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The Mechanism Of The Biological Reaction Of The Aba And The Marine Algae Extract And Its Effects On The Apparent Changes And Chemical Changes Of The Anise Plant

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Abstract: *This experiment was carried out during two winter successive season (2012-2013) , (2013-2014) at the Experimental Fields of the Field Crops Department , College of Agriculture , University of Baghdad , to study the mechanism of the Biological reaction of the spraying effects of three levels of ABA at (0 , 2.5 , 5) mg . L^{-1} with three levels of Marine Algae extract (0 , 2.5 , 5) ml .L^{-1} and its effects on the apparent changes and chemical changes of Anise Plant (PimpinellaanisumL.) , in a randomized complete block design with three replicatiopnsas a factorial experiment, Results indicated that treatment with GA_3 and Marine Algae extract was significantly increased values of all parameters measure . However , levels of 5 mg ABA . $L^{-1}$and 5 ml . L^{-1} extract showed highest values of : The plant hight98.76 , 105.30 cm, number of leaves 115.26 , 114.80 , number of branches 34.46 , 64.70 , wet weight 1019.50, 1178.00 g, dry weight 348.20 , 402.30g,Content of chlorophyll 77.60 , 80.50 mg , Content of carbohydrates 86.96 , 88.76% , Content of auxin88.20 , 90.00% , Content of gibberellin 118.00, 121.66% , Content of volatile oil 6.33 , 8.00% , Yield of volatile oil 66.03 , 97.12 L^{-1} .*

Key words: *Anise, ABA, Marine Algae Extract, Apparent Changes, Chemical Changes.*

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I. Introduction:

The Medical plants occupy a great position in present time especially in agricultural and industrial production, and takes a great care in most countries producing these plants for being the primary sourceof medicinal plant drugs which involved in drugs production whether as concentrations or essential effective materials or as primers of forming medicinal chemical compounds, that's why they considered one of the most important materials in drugs industries and its importance increased with increasing of invested funds and increasing of raw material consumed in drug industries . One of the factors that led to give great care for growing and investment of medical plants in the last period is the disappearance of the belief that medical plants be can be dispensed with as being a natural source in drugs industry and replaced by chemical effective materials , the disappearance of this belief due to the fact that that effective materials formed by factories will be of high purity , as well the manufactured medical materials have harmful side effects even if these effects didn't appear in the period of taking the drugs (7) and (14) . Anise plant *Pimpinellaanisum*is considered one of the most important pillars of medical and aromatic plantsthat belong to the Umbellifereae(tent) family which consists of more than 250 type of important medical crops scattered around the world which differ in their content of volatile oil in quality and quantity, the Anise plants importance due to its content of volatile oil including many turbine materials which vary depending on the difference in plants species and organs in quantity and quality , the main turbine compounds of the volatile oil in Anise plants ranging from 70-95% , the volatile oil resulting from the green herbs of flowering Anise plant differs from the oil resulting from the seeds of the same plant especially in the total and qualitative content , and the volatile oil extracted from the seeds entersin Manufacture of medicines for colic, convulsions and gastrointestinal cramps accompanied by severe pain, and may be added to some drugs like Asthma drugs and enters in sputum expulsion drugs as well as calming nerves drugs , it's also added to bad smell drugs to improve its fragrance properties and added also to make up and enters in food industries liquid and dry detergents , and in insecticides industry as the volatile oil of anise plants considered itself is an insecticide (4) and (14) , the hormone of Abscisic acidis classified as one of the most important plant inhibitors which affect plant growth , the plants and plant different organs vary in their response to Abscisic acid activity according to its concentration in its different tissue causing some biological mutations and chemical changes to these organs , and its noted that all plants differ in their response in flowering process according to the Abscisic acid activity and photovoltaic period length , so one group will be early in flowering and the other be late , another group will set few flowers whereas the other set no flowers

(vegetative) and this may due to Abscisic acid and its hormonal effect on other components or due to other treatments accompanying it and the combination of their effect together on plants which may affect in plant conversion from vegetative growth stage to flowering stage through food transformations pathways in three major interactions , the first one is the reverse hydrolysis of glucose asters and forming phaseic acid , and the other two interactions is forming the oxidized form of the compoundglucopyranoside – absscisyl - Hydroxy methyl both are ineffective compounds and formed through the compound dihydrophaseic with return of the full state (ABA) with or without water where supplying the plants with water will reduce the average of ABA in cells , and the mechanism of this hormone action and its effect on vegetative and flowery growth characters were still unknown and must be studied searching the fact of their pathways and biological activity and the accurate biological and chemical studies (2) and (3), algae extracts considered as organic products and used in stimulating plants growth in low concentrations as well containing small and large nutrients and growth promoting materials like Auxins , Gibberellins , Cytokines , vitamins , amino and organic acids and Auxins-like compounds activating and stimulating growth like alginic , laminarin , manitol , fukudan , pentosan- methyl and multi sugars , and contains also betaine which considered the source of nitrogen in low concentrations and osmosis regulator in high concentrations , so some researchers made studies to find out the effect of algae extracts on different crops and found that some changes occur on the plants treated with the extracts like delaying entry into old age and preventing the fall of leaves , flowers , seeds and crops , and also preventing yellowish . Till now the reasons behind this were effect not proved, whether the reason is the growth regulators into the extract or alginic acid,laminarin , manitol , fukudan , pentosan- methyl and when spraying plants with algae extracts led to improve the efficiency of metabolism in leaves by increasing the efficiency of photosynthesis and the positive effect on proteins conserving chlorophyll and preventing its resolving also promoting cell division and roots growth in order to increase the storage capacity in treated plants (1) and (2) .

This study concentrated on the following aims : comparing the effect of spraying with Abscisic acid with algae extracts and the reflection of efficiency and activity of each of them on regulating growth and flowering of vegetative parts forming flower buds later in Anise plants and fellow- up the apparent variations of vegetative and flowers growth and internal biochemical changes as a result of their response and effectiveness.

II. Materials and Methods:

A field experiment was conducted during the seasons 2012/2013 and 2013/2014 in the experimental field of College of Agriculture/ University of Baghdad in Abu-Ghraib to compare the effect of spraying Abscisic acid on the growth , production and oil content in Anise plants that refers to the specie *Pimpinellaanisum* L. , the randomized complete block design (RCBD) were used with three replications as a global experiment , the number of experimental units were 27 each unit included 5 lines with a distance of 2 × 3 (the distance between on line and the other 0.50m) and the number of plants in each unit were 40 plants with seeds rate of 10 Kg seeds.ha^{-1} (4) , the field was planted with seeds on 15/10 for the two seasons, field serving process continued as needed specially irrigation because anise is so sensitive to thirst , the soil was fertilized with nitrogen fertilizer in the form of urea as recommended as nitrogen source in two batches of 100 Kg N.ha^{-1} in each batch, the first batch was after a month and half from planting and the second batch after a month and half from the first batch , phosphate fertilizer was added (21% P Mono ammonium) as phosphorus source in one batch of 100 Kg P.ha^{-1} and the potassium fertilizer was added in the form of potassium sulfate (41.5%K) as potassium source in one batch of 60 Kg P.ha^{-1} , the two fertilizers were added during soil preparation the spraying was regulate with other different service processes , Abscisic acid were used with concentrations of 0,2.5,5 ml.lt^{-1} coded as A_0 , A_1 , A_2 , plants sprayed in the peak stage of vegetative activity (stage of 4-6 leaves) and spraying was repeated after 30 days (21) , algae extracts were used with concentrations of 0 , 2.5 , 5 ml.lt^{-1} coded as C_0 , C_1 , C_2 , the plants were sprayed with the extract after two weeks of the first spray with Abscisic acid and the second spray of extract will be with the emergence of 50% of floral buds , ten plants were selected randomly from the middle three lines of each treatment to study the following study indicators :

- Plant length (cm.plant^{-1}) : measured from the area of its contact with soil to the top of the highest peak of the ten plants from each treatment then measured its mean.
- Number of leaves (leaf.plant^{-1}) :the number of plant leaves for the ten plants in each treatment were counted then measured their mean.
- The number of sub- branches (branch.plant^{-1}) :the sub- branches for the ten plants of each treatment were counted then measured their mean.
- The soft weight (gm.plant^{-1}): the soft weight for the ten plants of each treatment was calculated at full maturity(when seeds turned from green to light brown) then measured its mean.
- The dry weight (gm.plant^{-1}): the wet weight for the ten plants of each treatment was calculated aerially until the weight is stable then measured its mean.
- The relative content of chlorophyll (mg.100g wet): estimated according to method (4).

- The percentage of total carbohydrates dissolved in leave (%): estimated according to the method described by (7).
- The leaves content of plant hormones (mg.kg.leaf tissue^{-1})estimated according to method (18).
- The leaves content ofvolatile oil (%): estimated according to what mentioned by (4).

III. Results and Discussion:

The results of table (1) showed that the plants sprayed with Abscisic acid was significantly affected as plants in treatment A_1(3mg.lt^{-1}) achieved the highest value in Anise plants length of 66.18 and 66.35 cm.plant^{1} for the two seasons of this study with significant difference from treatment A_2 (6 mg.lt^{-1}) which gave values of 54.76 and 54.86 cm.plant^{-1} for the two seasons and treatment A_0 (unsprayed with Abscisic acid) which gave values of 32.36 and 38.84 gm.plant^{-1} for the two seasons , the spraying treatments with algae extractsin the same table indicated that plants in treatment C_2 (5 ml.lt^{-1}) characterized by giving the highest values of plant length in Anise plant reached 76.58 and 79.57 cm.plant^{-1} for the two seasons with significant difference from treatment C_1 (2.5 ml.lt^{-1}) which gave values of 55.12 and 54.62 cm.plant^{-1} for the two seasons and treatment C_0 (unsprayed) gave values of 21.61 and 25.86 cm.plant^{-1} for the two seasons, and concerning the effect of interfered treatments between Abscisic acid and algae extracts the results showed significant increase in plant length of Anise plants from 15.30 and 20.16 cm.plant^{-1} in plants of treatment A_2C_0 which is spraying with6 mg.lt^{-1} of Abscisic acid and spraying with distilled water only to 98.76 and 105.30 cm.plant^{-1} in plants of treatment A_1C_2 of spraying with 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1} of algae extracts significantly increased than all other interference for the two seasons, this may due to aggregation and concentration of growth regulators such as cytokines and Auxins which helps plant rapid growth like indole acetic acid , petanin , indolepiotrick acid and their accumulation in the tissue of plant different organs as well as the fact that the extract is very rich with small and large nutrients and with their role together may overcome the dominance and control degree of Abscisic acid , and their efforts were merged for the prevention and inhibition of enzyme activity which analyze and crush Auxins and Gibberellins biologically , and that reflects on promoting the elongation of new cells from the cell division reflecting in general on the strength of plants general vegetative growth , including this character (6), (7) and (8).

Its noted also from the results of table (1) the significant effect of plants treated with Abscisic acid in the number of leaves in Anise plant, the plants in treatment A_1 (3mg.lt^{-1}) gave higher values in the number of leaves reached 74.20 and 80.76leaf.plant^{-1} for the two seasons followed by plants of treatment A_2 (6 mg.lt^{-1}) in which plants gave values of 60.50 and 69.50 leaf.plant^{-1}for the two seasons in comparison with the unsprayed plants with it which gave values of 46.94 and 60.97 leaf.plant^{-1} for the two seasons, and the results of table (1) indicted the motivational behavior of algae extracts in affecting this character and the effect increased with increasing the levels of used concentration until reaching the concentration (5ml.lt^{-1}) in which plants gave values of 87.47 and 95.32 leaf.plant^{-1} for the two seasons which significantly differ from the treatment C_1 (2.5ml.lt^{-1}) which gave values of 61.83 and 74.92 leaf.plant^{-1} for the two seasons, and treatment C_0 (unsprayed) in giving values of 32.33 and 41.00 leaf.plant^{-1} for the two seasons, and concerning the effect of interference treatments between Abscisic acid and algae extracts the results showed significant differences in number of leaves in Anise plants from 25.16 and 30.80 leaf.plant^{-1} in plants of treatment A_2C_0 of spraying 6 mg.lt^{-1}Abscisic acid with spraying distilled water only to 115.26 and 114.80 leaf.plant^{-1} in plants of treatment A_1C_2 of spraying 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1} algae extracts was significantly exceeded than all other interventions for the two seasons , this may due to the presence of Auxins in the extract which increases the speed of cell division and renewing it in the tissue cells of leaf base and stopping the analytical enzymes activity on cell walls , in addition to that most upscale plants sprayed with algae extracts achieved multiple growth and increasing in stalks elongation , number , and leaves area, and were able to get rid from Abscisic acid by removing, dissolving and losing its prevention effect because of the extract high content of growth steroids and catalysts like algenek acid, lymarinine, manitol, fukudan, pentosan methyl and natural organic materials which improved the soil characteristics through increasing its interchangeable capacity and increasing the number of active bacteria on soil which improves absorption efficiency and improving the efficiency of metabolism in leaves through increasing the efficiency of photosynthesis during spraying algae extracts on plants (2) and (8) and (9).

The results of table (1) indicated also that treatment of spraying with Abscisic acid exceeded significantly in its effect on the number of sub-branches in Anise plants, as plants if treatment A_1 (3mg.lt^{1}) showed values of 33.93 and 44.88 branch.plant^{-1} for the two seasons which weren't far from plants of treatment A_2 (6 mg.lt^{-1}) which gave values of 34.62 and 37.01 branch.plant^{1} for the two seasons of study and the unsprayed treatment which gave values of 32.92 and 31.42 branch.plant^{-1} for the two seasons, the results showed also the response of plants sprayed with algae extracts and achieved the highest number of sub – branches in Anise plants coinciding with increasing the levels of concentrations used up to the concentration of (5 ml.lt^{1}) which its plants gave values of 40.76 and 52.10 branch.plant^{-1} for the two seasons followed by plants in treatment C_1 (2.5 ml.lt^{-1}) which gave values of 39.93 and 40.53 branch.plant^{-1} for the two seasons of study, and

treatment C_0 (unsprayed) in giving values of 20.77 and 20.68 branch.plant^{-1} for the two seasons, and concerning the effect of interference treatments between Abscisic acid and algae extracts the results showed significant differences in number of branches in Anise plants from 12.86 and 14.64 branch.plant^{-1} in plants of treatment A_2C_0 of spraying 6 mg.lt^{-1}Abscisic acid with spraying by distilled water only to 34.46 and 64.70 branch.plant^{-1} in plants of treatment A_1C_1 of spraying with 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1} algae extracts exceeded significantly than all other interference for the two seasons, and this may due to the cancellation and removal of the effect resulting on growth by algae extracts of added Abscisic acid , minimizing its impact and controlling its biological impact on preventing growth through working on increasing the growth of lateral buds (biological activity centers) and converting its branches into vegetative growths (2) and (11) and (16) and as mentioned before preventing the activity of the enzyme that analysis and breaks Auxins and Gibberellins or biologically inhibiting it reflecting on promoting elongation of new cells from cell division as buds stimulation due to the sovereignty which in its turn due to the effectiveness of acetic acid indole formed in peripheral peaks of plants transforming to lateral buds which reflects in turn on the number of branches.

Table (1) plant height (cm.plant^{-1}) , number of leaves (leaf.plant^{-1}) and number of sub-branches (branch.plant^{1}) affected by Abscisic acid concentrations gm.lt^{1} and concentrations of algae extracts (ml.lt^{-1})

Affective factors	Studied characters					
	Plant height		Number of leaves		Number of sub-branches	
	M1	M2	M1	M2	M1	M2
A_0	**32.36**	**38.84**	**46.94**	**60.97**	**32.92**	**31.42**
A_1	**66.18**	**66.35**	**74.20**	**80.76**	**33.93**	**44.88**
A_2	**54.76**	**54.86**	**60.50**	**69.50**	**34.62**	**37.01**
L.S.D 5%	**6.99**	**5.05**	**7.12**	**15.37**	**10.93**	**5.43**
C_0	**21.61**	**25.86**	**32.33**	**41.00**	**20.77**	**20.68**
C_1	**55.12**	**54.62**	**61.83**	**74.92**	**39.93**	**40.53**
C_2	**76.58**	**79.57**	**87.47**	**95.32**	**40.76**	**52.10**
L.S.D 5%	**6.99**	**5.05**	**7.12**	**15.37**	**10.93**	**5.43**
A_0C_0	**26.86**	**33.60**	**38.90**	**51.23**	**27.63**	**25.50**
A_0C_1	**30.06**	**37.96**	**47.60**	**61.63**	**33.73**	**31.76**
A_0C_2	**40.16**	**44.96**	**54.33**	**70.07**	**37.40**	**37.00**
A_1C_0	**22.66**	**23.83**	**32.93**	**40.97**	**21.83**	**22.10**
A_1C_1	**77.13**	**69.93**	**74.40**	**86.53**	**45.50**	**47.86**
A_1C_2	**98.76**	**105.30**	**115.26**	**114.80**	**34.46**	**64.70**
A_2C_0	**15.30**	**20.16**	**25.16**	**30.80**	**12.86**	**14.46**
A_2C_1	**58.16**	**55.96**	**63.50**	**76.60**	**40.56**	**41.96**
A_2C_2	**90.83**	**88.46**	**92.83**	**101.10**	**50.43**	**54.60**
L.S.D 5%	**12.12**	**8.76**	**12.34**	**26.63**	**18.94**	**9.41**

The results of table (2) indicated that plants sprayed with Abscisic acid significantly affected and plants in treatment A_1 (3 mg.lt^{-1}) gave highest values of soft weight in Anise plants of 606.41 and 653.34 gm.plant^{-1} for the two seasons with significant difference from treatment A_2 (6 mg.lt^{-1}) which gave values of 452.88 and 476.76 gm.plant^{-1} for the two seasons and treatment A_0 (unsprayed) which gave values of 232.09 and 240.76 gm.plant^{-1} for the two seasons, the treatments of spraying with algae extracts in the same table indicated also that plants in treatment C_2 (5 ml.lt^{-1}) gave the highest values of soft weight in Anise plants of 740.08 and 797.93 gm.plant^{-1} for the two seasons with significant difference from treatment C_1 (2.5 ml.lt^{-1}) which gave values of 480.81 and 462.18 gm.plant^{-1}) for the two seasons and treatment C_0 (unsprayed) in giving values of 70.49 and 110.74 gm.plant^{-1} for the two seasons , and concerning the effect of interfered treatments betweenAbscisic acid and algae extracts the results showed significant increase of soft weight in Anise plants from 38.23 and 62.30 gm.plant^{-1} in plants of treatment A_2C_0 which is spraying with 6 mg.lt^{-1}Abscisic acid and spraying with distilled water only to 1019.50 and 1178.00 gm.plant^{-1} in plants of treatment A_1C_2 which is spraying with 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1} algae extracts exceeded significantly on all other interferences for the two seasons, in spite of the effect of Abscisic acid in the obstruction of vegetative growth and causes latent in the peripheral buds and delay in the flowering process when stillness is over but the efficiency of Abscisic acid did not focus the hormone content in algae extracts which have a role in transforming plants from vegetative growth phase to flowering phase , and as mentioned by (2) and (12) and (17) the effect of Abscisic acid and growth preventing activity can be removed by using of small and large nutrients and growth promoting materials like Auxins , Gibberellins ,Cytokines , vitamins , amino and organic acids and Auxins –like compounds activating and stimulating growth like alginic , laminarin , manitol , fukudan , pentosan- methyl and other multi sugars and all these together in algae extracts depends on the place of interaction, the plant organ and the environment which reflects positively on this character.

The results of table (2) indicates the significant role of spraying treatments with Abscisic acid in affecting dry weight character in Anise plants as plants of treatment A_1 (3 mg.lt^{-1}) exceeded in giving values of dry weight reached 166.22 and 186.08 gm.plant^{-1} for the two seasons on plants of treatment A_2 (6mg.lt^{-1}) which

gave values of 104.66 and 109.56 gm.plant^{-1} for the two seasons and the plants in the unsprayed treatment which gave values of 54.78 and 50.89 gm.plant^{-1}, and it was noted from the same table the significant increase in Anise plants dry weight in treatments of spraying with algae extracts towards increasing the levels of used concentrations as plants in treatment C_2 (5 ml.lt^{-1}) gave the highest values of 210.80 and 229.23 gm.plant^{-1} for the two seasons compared with the unsprayed treatments with the extracts (sprayed with distilled water only) which plants gave the lowest values of 23.51 and 20.53 gm.plant^{-1} and concerning the internal effect between Abscisic acid and algae extracts the results showed significant differences in dry weight of Anise plants from 10.47 and 9.87 gm.plant^{-1} in plants of treatment A_2C_0 of spraying with 6 mg.lt^{-1}Abscisic acid with spraying distilled water only to 348.20 and 402.30 gm.plant^{-1} in plants of treatment A_1C_2 of spraying 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1} algae extracts exceeding by that significantly on all other interferences for the two seasons, this may due to the biological activating effect of the extract as mentioned before which affected the activity of Abscisic acid and inhibition of its effect and the extract role in encouraging the establishment of proteins, amino acids and enzymes , all those together considered the effective player in the progress of metabolism processes in plants (4) , including its effect on this character, as well as the extract same behavior that exceeded in growth indicators studied before including the dry weight character which affected later in turn the character of dry weight (2) , (4) , (21) and (24).

Table 2 indicated also the significant effect of plants treated with Abscisic acid in determining chlorophyll level in Anise plant leaves as plants in treatment A_1(3mg.lt^{-1}) gave the highest average of 57.85 and 56.79 mg.gm.leaf tisuue^{-1} for the two seasons followed by plants of treatment A_2 (6mg.lt^{-1}) which gave average of 49.93 and 50.11 mg.gm.leaf tissue^{-1} for the two seasons followed by unsprayed treatment with Abscisic acid which gave lowest average of 45.15 and 39.48 mg.gm.leaf tissue^{-1} for the two seasons , and the study indicated also Anise plants response to spray with algae extracts and the reflection of this effect on the relative content of chlorophyll in Anise plants leaves as the plants treated by spraying with the extract in concentration of (5 ml.lt^{-1}) gave the highest values of 65.78 and 65.98 mg.gm.leaf tissue^{-1} for the two seasons and the plants treated by spraying with the extract in concentration of (2.5 ml.lt^{-1}) were not so far and gave values of 55.33 and 51.97 mg.gm.leaf tissue^{-1} for the two seasons and differed significantly from plants in unsprayed treatment with extract (sprayed with distilled water only) which gave lowest values of 31.81 and 28.61 mg.gm.leaf tissue^{-1}, and the results showed also significant increase in the relative content of chlorophyll in Anise plants leaves between interference treatments from 23.33 an 23.46 mg.gm.leaf tissue^{-1} in plants of treatment A_2C_0 spraying with 6 mg.lt^{-1}Abscisic acid and spraying with distilled water only to 77.60 and 80.50 mg.gm.leaf tissue^{-1} in plants of treatment A_1C_2 which is spraying with 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1}algae extracts, this may be explained to growth activating effect and the forming of algae extracts especially Auxins and Gibberellins hormones through stimulating their inner establishment which in turn reflected on encouraging growth , development, morphological mutation and chemical change including chlorophyll concentration (4) , (15) and (19).

Table (2) soft weight (gm.plant^{-1}) ,dry weight (gm.plant^{-1}) and relative content of chlorophyll in leaves (gm.mg.leaf tissue^{-1}) affected by Abscisic acid concentrations gm.lt^{1} and concentrations of algae extracts (ml.lt^{-1})

Affecting factors	Studied characters					
	Soft weight		Dry weight		relative content of chlorophyll in leaves	
	M1	M2	M1	M2	M1	M2
A_0	**232.09**	**240.76**	**54.78**	**50.89**	**45.15**	**39.48**
A_1	**606.41**	**653.34**	**166.22**	**186.08**	**57.85**	**56.97**
A_2	**452.88**	**476.76**	**104.66**	**109.56**	**49.93**	**50.11**
L.S.D 5%	**79.78**	**91.43**	**50.58**	**55.51**	**5.48**	**3.83**
C_0	**70.49**	**110.74**	**23.51**	**20.53**	**31.81**	**28.61**
C_1	**480.81**	**462.18**	**91.34**	**96.76**	**55.33**	**51.97**
C_2	**740.08**	**797.93**	**210.80**	**229.23**	**65.78**	**65.98**
L.S.D 5%	**79.78**	**91.43**	**50.58**	**55.51**	**5.48**	**3.83**
A_0C_0	**103.13**	**163.60**	**36.23**	**32.13**	**38.83**	**33.80**
A_0C_1	**239.63**	**234.30**	**60.20**	**52.13**	**45.30**	**38.26**
A_0C_2	**353.50**	**324.37**	**67.90**	**68.40**	**51.33**	**46.40**
A_1C_0	**70.10**	**106.33**	**23.83**	**19.60**	**33.28**	**28.56**
A_1C_1	**729.63**	**675.70**	**126.63**	**136.33**	**62.66**	**61.86**
A_1C_2	**1019.50**	**1178.00**	**348.20**	**402.30**	**77.60**	**80.50**
A_2C_0	**38.23**	**62.30**	**10.47**	**9.87**	**23.33**	**23.46**
A_2C_1	**473.17**	**476.53**	**87.20**	**101.80**	**58.03**	**55.80**
A_2C_2	**847.23**	**891.43**	**216.30**	**217.00**	**68.43**	**71.06**
L.S.D 5%	**138.19**	**158.37**	**87.60**	**96.15**	**9.49**	**6.64**

The results of table (3) indicated the significant response of plants treated with Abscisic acid through its effect in determining leaves content of carbohydrates as plants in treatment A_1 (3 mg.lt^{-1}) gave the highest

average in this character of 63.68 and 63.11% for the two seasons followed by plants of treatment A_2 (6 mg.lt^{-1}) which gave average of 54.11 and 53.94 % for the two seasons followed by plants of the unsprayed treatment with Abscisic acid which gave lowest average of 49.53 and 46.43% for the two seasons, and the results indicted also the response of Anise plants for spraying with algae extracts and the reflection of this effect on leaves content of carbohydrates in Anise plant that the plants in treatments sprayed with the extract in concentration of (5 ml.lt^{-1}) gave the highest values of 74.40 and 73.21% for the two seasons and plants in the treatment of spraying with the extract in concentration (5 ml.lt^{-1}) were not so far in giving values of 61.16 and 59.33% for the two seasons and differ significantly from plants of unsprayed treatment with the extract (sprayed with distilled water only) which gave the lowest value of 31.76 and 30.94% , the results indicated also significant increase in the relative content of chlorophyll in plant leaves between the interference treatments from 20.96 and 24.00% in plants of treatment $A_2C_0$of spraying with (6mg.lt^{-1}) Abscisic acid and spraying with distilled water only to 86.96 and 88.76% in plants of treatment A_1C_2 of spraying with (3 mg.lt^{-1}) Abscisic acid with (5 ml.lt^{-1}) algae extracts , this explains the extract role in synthesizing the protein and nucleic acids through the activity of enzymes specialized in their synthesis as mentioned before which will result in increasing the organic content as a result of encouraging carbonation including the carbohydrate products (14) and (19).

The results in table (3) indicated also significant differences between treatments of spraying with Abscisic acid in the percentage of Auxins like materials in the leaves of Anise plants , as treatment A_1 (3mg.lt^{-1}) exceeded in giving the highest values of Auxins like materials percentage in leaves reached 59.20 and 63.24% for the two seasons compared with the plants in treatment A_2 (6 mg.lt^{-1}) which gave highest Auxins like materials percentage in leaves of 50.66 and 56.25, and unsprayed plants which gave values of 38.85 and 44.13% in leaves, the results showed that the extracts have a significant effect in this character as the concentration 5 ml.lt^{-1} ofalgae extracts gave the highest value of Auxins like materials percentage in leaves of 71.74 and 73.71% for the two seasons followed by treatment C_1(2.5 ml.lt^{-1}) which gave values of 51.38 and 57.26% for the two seasons and differed significantly from treatment of unsprayed plants which gave values of 25.58 and 32.65% , and concerning the interference between Abscisic acid and algae extracts the results showed significant increase in Auxins like materials percentage of leaves in Anise plants from 18.90 and 28.26% in plants of treatment A_2C_0 spraying with 6mg.lt^{-1}Abscisic acid with spraying by distilled water only to 88.20 and 90.00% in plants of treatment A_1C_2 spraying with 3mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1}algae extracts , this may be interpreted as losing Abscisic acid its activity when adding other hormones which have the same contractive effect including the hormones available in algae extracts characterized by their biological Auxins activity and the hormonal effectiveness on plants and their inner effect through increasing Auxins supply , controlling Abscisic acid activity and preventing its effect and this was confirmed by (2) , (14) and (19).

The results in table (3) showed also significant differences between treatments of spraying with Abscisic acid in Gibberellins like materials percentage in Anise plants leaves, as treatment A_1 (3 mg.lt^{-1}) was exceeded in giving the highest value in Gibberellins like materials percentage in leaved of 78.75 and 82.20% for the two seasons compared with the plants in treatment A_2 (6 mg.lt^{-1}) which gave values of Gibberellins like materials percentage in leaves of 63.70 and 67.62 , the results showed that the extract have a significant effect in this character as the concentration 5 ml.lt^{-1}algae extracts gave the highest value in Gibberellins like materials percentage in leaves of 91.92 and 97.51% for the two seasons followed by plants of treatment C_1 (2.5 ml.lt^{-1}) which gave values of Gibberellins like materials percentage in leaves reached 69.03 and 73.34% for the two seasons and differed significantly from unsprayed plants which gave values of 37.14 and 39.64% , whereas the effect of interference between Abscisic acid and algae extracts the results showed significant increase in Gibberellins like materials percentage in Anise plant leaves from 23.33 and 26.53% in plants of treatment A_2C_0 spraying with 6 mg.lt^{1}Abscisic acid and spraying with distilled water only to 118.00 and 121.66% in plants of treatment A_1C_2 spraying with 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1}algae extracts, this may due to the hormonal stimulators existing in algae extracts which activate the cells forming plant organs tissue and which have the high capability of forming and producing active Gibberellins or have the ability in transforming of Gibberellins from inactive case to active and biologically free (7) , (19) and (20).

Table (3) Leaves content of chlorophyll (%) ,Auxins like materials (%) and Gibberellins like materials (%) affected by Abscisic acid concentrations (gm.lt^{-1}) and algae extracts (ml.lt^{-1})

Affecting factors	Studied characters					
	Leaves content of chlorophyll		Auxins like materials		Gibberellins like materials	
	M1	M2	M1	M2	M1	M2
A_0	**49.53**	**46.43**	**38.85**	**44.13**	**55.64**	**60.67**
A_1	**63.68**	**63.11**	**59.20**	**63.24**	**78.75**	**82.20**
A_2	**54.11**	**53.94**	**50.66**	**56.25**	**63.70**	**67.62**
L.S.D 5%	**5.61**	**7.75**	**5.07**	**6.32**	**10.12**	**9.56**
C_0	**31.76**	**30.94**	**25.58**	**32.65**	**37.14**	**39.64**
C_1	**61.16**	**59.33**	**51.38**	**57.26**	**69.03**	**73.34**
C_2	**74.40**	**73.21**	**71.74**	**73.71**	**91.92**	**97.51**

L.S.D 5%	**5.61**	**7.75**	**5.07**	**6.32**	**10.12**	**9.56**
A_0C_0	**41.83**	**38.36**	**30.33**	**37.16**	**50.00**	**53.10**
A_0C_1	**49.00**	**46.90**	**38.76**	**45.80**	**54.60**	**61.40**
A_0C_2	**57.76**	**54.03**	**47.46**	**49.43**	**62.33**	**67.53**
A_1C_0	**32.50**	**30.46**	**27.53**	**32.53**	**38.10**	**39.30**
A_1C_1	**71.60**	**70.10**	**61.86**	**67.20**	**80.16**	**85.63**
A_1C_2	**86.96**	**88.76**	**88.20**	**90.00**	**118.00**	**121.66**
A_2C_0	**20.96**	**24.00**	**18.90**	**28.26**	**23.33**	**26.53**
A_2C_1	**62.90**	**61.00**	**53.53**	**58.80**	**72.33**	**73.00**
A_2C_2	**78.46**	**76.83**	**79.56**	**81.70**	**95.43**	**103.33**
L.S.D 5%	**9.73**	**13.43**	**8.78**	**10.95**	**17.53**	**16.57**

The results in table (4) indicated also significant differences between treatments of spraying with Abscisic acidin seeds content of volatile oil in Anise plants, as plants in treatmentA_1 (3mg.lt^{-1}) exceeded in giving the highest value of volatile oil percentage reached 4.31 and 5.37% for the two seasons compared with plants in treatment A_2 (6 mg.lt^{-1}) which gave value in volatile oil percentage of 3.58 and 4.6%, the results indicated the significant effect of this character as the concentration of 5 ml.lt^{-1}algae extracts gave the highest value in volatile oil percentage of 5.15 and 6.36% for the two seasons , followed by plants of treatment C_1 (2.5 ml.lt^{-1}) which gave values of 3.96 and 4.86% for the two seasons and differed significantly from unsprayed plants which gave values of 1.66 and 2.09%, as for the interference effect between Abscisic acid and algae extracts the results showed significant difference in volatile oil percentage from 1.03 and 1.38% in plants of treatment A_2C_0 spraying with 6 mg.lt^{-1}Abscisic acid and spraying with distilled water only to 6.33 and 8.00 % in plants of treatment A_1C_2 spraying with 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1}algae extracts, this may interpreted as Auxins as known and mentioned before work on encouraging some biologically complex components and important in building new cells walls resulted from continuous division of adult mothers cells and encouraging different photosynthesis and metabolism operations, also forming and producing the nucleic acids such as RNA which later focus on the biological and chemical operations and their products including the volatile oil and restricting the inhibitory effect of Abscisic acid and its different activities (2), (22), (23) and (24).

The results in table (4) also indicated significant differences between treatments of spraying with Abscisic acid in volatile oil percentage values in Anise plants, the plants of treatment A_1 exceeded in giving the highest value of volatile oil percentage reached 34.73 and 47.05 lt.ha^{-1} for the two seasons compared with plants of treatment A_2 (6 mg.lt^{-1}) which gave values in volatile oil of 22.87 and 29.03 lt.ha^{-1}, the results, the results indicated the significant effect of the extracts in this character as the concentration 5 ml.lt^{-1}algae extracts gave the highest value in volatile oil percentage of 42.24 and 58.92 lt.ha^{-1}for the two seasons followed by treatment C_1(2.5 ml.lt^{-1}) which gave values in volatile oil of 21.02 and 24.95 lt.ha^{-1} for the two seasons and differed significantly from unsprayed plants which gave values of 1,28 and 2.43 lt.ha^{-1}, as for the interference effect between Abscisic acid and algae extracts , the results showed significant increase in volatile oil yield from 0.35 to 0.82 lt.ha^{-1} in plants of treatment A_2C_0 spraying with 6 mg.lt^{-1}Abscisic acid and spraying with distilled water only to 66.03 and 97.12 lt.ha^{-1} in plants of treatment A_1C_2 spraying with 3 mg.lt^{-1}Abscisic acid with 5 ml.lt^{-1}algae extracts, and this may due to the biologically activating effect of the extract as mentioned before which situated on Abscisic acideffectiveness and inhibition of its effect and the role of the extract in encouraging the building of proteins, nucleic acids and enzymes through photosynthesis and metabolism processes of plant, including affecting the pathway of this character as well as the superior behavior of the extract in studied growth indicators mentioned before including volatile oil percentage character (21)m(22),(23) and (24).

Table (4) the volatile oil percentage (%) and volatile oil yield (%) affected by Abscisic acid concentrations gm.lt^{1} and algae extracts (ml.lt^{-1}).

Affecting factors	Studied characters			
	volatile oil percentage		volatile oil yield	
	M1	**M2**	**M1**	**M2**
A_0	**49.53**	**46.43**	**38.85**	**44.13**
A_1	**63.68**	**63.11**	**59.20**	**63.24**
A_2	**54.11**	**53.94**	**50.66**	**56.25**
L.S.D 5%	**5.61**	**7.75**	**5.07**	**6.32**
C_0	**31.76**	**30.94**	**25.58**	**32.65**
C_1	**61.16**	**59.33**	**51.38**	**57.26**
C_2	**74.40**	**73.21**	**71.74**	**73.71**
L.S.D 5%	**5.61**	**7.75**	**5.07**	**6.32**
A_0C_0	**41.83**	**38.36**	**30.33**	**37.16**
A_0C_1	**49.00**	**46.90**	**38.76**	**45.80**
A_0C_2	**57.76**	**54.03**	**47.46**	**49.43**
A_1C_0	**32.50**	**30.46**	**27.53**	**32.53**
A_1C_1	**71.60**	**70.10**	**61.86**	**67.20**
A_1C_2	**86.96**	**88.76**	**88.20**	**90.00**

A_2C_0	**20.96**	**24.00**	**18.90**	**28.26**
A_2C_1	**62.90**	**61.00**	**53.53**	**58.80**
A_2C_2	**78.46**	**76.83**	**79.56**	**81.70**
L.S.D 5%	**9.73**	**13.43**	**8.78**	**10.95**

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