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Effect of the period of soaking and concentrations of salicylic acid in the growth and production of iris

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Abstract: *A study to investigate the effect of socking Iris hollandica bulbs in Salicylic acid(SA) on the growth and flowering was conducted at a the plastic houses of the Department of Horticulture and Garden Engineering / college of Agriculture / University of Baghdad at the site of Jadiriya during the fall season of 2016. The bulbs were socked in SA at concentrations of 50, 100, 200 mg/L for three periods: 1, 2, and 3 hours, for the control treatment, bulbs were socked in distilled water only. The results can be summarized as following: Plants that their bulbs were soaked in SA at concentration of 200mg.L^{-1} for 4 hours were superior in vegetative traits i.e. plant height (78.90 cm), number of leaves (8.25 leaves.$plant^{-1}$), chlorophyll content in the leaves (66.92 mg.100g $^{-1}$ fresh weight), number of branches (2.42 branches. $plant^{-1}$), fresh and dry weight (82.77 ، 58.16 g) respectively. Flower growth traits were clearly affected by the treatments, as they were, number of flowers (2.92 flower.$plant^{-1}$), flower diameter (10.99 cm), flower pedicel length (48.21 cm) flowering time (100.00 days), duration of plant flowering (8.25 days), and vase life (8.42 days). The effects of interaction between treatments, Salicylic acid and period of soaking were significant in improving all vegetative and flowering traits.*

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I. Introduction

Iris hollandica belongs to the Iridaceae family. The genus Iris includes around 200 species some of them are annual and the others are perennial. Some of these species are summer plants and others are winter plants. These species originated in the Mediterranean basin and adjacent areas, and in the Central Europe region up to Japan(AL sultan et al ,1992).

Plant growth regulators are organic compounds synthesized naturally or artificially that cause changes in plant growth and development when applied at some stages of plant growth, either as stimulators or inhibitors. They have been known for their ability to control the physiological and biochemical processes during the primary and secondary metabolism (Heldet et al, 1997).

There are several methods to treat ornamental plants, including bulbs with growth regulators, but the most common ones are either spraying plants or soaking the bulbs for a specific period before planting. Responding plant for any of these depends upon some factors, the most important ones are the way in which the plants absorb the growth regulator and the environmental conditions around the plants. The method of soaking flowering bulbs before planting is used to break the dormancy phase that most bulbs pass by (Sajjad, 2017). Studies proved that the possibility of enhancing plant growth, increasing the flower number and improve their quality as a result of soaking the bulbs in growth regulators prior to plant them. Padmatha (2013) clarified that soaking Gladiolus corms, varieties Darshan and Dhiraj in 2% Thiourea, 150 ppm Salicylic acid, 150 ppm GA, or 15% Potassium, for 12 or 42 hours led to an increase in the percentage of the corm germination and the number of buds per a corm, and also increased the corm size and the number of corms produced by plants. The researchers added that soaking the bulbs for 24 hours was better than 12 hours in plant response, and the variety Dhiraj was more responded than the variety Darshan. Padmatha (2014) referred to soaked Gladiolus corms in 2 % Thiorea was more affected than other materials and concentrations mentioned above in increasing vegetative growth, flowering corm number and the number of florets per panicle and shortening the period preceding the flowering. Sajjad (2015) explained that when soaking Gladiolus corms in GA3, BA, or Etherel at the concentrations of 0, 50, 100, and 200 ppm, 100 ppm GA3 increased the plant height noticeably to become 105 cm rather than 97.6 cm at the control treatment plants, the percentage of flowering corm panicle length, and corm weight also increased to 84.67 %, 40.03 cm, and 68.3 g respectively. He also revealed that soaking the corms in BA increased the growing buds at (2.14) and lowered the plant height at (87.0 cm), while the treatment of 50 ppm Etherel was the best in increasing the pedicel length at (42.14 cm). Taha (2012) mentioned that when spraying iris plants with concentrations 0, 250, 500, and 750 ppm of GA3, 0, 250, 500, and 1000 ppm of Cycocel, or 0, 125, 250, and 500 ppm of Alar, the 750 ppm AG3 treatment was were the best that led to early

flowering and an increase in the plant height, while the treatments of 1000 ppm CCC, and 500 ppm Alar were the most effective in shortening the pedicel length, delaying the flowering date; and increasing each of the panicle fresh and dry weight, number of formed corms, bulb content of carbohydrates and leaf content of chlorophyll. Krug (2006) found that soaking Narcissus corms in the concentrations of 10, 20, 25, 30, and 40 mg/l Frurimidol for 10 min causes shortening plants. Currey (2010) concluded that soaking *Liliumlongiflorum* bulbs in Pacloubulmzolat the concentrations of 0, 30, 60, and 120 mg/l for 15 min resulted in early flowering and short plants, the two concentrations 30 and 60 mg/l were the most effective in these two traits.

The response of flowering bulbs toward soaking in growth regulators varies according to the period of soaking, It is necessary to determine the appropriate period of time, especially increasing the period of soaking may lead to rot of the bulbs after planting. Kruy (2014) confirmed that soaking hyacinth bulbs in growth regulators for 20 minutes was the best period among others (1, 5, 10, and 40 minutes) whereas, soaking the bulbs of Tulip, Narcissus, and Dahlia for 10 minutes gave the best results. The researchers showed that the soaking solution temperature was dramatically affected the response to the growth regulators. To determine the suitable degree between the low degree 46F and the high degree 89F, they found that the best results of hyacinth plant height were obtained when soaking the bulbs in Pacloubulmzol or Frurimidol solution at temperature 60-75 F. They added that the best period for soaking Freesia corms was 60 minutes. The study aimed to know the effect of the periods of soaking iris bulbs in different concentrations of salicylic acid on growth, flowering and bulb formation of the iris plant.

II. Materials and methods

The study was conducted at one of the plastic houses of the Department of Horticulture and Garden Engineering / College of Agriculture / University of Baghdad at the site of Jadiriya during the fall season of 2016. The soil of the plastic house was prepared by plowing, loosening and leveling. The bulbs of Iris plants were soaked in the growth regulator, Salicylic acid, at concentrations of 0, 50, 100, and 100 mg. L^{-1} for different periods (0, 1, 2, and 4 hr.) prior to planting, while, the bulbs of control treatment were soaked in water for the same periods. Soil samples were taken and sent to the labs of department of Soil and Water Sciences of the college of Agriculture – University of Baghdad to determine their physical and chemical characteristics. Table (1) shows some physical and chemical characteristics of the planting soil.

The soil of plastic house was divided into terraces of 1m width stretched along the plastic house. Tow tubes were installed on each terrace with a distance of 40cm between each and they contained holes, distanced by 30 cm, to be used for drip irrigation. The bulbs of *Iris hollandica*, produced by Dekee the Dutch company, were obtained from one of agriculture bureaus where they were imported and provided. The bulbs were taken out from all concentrations of the solutions that has been soaked in, left to dry for an hour and then planted in lines at a depth of 3-4 cm. with the distances of 30cm between bulbs and 40 cm between lines, each bulb was planted next to the same hole location of the tubes to ensure obtaining enough amount of water. Having bulbs emerged and 2-4 pairs of leaves formed, the field processes such as weeding, fertilization etc. were done. The plants were fertilized by the foliar fertilizer Terra-Sorb Complex, produced by an Italian company, at concentration of $2ml.L^{-1}$ once every two weeks throughout the research period. The fertilizer was applied as spray using 20ml sprayer after mixing it with liquid soap. Table (2) explains the fertilizer composition.

A factorial experiment using Randomized Complete Block Design (RCBD) with three replicates was conducted. Four plant were taken from each terrace to represent a replicate. The Less Significant Difference (LSD) test at the probability level of 0.05 was used to compare among means.

Data that included vegetative traits growth were recorded at the stage of initiating flower buds, while the traits of flower growth were taken through the period extended from initiating flower buds till the end of flowering stage.

Table (1) some physical and chemical characteristics of the planting soil

Characteristics	Measuring unit	Value
Ec	$ds.m^{-1}$	2.1
Ph		7.2
Ca	Meq/l	8.71
Mg		5.11
Cl		8.52
HCo_3		1.7
Available Nitrogen	%	0.004
Available Phosphorus	Mg/kg	73.12
Available Potassium	Meq/l	1.83
Na	Meq/l	4.17
Organic Matter	%	0.80
S	Mg/kg	2.41
$CaCo_3$	%	32.41
Sand		43.2

Clay	%	10.8
Silt		46.0
Texture	Sandy silt	

Table (2) the composition of the foliar fertilizer Terra-Sorb Complex

Total Nitrogen	%5.5
Organic Metter	%35
Fe	%1
Mn	%0.1
Organic Nitrogen	%5
Zn	%0.1
B_0	%1.5
Mg_0	%0.8
M_0	%0.001
Amino acids	%20

III.Results

1-Effect of the soaking period of Iris bulbs in Salicylic acidat different concentration on vegetative growth traits

1-1 plant height (cm)

Results in the table (3) showed that soaking iris bulbs in the Salicylic acid affected plant height significantly at all concentrations. Soaking the iris bulbs in the 200 mg/L SA for two hours led to a significant increase in comparison to the control treatment that gave the lowest plant height, and they were 78.90 cm and 66.19 cm respectively. The soaking period also affected significantly by increasing plant height, the best period of soaking was two hours in which the plant height reached 75.84 cm. The effect of interaction between the two factors was significant for the most concentrations. Soaking the bulbs at 200 mg/L SA for two hours had a clear significant effect on the plant height (81.68 cm) in comparison to the control that gave the lowest height (62.24 cm).

Table 3: effect of the soaking period in SA concentrations on the plant height(cm)

Soakingpriod (hours) / **Concentration(mg.l^{-1})**	**0**	**1**	**2**	**4**	**Effect of SA concentration**
SA1	62.24	73.48	74.47	74.60	66.19
SA2	65.26	75.42	78.40	80.61	75.72
SA3	65.63	77.10	78.94	81.68	76.6
SA4	71.61	76.89	74.91	78.70	78.90
Effect of soaking period	71.20	74.92	75.84	75.53	

L.S.D toSA=0.82

L.S.D to **soaking period=0.82**

L.S.D to interaction between SAconcentration and duration of soaking = 1.64

1-2 Number of leaves (leaves. Plant^{-1})

Table (4) showed that the treatment of soaking iris bulbs in the salicylic acid led to a significant increment in the number of leaves. The concentration 200 mg.L-1 of salicylic was superior to the other soaking treatments including the control, recording 8.25 leaves. plant^{-1}. The period of four hours of soaking iris bulbs recorded the best response of the number of leaves that was 7.83 leaves. Plant^{-1}. However, this treatment did not differ significantly from that of soaking for two hours. The effect of interaction between four hours of soaking and the concentration of 200 mg. L^{-1} gave the highest number of leaves (8.67 leaves. Plant^{-1}) in comparison to the control which gave the least number (5. 33 leaves. Plant^{-1}).

Table 4: effect of the soaking period in SA concentrations on the number of leaves (leaf.plant^{-1})

Soakingpriod (hours) / **Concentration (mg.l^{-1})**	**0**	**1**	**2**	**4**	**Effect of SA concentration**
SA1	5.33	7.00	7.00	7.67	6.08
SA2	5.67	7.33	7.33	8.00	7.33
SA3	6.67	7.33	8.00	8.67	7.67
SA4	6.67	7.67	8.33	8.67	8.25

Effect of soaking period	6.75	7.08	7.67	7.83

L.S.D toSA=0.38

L.S.D to **soaking period=0.38**

L.S.D to interaction between SAconcentration and duration of soaking =0.75

1-3 Content of chlorophyll in the leaves (mg.100g^{-1} fresh weight)

Results of the table (5) showed that soaking iris bulbs in Salicylic acid had a significant effect on the chlorophyll content in the leaves. Soaking the bulbs in the 200 mg. L^{-1} salicylic acid increased the chlorophyll content of the leaves significantly to 66.92 mg.100^{-1} g of fresh weight, in comparison to the control which gave the least content of chlorophyll (60. 98 mg. 100g^{-1} of fresh weight). The effect of soaking period on increasing the chlorophyll content of leaves was significant. The table (5) showed that soaking for four hours gave the best content of chlorophyll (65.99), however, it did not differ from the treatment of two hours. The binary interaction effect, shown in the same table, of soaking for two hours with concentration of 200mg. L^{-1} was significant in increasing the chlorophyll content in the leaves to 69.11mg. 100g^{-1} of the fresh weight, in comparison to the other concentrations and soaking durations.

Table 5: Effect of the soaking period in SA concentrations on chlorophyll content in the leaves (mg.100g^{-1} fresh weight)

Soakingpriod (hours) / Concentration (mg.l$^{-1)}$	0	1	2	4	Effect of SA concentration
SA1	59.87	60.59	62.52	64.21	60.98
SA2	59.96	64.30	66.07	67.47	64.02
SA3	60.96	65.31	67.05	69.11	65.93
SA4	63.15	65.86	68.90	66.87	66.92
Effect of soaking period	61.80	64.45	65.61	65.99	

L.S.D toSA=1.62

L.S.D to **soaking period=1.26**

L.S.D to interaction between SAconcentration and duration of soaking =2.52

1-4 Number of brunches (brunches. plant^{-1})

Table (6) referred to a significant increment in the number of branches (2.42 branches. plant^{-1}) due to the treatment of soaking the iris bulbs in 200 mg. L^{-1} of salicylic acid in comparison to the control treatment where the bulbs were soaked in water only and gave just 1.00 branches. plant^{-1}. All binary interactions showed a significant superiority in affecting the number of branches(2.08) The treatment of soaking the bulbs in salicylic acid for four hours gave the higher number of branches (2.67 branches. plant^{-1}), the result was similar to the same concentration for two hours, in comparison to soaking the bulbs in distilled water that gave less number of branches (1.00 branches. plant^{-1}).

Table 6: Effect of the soaking period in SA concentrations on Number of brunches (brunches. plant^{-1})

Soakingpriod (hours) / Concentration(mg.l^{-1})	**0**	**1**	**2**	**4**	**Effect of SA concentration**
SA1	1.00	1.33	1.67	1.67	1.00
SA2	1.00	1.67	2.00	2.00	1.75
SA3	1.00	2.00	2.33	2.33	2.17
SA4	1.00	2.00	2.67	2.67	2.42
Effect of soaking period	1.42	1.67	2.08	2.08	

L.S.D toSA=0.28

L.S.D to **soaking period=0.28**

L.S.D to interaction between SAconcentration and duration of soaking =0.56

1-5 Fresh and dry weight (g)

Tables (7and 8) referred to a significant increment in the fresh and dry weight to become 82.77 and 58.16 g respectively as a result of soaking the iris bulbs in salicylic acid, in comparison to soaking them in distilled water that gave 76.50 and 47.75g respectively. The period of soaking had a clear significant effect on the fresh and dry weight of vegetative growth of iris plant. Four hours of soaking was superior in increasing the fresh and dry weights that were 81.24 and 55.22 g respectively. The same table showed that all binary interactions affected the fresh and dry weight significantly. The binary interaction between the treatment of

soaking bulbs in the concentration of 200 mg. L^{-1} and the period of four hours gave fresh and dry weight (84.01 and 60.69 g respectively) that was significantly higher than the treatment of soaking the bulbs in distilled water that gave the least weight (75.10 and 41.70 g respectively).

Table 7: Effect of the soaking period in SA concentrations on the fresh weight(g)

Soakingpriod (hours) / Concentration(mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	75.10	72.22	78.86	80.32	76.50
SA2	77.04	77.50	81.11	83.30	77.29
SA3	75.42	78.76	81.43	84.01	80.97
SA4	78.36	80.62	82.47	83.45	82.77
Effect of soaking period	76.62	79.74	79.92	81.24	

L.S.D toSA=0.69

L.S.D to **soaking period=0.69**

L.S.D to interaction between SAconcentration and duration of soaking =1.83

Table 8: Effect of the soaking period in SA concentrations on the dry weight(g)

Soakingpriod (hours) / Concentration(mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	41.70	45.50	50.58	53.25	47.32
SA2	48.31	49.56	53.76	58.12	50.20
SA3	49.26	52.26	54.58	60.69	53.39
SA4	50.01	53.50	56.82	60.57	58.16
Effect of soaking period	47.75	52.44	54.20	55.22	

L.S.D toSA=**0.43**

L.S.D to **soaking period=0.43**

L.S.D to interaction between SAconcentration and duration of soaking =0.87

2 : Effect of the soaking period of iris bulbs in salicylic acid on the flowering traits

2 -1 number of flowers (flowers. Plant^{-1})

Table (9) showed that the treatment of soaking the iris bulbs in salicylic acid had a significant effect on the number of flowers. The bulbs that were soaked in 200mg. L^{-1} surpassed the other concentration treatments and produced 2.92 flowers. Plant^{-1}, in comparison to the least number of flowers (1.25 flower. Plant $^{-1}$) produced by plant soaked in distilled water only. The effect of the soaking period of the iris bulbs was significant. Soaking the iris bulbs for four hours gave 2.42 flowers. plant^{-1},higher than the other treatments including the untreated plants that gave 1.42 flowers. plant^{-1} only.

The same table showed that the binary interaction between soaking iris bulbs in salicylic acid at the concentration of 200 mg. L^{-1} and the period of four hours resulted in a significant increase in the number of flowers that was 2.67 flowers. plant^{-1}, and was similar to the treatment of soaking for two hours, in comparison to the treatment of soaking in distilled
water where the number of flowers decreased to 1.00 flower. Plant $^{-1}$.

Table 9: Effect of the soaking period in SA concentrations on the number of flowers (flowers. Plant^{-1})

Soaking period(hours) / Concentration(mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	1.00	1.00	1.67	1.67	1.25
SA2	1.33	2.00	2.00	2.00	1.83
SA3	1.33	2.00	2.00	2.00	2.08
SA4	1.33	2.33	2.67	2.67	2.92
Effect of soaking period	1.42	2.83	2.17	2.42	

L.S.D toSA=0.32

L.S.D to **soaking period=0.32**

L.S.D to interaction between SAconcentration and duration of soaking =0.63

2-2 flower diameter (cm)

Results of the table (10) clarified that the flower diameter increased significantly affected by soaking the bulbs in salicylic acid at the concentration of 200 mg.L^{-1}, and was 10.99cm, in comparison to soaking them in distilled water that gave less flower diameter, 9.61cm only. The flower diameter increased significantly due to soak the bulbs for two and four hours and was 10.76 and 10.79 cm respectively. The flower diameter was affected significantly by the interaction between salicylic acid concentrations and the periods of soaking.

Soaking the bulbs in the concentration of 200 mg. L^{-1} for four hours gave the higher value of flower diameter, 11.79 cm, , in comparison to the treatment of soaking the bulbs in distilled water that gave flower diameter of 8.99 cm.

Table 10: Effect of the soaking period in SA concentrations on the flower diameter (cm)

Soaking priod(hours) / Concentration(mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	8.99	10.08	10.24	10.64	9.61
SA2	9.20	10.31	10.16	11.04	10.52
SA3	9.98	10.80	10.69	11.52	10.45
SA4	10.28	10.89	10.09	11.79	10.99
Effect of soakingperiod	9.98	10.17	10.75	10.76	

L.S.D toSA=0.26

L.S.D to **soaking period=0.26**

L.S.D to interaction between SAconcentration and duration of soaking =0.53

2-3 Number of days prior to the flowering time (days)

The results in the table (11) explained that the flowering time was affected significantly by the treatment of soaking the iris bulbs in salicylic acid. Soaking the bulbs in the distilled water led to delay in the time of flowering (113.80 days) in comparison to those were soaked in salicylic acid which flowered after 100.00 days only. The period of soaking had a significant effect on the flowering time that was 103.83 days due to soak the bulbs in salicylic acid for four hours. The same table showed that the binary interaction between soaking bulbs in concentration of 200 mg.L^{-1} and the soaking period for four hours was significant, the flowering time was 97.67 days, that did not differ significantly from the soaking period for two hours in which the flowering time was 97.33 days, in comparison to the untreated bulbs that delayed the flowering time to become 118.67 days.

Table 11: Effect of the soaking period in SA concentrations on the Number of days prior to the flowering time (days)

Soakingpriod (hours) / Concentration (mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	118.67	110.33	108.00	105.67	113.80
SA2	113.67	107.67	104.64	99.33	108.00
SA3	110.67	106.67	104.33	97.33	104.50
SA4	109.33	107.33	101.00	97.67	100.00
Effect of soaking period	110.87	106.33	104.75	103.83	

L.S.D toSA=0.85

L.S.D to **soaking period=0.85**

L.S.D to interaction between SAconcentration and duration of soaking =1.70

2-4 flower pedicel length (cm)

Table (12) showed that soaking the iris bulbs in salicylic acid at the concentration of 200 mg.L^{-1} increased the flower pedicel length significantly to 48.21 cm, in comparison to the flower pedicel length of 38.89 cm resulted from soaking the bulbs in distilled water only. The treatment of soaking the bulbs for four hours was superior in increasing flower pedicel length giving 46.49 cm, in comparison to the treatment of soaking the bulbs in distilled water that gave the flower pedicel length of 41.73 cm. The same table results showed that the effect of interaction between the treatment of soaking in 200 mg.L^{-1} and the period of two hours was significantly superior in giving the longest flower pedicel (50.21 cm),. in comparison to the control treatment that gave the least length (34.78 cm).

Table 12: Effect of the soaking period in SA concentrations on the flower pedicel length (cm)

Soakingpriod (hours) / Concentration (mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	34.78	42.43	42.43	45.04	41.17
SA2	39.14	44.82	44.82	48.01	38.89
SA3	40.67	45.39	45.39	50.21	47.30
SA4	40.96	46.59	46.59	49.56	48.21
Effect of soaking period	41.73	44.18	46.17	46.49	

L.S.D toSA=0.35
L.S.D to **soaking period=0.35**
L.S.D to interaction between SAconcentration and duration of soaking =0.69

2-5 Vase life

The table (14) results showed that soaking iris bulbs in salicylic acid at the concentration of (200 mg.L^{-1}) affected their vase life significantly to became 8.42 days, in comparison to soaking them in just distilled water that led to only 6.67 days of the vase life. It was observed that the soaking period had a significant effect on increasing the number of days of the flower survival in the vase. The treatment of soaking the bulbs for 2 and 4 hours increased the iris flower vase life significantly, reached 7.92 days, in comparison to the flowers whose bulbs were not treated that reduced their vase life to 6.67 days.

The same table showed that the effect binary interaction of soaking the bulbs with the period of soaking was significant in increasing the vase life of the iris flowers. The treatment of soaking the bulbs in salicylic acid at the concentration of 200 mg. L^{-1} for the period of two hours was superior to the other treatments resulted in the longest vase life of iris flowers (9.00 days), in comparison to the flowers whose bulbs were soaked in just distilled water that gave less vase life (6.00 days only).

Table 14: Effect of the soaking period in SA concentrations on the Vase life

Soakingpriod (hours) / Concentration (mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	6.00	6.33	7.00	7.33	6.67
SA2	6.33	7.33	8.00	8.67	7.08
SA3	7.00	7.33	8.33	9.00	7.92
SA4	7.33	7.33	8.33	8.87	8.42
Effect of soaking period	6.67	7.58	7.92	7.92	

L.S.D toSA=0.41
L.S.D to **soaking period=0.41**
L.S.D to interaction between SAconcentration and duration of soaking =0.82

2-6: Duration of plant flowering (days)

Results in the table (15) referred to significant differences among treatments in the duration of plant flowering. It was observed that it was 8.50 due to soak the bulbs in 200 mg.L^{-1} of salicylic acid in comparison to soaking the bulbs in distilled water that whose duration of plant flowering was 7.75 days. The period of soaking iris bulbs in salicylic acid for two hours affected significantly by increasing the plant flowering durations to 8.33 days. In comparison to the untreated bulbs that gave less duration of plant flowering that was 7.25 days only. The results also showed that the binary interaction of soaking the bulbs in salicylic acid at the concentration of 200 mg. L^{-1} with the period of four hours increased the number days of plant flowering duration to 9.33 days, in comparison to the un treated bulbs decreased the number of plant flowering duration to 7.33 days.

Table 15: Effect of the soaking period in SA concentrations on the Duration of plant flowering (days)

Soakingpriod (hours) / Concentration (mg.l^{-1})	0	1	2	4	Effect of SA concentration
SA1	7.33	7.00	7.33	7.33	7.75
SA2	7.67	7.67	8.00	8.33	7.67
SA3	8.00	8.00	8.00	9.33	7.83
SA4	8.00	8.00	8.00	9.00	8.50
Effect of soaking period	7.25	7.92	8.33	8.25	

L.S.D toSA=0.31
L.S.D to **soaking period=0.31**
L.S.D to interaction between SAconcentration and duration of soaking =0.63

The results of the tables (3, 4, 5, 6, 7, and 8) clarify that soaking iris bulbs in salicylic acid resulted in an increment in all values of vegetative growth indicators represented by plant height, number of leaves, chlorophyll content in the leaves, fresh weight and dry weight, in comparison to the untreated bulbs. These effects of salicylic acid my due to its role in increasing meristem cell division through increasing the auxins and cytokinins, whereas the effect of salicylic acid on the fresh and dry weight increment may due to its role in increasing the photosynthesis efficiency (Hayat and Ahmad, 2007), or possibly due to increased chlorophyll in the leaves, which convert light energy into chemical energy (Jabbarizadeh et al, 2009 and Amanullah*et al*, 2010).

The role of salicylic acid in enhancing the flowering traits (shown in the tables 9, 10, 11, 12, and 13) may due to its role in enhancing vegetative growth traits and increasing carbon assimilation products which led to increased sugars in the leaves that resulted in the flowering enhancement, as the flowers represent the sink to the leaf products, or may due to its role in increasing the physiological and developmental activities. As salicylic acid interacts with auxins to construct proteins and activate the genes responsible for DNA and RNA and then transfer these materials to the phloem sap to reach them to the active plant parts including the flowers that would increase the age of the flowers and reduce their deterioration (Mohaed, 1985).

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