

**Role of salicylic acid and Sucrose in the elongation vase life of *Dianthus caryophyllus* L.**

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**Abstract:**

An experiment was carried out in Horticulture and landscape gardening department in Faculty of Agriculture in Kufa university at season 2014, The flowers were collected at 15th of April \2014 to test the addition of salicylic acid(SA) in different concentrations ( 25,50,100and150 mg.L<sup>-1</sup>) with sucrose at concentration7% or the using sucrose alone at a concentration of 7% compared with control treatment (distilled water).Results showed that the best treatment using 100mg.L<sup>-1</sup> of SA with 7% sucrose which gave the highest fresh weight(g) and the highest quantity of absorbed water 26.00 g and 11.79 cm<sup>3</sup> respectively, compared with control treatment (distilled water) 22.75 g and 5.53 cm<sup>3</sup> respectively ,while the treatment of 150 mg of SA with 7% sucrose gave the highest percent of sugars content 7.97 g in contrast with control treatment(4.72 g).The highest respiration rate 110.50 mg.Co<sub>2</sub>.kg<sup>-1</sup>.hr<sup>-1</sup> when sucrose solution used alone in comparison with 50.10 mg.Co<sub>2</sub>.kg<sup>-1</sup>.hr<sup>-1</sup> when 150g of SA and 7% sucrose was used. This treatment increased the vase life of cut flowers to (8.95 days) compared with control (distilled water) (4.00 days)

**Keywords:** Cut Flowers, Salicylic Acid, Carnation, Sucrose.

## Introduction:

Carnation flowers are considered economically important cut flower in different species, the addition of some chemicals and preservatives material to vases is one of the best methods in order to maintaining repairing of cutting or opening and perfect mature flowers (8) . Some of these flowers that fail to open are need to adding some materials that help opening such as carnation and *Chresanthemum spp.* as compared with treatment by distilled water only [8and9] .Many applied researches revealed that the addition of salicylic acid play an important role in reducing or preventing .The structure of obstruction solution of transported vessels of floral stems , in addition play as antiseptic agent(6 and 12).Yuping,(15) found that the salicylic acid inhibit the action of ethylene that stimulate the welting before maturity. The addition of sucrose is consider one of the essential treatment in order to elongate the age of flowers by maintaining the activity and functions of mitochondria and regulating the water balance such as the neutralized of transpiration and increase the absorbed water(12).Borochoy. *et al*(7) mentioned that the addition of sucrose

reduced lysis of protein of cut flowers , the higher fresh weight was used 4% in *Chresanthemum spp.*(9).The greatest factor of cut flower deterioration is the respiration rate which was highest in flowers that treated only with distilled water. Assmail (1) showed that sucrose is responsible for the increasing of respiration rate in (25 - 45%), only when 0.1 %of sucrose is used in solution of cut flowers.

This research was aimed to use Salicylic acid and sucrose in elongation vase life of *Dianthus caryophyllus* L. flowers and their rules in respiration, water absorption and fresh weight of Carnation flowers.

## Materials and Methods:

The flowers of *Dianthus caryophyllus* L. were conducted on April,15, 2014 from lath house of Horticulture and landscape gardening department in Agriculture Faculty/ Kufa University .These flowers were placed in glass containers after the cutting of their floral stem and eliminating of the third down parts of floral stem (4). The glass containers contained 250ml of Salicylic acid (SA) in different concentrations of 25,50,100 and 150 mg.L<sup>-1</sup> with 7% of sucrose , in addition the sucrose at 7% alone include150ml sugar solution,

and the distilling water was used as control treatment .This experiment was consist of six treatments and every treatment was repeated three times, each replicate contain five flowers ,and the experiment was designated as Complete Randomized Design (C.R.D).Means was compared according to less significant differences L.S.D. at probability level 5% (2 ).Results analysis by Genstat program. The experiment was carried out at room temperature ( $20 \pm 5$ )°C and humidity (65-75%). The following criteria were as follow:

- 1- Estimation of respiration rate according to Nofl (4).
- 2- The count of absorbed water by using graduating cylinder and measuring the solution level in glass container and absorption rate of the flowers of each treatment (1).
- 3- The variation in fresh weight by sensitive balance (1).
- 4- Estimation the total sugars content according to A.O.A.C. (5).

Vase life was determined as the number of days from the begening until wilting of Carnation flowers.

### Results and Discussion:

Table (1) showed significant differences among the treatment of carnation, the

highest fresh weight 26.00 g for the treatment 100 mg.L<sup>-1</sup> of SA and 7% sucrose compared with control treatment 22.75g, The higher rate of absorbed water (11.79 cm<sup>-3</sup>) found at 100 mg.L<sup>-1</sup> of SA and 7% sucrose, similar result was obtained from the treatment 150 mg.L<sup>-1</sup> of SA and 7% sucrose while the least absorbed water rate was in control treatment (5.53cm<sup>-3</sup>).

Table(1) also revealed that the highest respiration rate was obtained from 7% sucrose only and has no significant differences with the treatment 25 mg.L<sup>-1</sup> of SA and 7% sucrose and control treatment in comparison with lowest rate(50.10) for the treatment 150 mg.L<sup>-1</sup> of SA and 7% sucrose .The highest carbohydrate total content in flowers, was 7.97% at 150 mg.L<sup>-1</sup> of SA and 7% sucrose which was different from the treatment of 100 mg.L<sup>-1</sup> of SA and 7% sucrose as compared with lowest sugar content (4.72%) for control treatment (Table1).

Above results may be related to the absorption of different preservative solution and the concentration 100 mg.L<sup>-1</sup> with SA 7% sucrose supplied the cut flowers with energy sources that used respiration (3) in addition ,that accumulate in floral parts and the presence of SA action as antiseptic agent

and prevent vessel obstruction (14) , this result agree with Zamani *et.al* (16) which showed that the SA may be inhibit ethylene production that increase the senescence of cut flower (13) that revealed the preservative solution that contained sucrose maintain of essential materials that used in respiration, Table (1) showed that water absorbed quantity increased in presence of SA + sucrose because the sucrose increased the osmotic concentration so maintain water absorption by turgid pressure (11 and 12) and reduced the contamination by microorganisms that present in preservative solutions. The results indicate that the treatment 150 mg.L<sup>-1</sup> of SA and 7% sucrose caused significant increase in the vase life of cut flowers (8.95 days) compared with control (distilled water) (4.00 days) (Table1). The advance in increase vase life with salicylic acid significantly extends the vase life .Cut flowers treatment with salicylic acid increases the enzyme antioxidant activity, delay the onset of hydrolysis of structural cell components ,decrease ethylene production (15).

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Table (1) Role of Salicylic Acid and Sucrose in Characters of Cut Flower

*Dianthus Caryophyllus* L.

Treatment Characters	Fresh weight (g)	Absorption water ( $\text{cm}^{-3}$ )	Respiration rate( $\text{mg}.\text{Co}_2.\text{kg}^{-1}.\text{hr}^{-1}$ )	Sugar percentage (%)	Vase life(day)
Control	22.75	5.53	108.70	4.72	4.00
7% Sugar	24.07	6.96	110.50	6.09	5.67
25 SA + 7 % Sugar	24.92	7.36	101.40	6.69	7.03
50 SA + 7 % Sugar	25.80	8.35	80.00	7.38	7.06
100 SA + 7 % Sugar	26.00	11.79	64.70	7.92	8.29
150 SA + 7 % Sugar	25.18	11.09	50.10	7.97	8.95
L. S. D	0.331	1.810	10.63	0.80	0.53

**دور حامض السالسليلك والسكرور في اطالة العمر المزهري لأزهار القرنفل *Dianthus caryophyllus* L. المقطوفة**

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**المستخلص:**

اجريت التجربة في قسم البستنة وهندسة الحدائق في كلية الزراعة - جامعة الكوفة وجمعت الأزهار بتاريخ 15-نيسان 2014 لأختبار اضافة حامض السالسليلك وبتراكيز مختلفة هي 150، 100، 50، 25 ملغم/ لتر مع اضافة السكرور بتركيز 7% او استعمال السكرور لوحده بتركيز 7% مقارنة مع معاملة المقارنة (الماء المقطر فقط).

اوضحت النتائج بان افضل معاملة كانت باستعمال 100 سالسليلك (SA) + 7% سكرور في اعطاء اعلى وزن طري واعلى معدل لكمية الماء الممتص بلغ 26.00 غم و 11.79 سم<sup>3</sup> على التوالي مقارنة مع معاملة المقارنة (الماء المقطر) بلغ 22.75 غم و 5.53 سم<sup>3</sup> على التوالي، بينما اعطت المعاملة 150 سالسليلك (SA) + 7% سكرور اعلى معدل لنسبة السكريات بلغ 7.97 غم مقارنة مع معاملة الماء المقطر 4.72 غم واعلى معدل لسرعة التنفس كان عند استعمال محلول السكرور لوحده بلغت 110.50 ملغم.CO<sub>2</sub> ساعة مقارنة مع 50.10 ملغم.CO<sub>2</sub> ساعة عند معاملة 150 سالسليلك (SA) + 7% سكرور. وهذه المعاملة زادت العمر المزهري الى (8.95 يوم) مقارنة مع المقارنة (الماء المقطر) (4 ايام).

الكلمات المفتاحية: أزهار القطف، حامض السالسليلك، القرنفل، السكرور