes (174.02 ppm), when the nucleus hardened (274.64 ppm). These results confirm that the Gibberellin increased significantly after the fruits sitting and the formation of the embryo. Its concentration in Daebli was much more and vibrate from year to year, which explains one of its Alternate bearing reasons.

Keywords: *Olives, alternate bearing, hormone gibberellin, the production quantity.*

Introduction:

The olive tree is one of the oldest cultivated plant species, as oil and fruits were used in trade by the Syrians 3000 years ago or more (Zohary, 1994), and it is known as the tree of ancient civilizations. Archaeological excavations indicate that the history of olives was linked to the account of the Mediterranean. Many scholars believe that natural Syria was the first to know olive cultivation for six thousand years B.C. (Rhizopoulou, 2007).

(Raya and Tilly, 2005) clarified that the olive tree has many economic and nutritional benefits, as the fruits were used to extract oil or as table fruits in the form of green or black olives in brine or saline solution, and the olives have a high nutritional value and consist of (79.23%) water And (17.57%) oil, (2.19%) ash, (1.16%) protein, traces of sugars and many mineral elements, especially sodium, calcium and magnesium (Ismaili, 2016).

The quantity of olive tree production varies from year to year due to its exposure to the phenomenon of fruit exchange or the so-called alternate bearing. The

phenomenon of alternate bearing is the phenomenon of the irregular bearing of fruits in olive trees during alternating years, so that olive trees give production in the year of bearing fruits and a little of it in the following year. It is almost non-existent in the absence of any climatic catastrophe. Comparing the years of bearing fruits and a few years of bearing the fruits separately shows a disturbance in production. This phenomenon does not suffer from olives only, but we find it in apple trees, pistachios, peaches, oranges, lemons, coffee, almonds, pears, walnuts, and others (Chao, 2015).

(Kour et al., 2018) finds that the phenomenon of alternate bearing in trees of 15 years of age and older is more than trees that have recently started bearing and bearing fruit and at the age of 3-5 years.

(David and Himelrick, 2014) studied the change in the concentration of gibberellin GA3 in some varieties of olives (Olea europaea L.) during the stage of flower differentiation and node formation and their effect on production. They found that increasing the concentration of Gibberellin during the flowering differentiation significantly reduces the appearance of flowering inflorescences and prevents the nodes' formation. The gibberellins secreted in particular from the fruit embryo increased dramatically after the decade. They limited the vegetative shoots' activity on the fruitful branch, thus depriving the tree of the vegetative growth carried in the next year, which caused a decrease in the next year's productivity. More precisely, their study revealed that the secreted Gibberellin Of the fruits in the contract phase and two weeks after the contract, one of the leading causes of the alternate bearing phenomenon.

(Ulger et al., 1999) found it is possible to observe the activity of hormonal substances of the type of gibberellins in the fruitful olive branches clearly in contrast to the non-fruitful branches, leads to the assumption that the developing embryo secretes these gibberellins in the olive fruit, hence the importance of Identifying and

knowing the role of Gibberellin in the phenomenon of resistance and its effect on the syphilis transformation of olive branches.

(Chao, 2015) conducted a study in California to find out the effect of removing the fruits before the kernel's hardening in mid-April. It was found that it contributed to giving profitable vegetative growth and increasing the number of flowers in the following spring. In contrast, delay in removing the fruits until after 75 days of hardening of the kernel led to a decrease Significant growth in the following year and a significant decrease in the number of flowers for the next season, as (74%) of the buds failed to differentiate into flower buds.

(Pritsa and Voyiatzis, 2004) found that gibberellins are hormones that are secreted from the newly developing fruit embryo and cause the reduction of the flowering differentiation by up to (50%) and can almost wholly fail it by affecting fertilization, the success of pollination, and the development of the vegetative and flower buds.

(Lavee, 2007) showed the effect of Gibberellin, like other plant hormones, depends on the timing of its secretion, the speed of its movement, its concentration, and the duration of its stay within the plant tissues, especially in the vegetative and flower buds.

He and Li (2013) said that Gibberellin affects the flowering process, inhibits the flowering process, increases the relative proportions of male flowers, and has no relation to the number of inflorescences.

(Al-Fozo et al., 2005) found that the process of flower thinning and treatment with Gibberellin in the full flowering stage did not affect the percentage of flower buds. In contrast, the process of thinning fruits at different dates then treatment with Gibberellin from the stage of the contract until the stage of hardening of the core led to a decrease in the percentage of flower buds. After two weeks of the nodes, we found that Aldaebli led to a decrease in the percentage of flower buds in the nodal

stage after two weeks and four weeks after the nodes, while no effect was observed in both cultivars at the location of hardening of the nucleus. , Confirming that the concentration of Gibberellin is variable during the tree's growth cycle and increases after a decade.

(El-Nady et al., 2012) explained that Gibberellin plays an inhibitory role in syphilis differentiation, through increased secretion from the fruit embryo, also increases its concentration in the buds, which causes an imbalance in other plant hormones and defect the work of the two nucleic acids (R.N.A., D.N.A.), which causes the failer of flower differentiation in the following year, and a small number of fruits. Thus a decrease in production, and the plants enter into the phenomenon of resistance.

(Garmendia et al., 2019) showed spraying Gibberellin plays a role in the decrease in the number of flowering inflorescences, reduces the number of flowers in the inflorescence, and changes the sexual ratio, especially when spraying coincides with the date of secretion of Gibberellin from the fetus after the decade and until the hardening of the core.

Research objectives: The research aims to determine the level of gibberellin GA3 in the various stages of the olive tree's annual growth cycle and its role in the phenomenon of resistance, and its effect on the syphilis transformation.

Research materials and methods

First: The place of searching: The search was carried out on a farm in the village of Al-Rabiah, which is 10 km to the west of the city of Homs, and the area is 487 meters above sea level, and it is located at 45 longitudes and 36 north latitude. The Mediterranean climate dominates the research area with cold rainy winters and hot, dry summers. Rainfall begins at the end of September and early October, and the period of rainy precipitation extends up to seven and a half months annually. The annual average

of rainfall amounts to 410 mm annually, and the soil was characterized by its heavy consistency Clayey, red-brown.

Second: Plant Material

The research was conducted on olive trees of 18 years old of the two local varieties (Sourani and Daibili) planted in the village of Al-Rabiah, with dimensions (7 x 7 m) and distributed in the field randomly, the service work for all trees of the two types are identical (irrigation, fertilization, cultivation, pruning). The research's implementation took two planting seasons: the first season (2017-2018) and the second season (2018-2019).

1- The Sourani variety: It is considered one of the main Syrian varieties, it is dual-purpose used for the production of oil and table and the percentage of oil in it is high (28, 30%), its production is abundant, its tendency to tolerance is light (Zaghloula, 2000).

2- The Daibili variety: It is considered one of the main Syrian varieties, it is dual-purpose, its oil content is (28%), it does not tolerate drought and frost, it has the characteristic of severe resistance, its production is abundant during the bearing season (Zaghloula, 2000).

Third: Research methods: The two agricultural seasons were carried out according to the following steps.

1- Collection of plant samples: Plant samples (leaves and fruits) were collected from trees of the Sourani and Daibli olive varieties.

2 - Cleaning and drying the plant samples: After obtaining the plant samples, they were cleaned from dust and suspended dirt, washed, and dried.

3- Slicing of plant samples: The plant parts used in the research were cut into small pieces and placed in suitable packages after weighing with a sensitive scale.

4- The samples are soaked with the appropriate solvent (water).

5 - Filter the reliable parts and obtain the concentrated plant extract.

6- Preparation of a standard series of pure Gibberellin within a range of (10, 60 µg/ml).

7- Conducting a spectral scan of pure Gibberellin within a range of (200, 400 nm).

8- Measuring the absorbance of the prepared samples at the maximum wavelength of each solvent.

After taking the plant samples, the level of the gibberellin readings was determined using a Spectrophotometer on the following dates: The first sample was on (1/1/2018), and until (12/31/2019), the plant samples totaling 24 samples were taken to the laboratory to prepare Plant extract to quantify Gibberellin, that is, at a sample rate every 15 days.

Results and discussion

The aim of assessing the level of the hormone gibberellin in the olive tree for the two studied cultivars is to know how the concentration changes (when it increases and when it decreases) to understand the relationship between the shift in focus and the process of flower differentiation, to prove or deny that Gibberellin secreted from the fruit embryo inhibits the syphilis differentiation, which increases the resistance of the trees Olives in the following year.

First: How to extract Gibberellin from the plant sample:

The extraction of Gibberellin from the plant sample of the two olive varieties (Surani and Daibili) was studied, and its concentration was determined using a spectrophotometer, as this method is called the molecular absorption method or the quantitative method of UV-VIS spectroscopy using a (UV-VIS-Spectrophotometer) or called the spectrophotometer (Tawfiq, 2010).).

Second: Study the factors affecting the extraction process and determine the concentration of Gibberellin using a spectrophotometer:

Before measuring the absorbance of solutions containing Gibberellin and determining its concentration, it is necessary first to study the factors affecting the extraction process and choose the best conditions for this process, which are affected by several factors illustrated in Figure (1), which also shows the stages of measuring Gibberellin using a spectrophotometer:

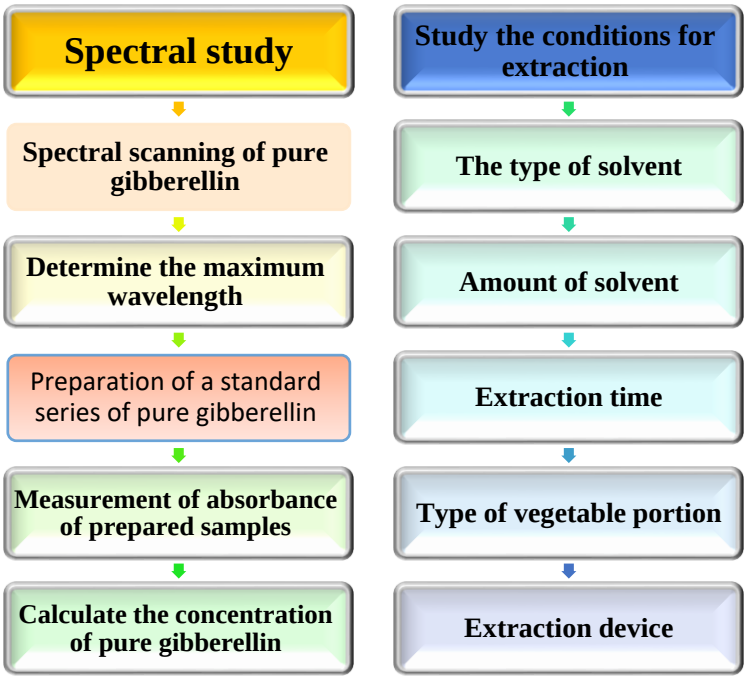

Figure (1): Factors affecting gibberellin extraction and spectral study stages.

The factors affecting the extraction process were studied to reach the best conditions and to study the effect of these conditions; it is necessary first to examine the dissolution of pure Gibberellin and determine its pH level, check the type of solvent, its concentration, and the time of extraction and the method of its effect.

2-1- Gibberellin dissolution: To choose the best solvent for the extraction process, it was first necessary to study the dissolution of Gibberellin in the proposed solvents for the study.

Gibberellin's dissolution has been studied in different solvents such as water, methanol, ethanol, chloroform, and n-Hexane. The results were as shown in table (1).

Table 1: Pure gibberellin degradation

Solvent	water	Ethanol	Methanol	Chloroform	n-Hexane
Hemolytic	dissolves in all proportions	dissolves in all proportions	good dissolution	Weak dissolution	Not dissolve

After the dissolution of pure Gibberellin was studied in the previous solvents, a spectrophotometer was performed to determine the maximum wavelength of Gibberellin in the used solvents. Table (2) shows the value of the ultimate wavelength corresponding to each of the studied solvents. Figure (2) also shows the spectrum of pure Gibberellin in water.

Table (2): The maximum wavelength of gibberellin corresponding to the used solvents.

Used Solvent	Maximum wavelength: λmax: nm
Water	256
alcoholic	257
Chloroform	276
n-Hexane	-

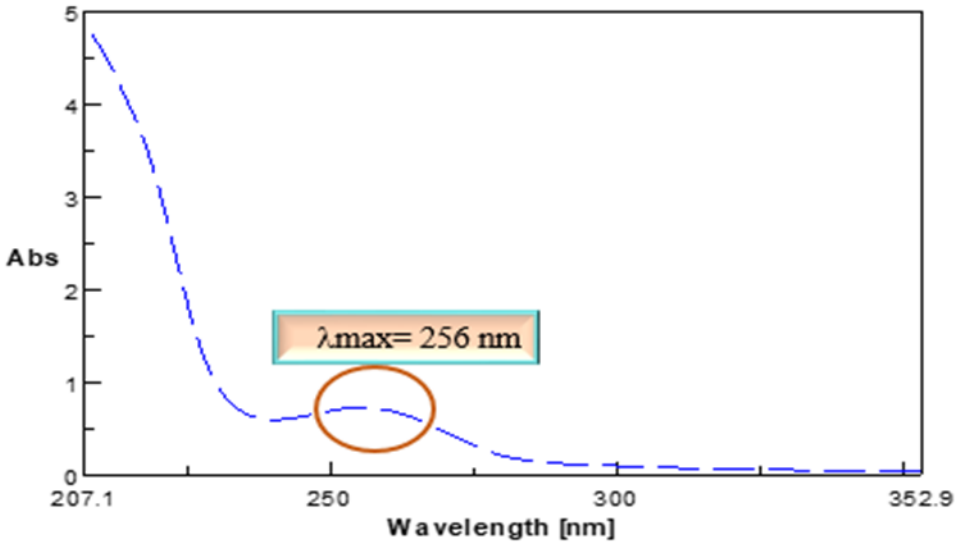

Figure 2: Pure gibberellin chromatogram

2-2 The pH of pure Gibberellin was determined by the digital pH scale (5.3).

2-3- To study the type and concentration of the solvent: A standard series was prepared from each solvent:

A- Water: pure Gibberellin dissolves in distilled water in all proportions, so water is the best solvent for Gibberellin and the most selective during the extraction process in our research and most similar previous studies as well (Moradinezhad et al., 2020), where (A expresses absorbance, C is expressed in concentration in ppm or µg / ml).

Table (3): Standard series using water

A	**C: µg/ ml**
0.3704	10
0.5178	20
0.9366	40
1.4531	60

B- Ethanol 10%: The second solvent used to study the type of solvent's effect in the extraction process is an alcoholic solution (ethanol 10%). As we know, ethanol is a well-dissolved proton polar solution for Gibberellin, and according to reference studies such as (Tawfiq 2010), several alcohols can be used. To extract Gibberellin from it: the propyl, isopropyl, methanol, and ethanol systems. Our research relied on ethanol as a solvent in the extraction process, as it dissolves Gibberellin in absolute ethanol and its comprehensive solutions in most proportions. The effect of ethanol on both the concentration of Gibberellin extracted and the selectivity of the extraction process was studied using three concentrations of it:

(100% ethanol), (10% ethanol), (5% ethanol), and the relatively better 10%, as shown in Figure (3), because the use of absolute ethanol reduced the selectivity of the extraction process to increase the likelihood of dissolving unwanted materials. (4) Standard series prepared in 10% ethanol.

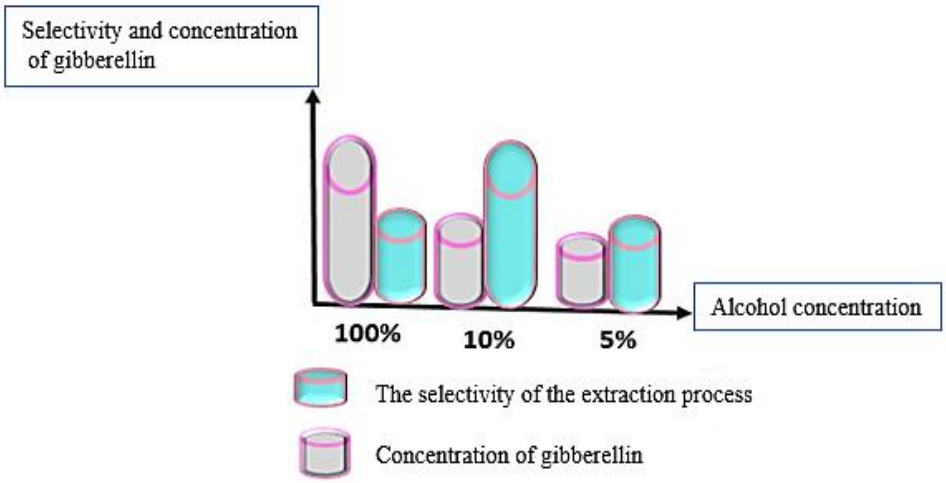

Figure 3: The relationship of alcohol concentration and selectivity

Table (4): Standard series prepared in 10% Ethanol

C: mgr/l	0.00325	0.00531	0.00727	0.00955
A	0.135	0.261	0.36208	0.48865

C- Chloroform: The third solvent chosen for the study is chloroform, which is considered one of the right polarity sweeteners. In this paper, the reason for selecting chloroform is to study the effect of organic solvents on 1- The extraction process. 2- Gibberellin extract concentration. 3- The selectivity of the extraction process.

It was accomplished in two ways, according to Figure 4:

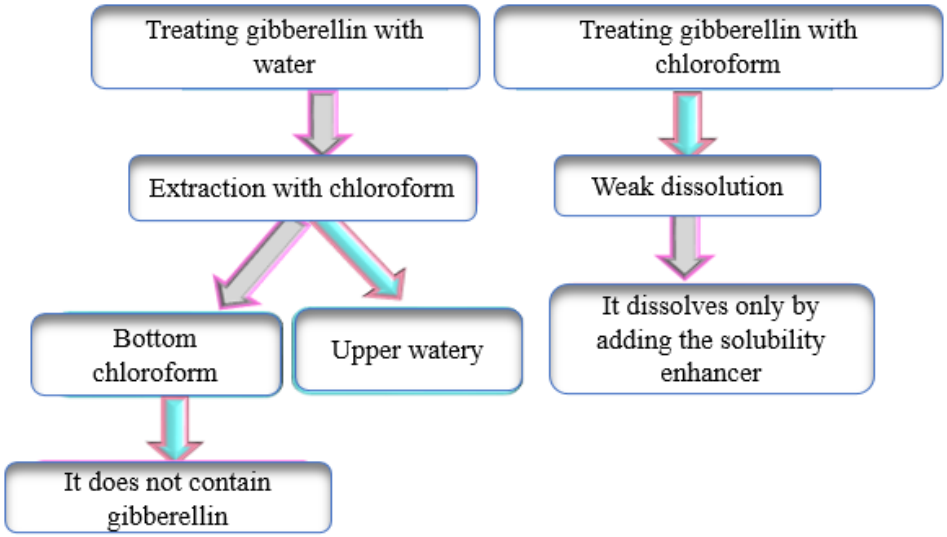

Figure 4: Study of the effect of chloroform on the extraction process

Therefore, according to Figure (4), it is not preferable to use chloroform to extract and quantify the amount of Gibberellin because pure Gibberellin is not dissolved into chloroform solubility increases with the presence of solubility enhancers such as Tween.

D- n-Hexane: It is considered a non-polar organic sweetener; pure Gibberellin is never dissolved in the n-Hexane, so a standard series was not present in the two hexane

regimes. Some organic compounds that are dissolved only in the n-Hexane are extracted, which may be removed with Gibberellin later)

As this was done through the following: a comparison was made among three samples that were studied under the same conditions, namely:

1- Samples extracted with n-Hexane only.

2- Samples extracted with water.

3- Samples extracted hexane and then water, respectively.

The absorbance corresponding to the three samples was recorded at the same wavelength.

Table (5): Study of the effect of the n-Hexane solvent on the extraction process

Conditions	λmax =256 nm m=5.044 g , V=50 ml ,			
Solvent	n-Hexane	water	alcoholic10%	Water after n-Hexane
Absorbance A	-	0.355	0.441	0.350

Where it is noticed from the table (5) that the absorbance of the aqueous extract after adding the two hexane regimens is very close if it is not used, so there is no need to perform the extraction process with it.

2-4- Study the effect of the extraction period (extraction time).

Several experiments were conducted for several samples of the Sourani and Daibili olive varieties during different periods to study the effect of the soaking time (extraction) by measuring the absorbance of the extracted solutions over time, as it was observed that the wet time (extraction time) the plant samples increased, the color intensity gradually increased for the extract. It was also observed that the concentration

increased relatively with time. Still, on the other hand, the extraction process's selectivity decreased, as with the increase in the extraction time, the relative dissolution of some unwanted compounds increased. It is shown in Figures (5 and 6), where it is clear that the increase in the extracted concentration increases with the increase in the extraction period.

Figure (5): Increasing the color intensity of the extracted solutions with increasing time

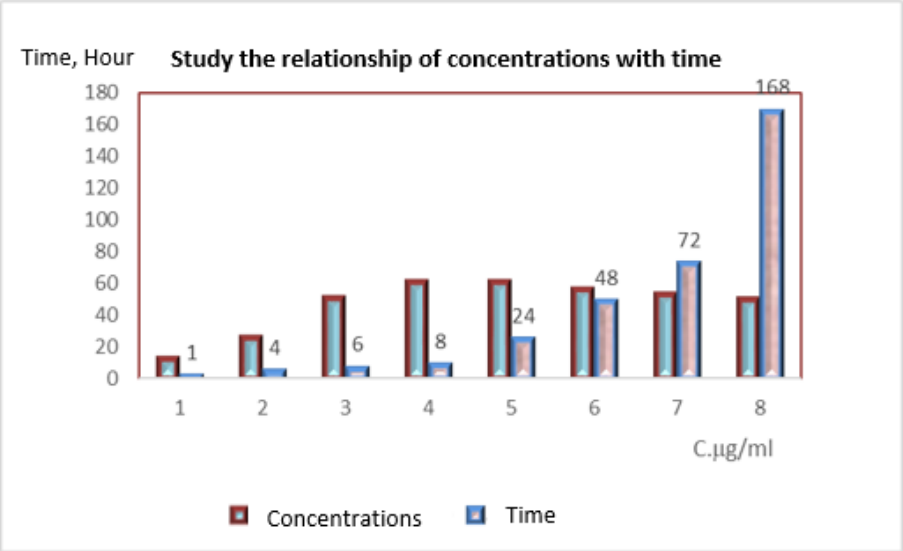

Figure 6: The relationship between concentration and extraction duration

-5- Study the effect of the type of plant part extracted:

The comparison was made on three extracts of Gibberellin: fruit extract, leaf extract, and fruit and leaf extract. It was found that the largest concentration of Gibberellin in the two studied cultivars was in fruits and then leaves.

2-6- Study the effect of the extraction method:

A comparison between the two extraction methods using the traditional way (soaking process) and extraction using an ultrasound device was made on several plant samples for the two varieties as follows:

The extraction mixtures were placed in an ultrasound device simultaneously as the varieties were soaked traditionally. A slight increase in the concentration of Gibberellin extracted using ultrasound was observed. When comparing two solutions: the first time was placed with an ultrasound device (6 hours) and another solution soaked for ten hours, it was noticed that the solution placed inside the ultrasound gave a relatively higher concentration, which is shown in Table (6). The ultrasound extraction method was about 4 hours shorter, and its selectivity was better than the traditional way.

Although the improvement is slight with the use of the ultrasound machine, this type of device could have a large role in future extraction research.

Table (6): Comparison between the conventional extraction method and sound waves

Variety	Extraction method					
	Sound wave method			Traditional way		
	Extracted Gibberellin (ppm)	Selectivity	Extraction duration	Extracted Gibberellin (ppm)	Selectivity	Extraction duration
Sourani	35	more	6 hours	30	less	10 hours
Daebli	50	more	6 hours	46	less	10 hours

Thus, after studying the factors affecting the process of extracting Gibberellin from plant samples, we can reach the optimal conditions for the extraction process, which are represented by the stages shown in Figure (7):

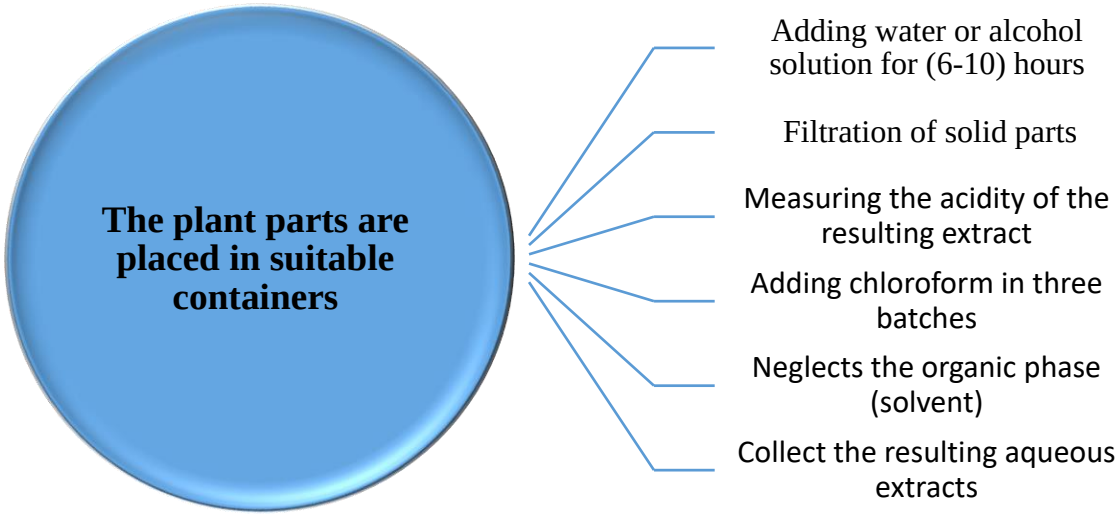

Figure 7: Optimal gibberellin extraction method

To ensure that the extracts of the plant samples contained Gibberellin, this was done in two ways:

1- A comparison was made between the spectra recorded on the spectrophotometer with the pure gibberellin spectrum, as it is noticed that they correspond in large proportions as in Figures (8 and 9).

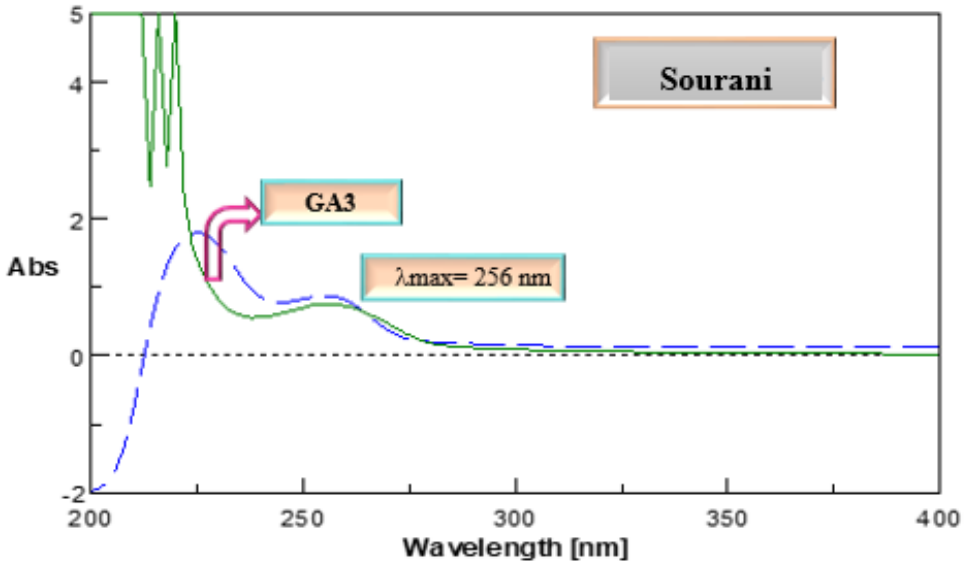

Figure (8): Comparison of pure gibberellin spectrum with gibberellin spectrum in Sourani cultivar

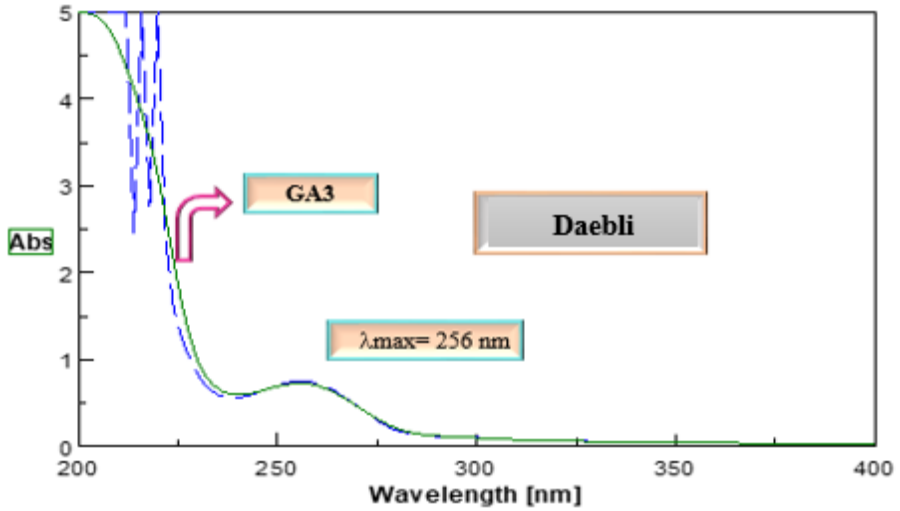

Figure (9): Comparison of pure gibberellin spectrum with gibberellin spectrum in Daebli cultivar

2- Thin layer chromatography method: After obtaining the extracts containing Gibberellin, the extraction solvent was evaporated, and then the samples were dissolved with ethanol, and the samples were carried on thin-layer chromatographic sheets using a cliff plate: which are two different solvents in polarity, and the plate containing the compound to be tested is placed inside a chamber The escapement, in which the mobile phase pulls the components of this substance upward, and its components are separated

according to their polarity, and the most polar is at the top and the least at the bottom (Hassan, 2000).

Table (7) shows the change in the level of the hormone gibberellin in the trees of the Sourani and Daibili olive varieties during the annual growth cycle of the seasons (2017-2018) and (2018-2019).

Table (7): The concentration of gibberellin hormone (ppm) changed in the trees of the Sourani and Daibili olive varieties during the annual growth cycle of the seasons (2017-2018) and (2019-2018).

The growth phases	Date	Daebli			Sourani		
		First season	**Second season**	**Average**	**First season**	**Second season**	**Average**
Floral induction	1/1	68.38	98.30	83.34	39.12	55.33	47.22
	15/1	68.54	103.28	85.92	47.69	66.08	56.89
	1/2	82.08	108.44	95.26	52.10	66.87	59.49
Floral differentiation	15/2	97.71	113.32	105.52	63.21	77.41	70.31
	1/3	99.04	115.01	107.03	63.98	88.55	76.27
	15/3	99.97	128.82	114.40	67.58	95.25	81.42
Flowering	1/4	104.58	129.16	116.87	79.15	95.64	87.40
	15/4	115.80	152.27	134.04	89.78	104.28	97.03
	1/5	129.36	157.71	143.54	95.10	108.50	101.8
Flowers opening	15/5	148.51	166.39	157.45	101.44	115.00	108.22
Fruit set	1/6	155.58	192.46	174.02	149.17	165.81	157.49
	15/6	186.77	195.70	191.24	174.98	187.76	181.37
Fruit growth	1/7	196.46	265.29	230.88	188.91	196.27	192.59
	15/7	199.59	272.12	235.86	197.15	200.69	198.92
Hardening of the core	1/8	228.25	318.08	273.17	205.78	212.37	209.08
	15/8	235.78	313.50	274.64	210.47	215.94	213.21
Fruit ripening	1/9	196.29	265.36	230.83	178.14	175.26	176.7
	15/9	152.10	212.11	182.11	113.84	139.45	126.64
	1/10	144.09	174.97	159.53	104.22	117.37	110.80

Picking	15/10	145.37	164.80	155.09	100.87	104.18	102.53
	1/11	138.16	157.29	147.73	98.98	92.37	95.68
	15/11	119.59	130.37	124.98	98.74	92.62	95.68
Relative rest	1/12	114.33	109.43	111.88	75.96	89.34	82.65
	15/12	103.70	94.58	99.14	61.19	65.67	63.43

The statistical analysis of table (7) showed that the concentration of Gibberellin inside the olive tree changed for both varieties from the beginning of the growing season to the end. It was found that Gibberellin increases clearly with the beginning of the decade and the formation of the embryo, and this is in agreement with (Rademacher, 2000) who confirmed that the plant produces Gibberellin By the fruit and seed embryo, it secretes it and moves in all directions to act on the target organ to be either an inhibitor or a tonic depending on the concentration of Gibberellin, the timing of the effect and the type of physiological process that affects it, it may be a stimulant for a revolution in a particular organ in the plant and an inhibitor for another function in another organ and its concentration increases after The nodes reach a high level, only to return to gradually diminish. In olives, for example, the concentration begins to decline after the hardening of the fruit core.

It is noticed that the concentration of Gibberellin in the two cultivars after reaching its peak in the period of hardening of the nucleus returns to gradually decrease according to the stage of growth, as it reached (ppm 213.21) in the middle of August. It was at the cultivar Daibili higher, going (ppm 274.64) in the same period. Its concentration does not exist in the plant even after the embryo stops excreting it because there remains a residual trace. It is clear that its attention changes continuously during the annual growth cycle of the plant, and this is what they showed (Al-Bamarny and Abdulrahman, 2018) when they concluded that Gibberellin is a necessary plant hormone in The plant is due to the success of various physiological processes and its

concentration changes in proportion to achieving balance with other hormones to contribute to the success of different growth stages.

After the decade, the concentration of Gibberellin began to increase dramatically, reaching its highest value in the stage of hardening of the nucleus and then stabilizing a period of time (about 10, 15 days) and then returning to decrease again to the end of the annual growth cycle of the olives, and this is in agreement with (Lenahan et al. ., 2006) which showed that the concentration of Gibberellin inside the plant changes during the stages of plant growth, where its concentration is low in the winter and results from the residual effect of the development of the past year, and the secretion begins after the decade from the fruit embryo and gradually increases until the stage of hardening of the kernel and reaches its peak and returns to its concentration after This is confirmed by the delay in reaping the fruits and the length of their survival on the tree after maturity, which leads to an increase in the residual effect of gibberellins on the plant in general and in the buds in particular, which causes a decrease in flowers in the following year.

If we conducted a comparison between the average concentration of Gibberellin in the two studied seasons for the two studied cultivars, we found that the concentration of Gibberellin in the Daibili cultivar is higher than the Sourani cultivar, as shown in Figure (10), and this is related to the genetic characteristics of each variety. We find that in the Daibli cultivar, there is a clear difference in concentration. Between one season and another at the same time, while we find that the concentration is almost equal between the two seasons of the study of the Sourani cultivar, and it can be concluded that one of the reasons causing the strict tolerance of the Daibili cultivar is the high concentration of Gibberellin which inhibits the syphilis differentiation.

We find from the table (7) that the level of Gibberellin in the 2018 season is the lowest, which allowed differentiating better and this reflected positively on production,

and this is in agreement with (Al-khattab, 2017) when he emphasized that one of the most important reasons for the failure of the syphilis differentiation in olives and the occurrence The resistance from year to year is Gibberellin secreted from the fruit embryo, as it inhibits the flowering differentiation and reduces the percentage of flower buds, hence the importance of the embryo sabotage and fruit thinning treatments to reduce its inhibitory effect and regulate the action of other plant hormones that contribute to the increase of flowering buds open.

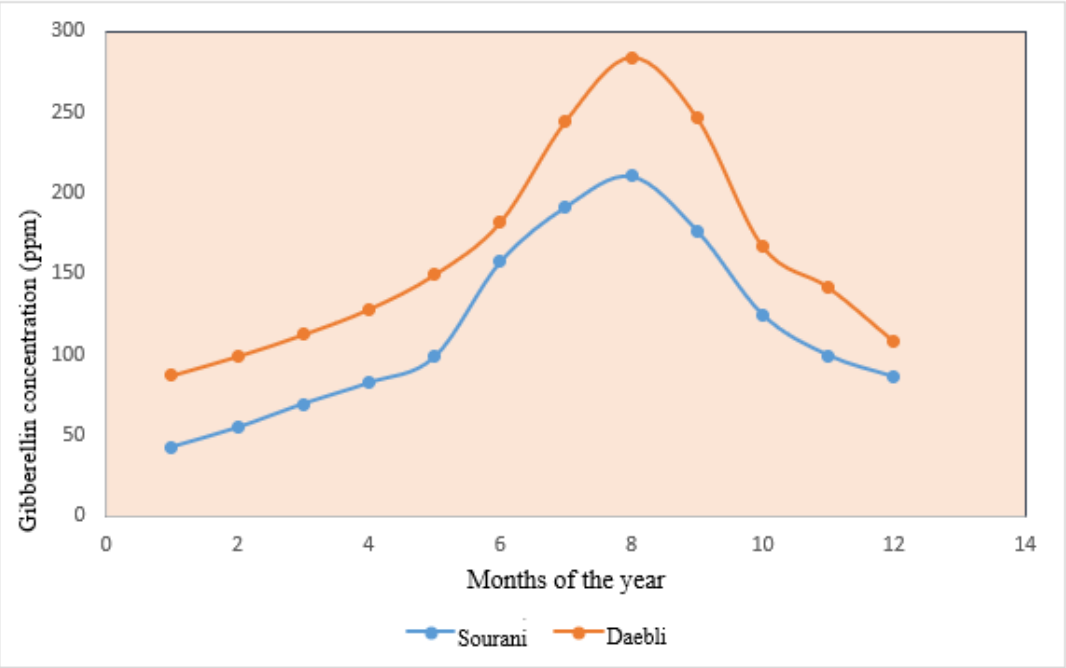

Figure (10): Gibberellin concentration in the Sourani and Daebli olive varieties for the (2017-2018) and (2018-2019) seasons.

The secreted Gibberellin moves from the fruit embryo in all directions slowly within the branch or the expulsion itself. It does not move from one branch to another as it is a polar compound and is characterized by its local effect on the target organ only. A cumulative increase in its concentration in the plant occurs. When it moves to the target organ, a hormonal and physiological imbalance occurs with the organ's function, and this is what happens in buds, inflorescences, and flowers (Domingos et al., 2016).

Conclusions

Through the findings in the research "Determining the level of the gibberellin hormone in the various annual growth stages of the trees of the Sourani and Daibili olive varieties and its role in the alternate bearing phenomenon," it was found that:

1- Gibberellin changes its concentration inside the olive tree and rises to its highest value during the kernel's hardening, gradually decreasing.

2- Delay in reaping fruits after ripening increases the concentration of remaining Gibberellin and reduces flowers in the following year.

3- The high concentration of Gibberellin in the Daibili cultivar made it more resistant to the Sourani cultivar, especially at the beginning of the nucleus's hardening, which confirms that the fruit embryo is the source of the increase of Gibberellin.

Recommendations

The fruit thinning procedure in the abundant bearing year in June alleviates the effect of Gibberellin produced by the fruits, thus reducing the alternate bearing.

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