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EFFECT OF NEEM OIL AS PULSING SOLUTION ON LONGEVITY OF TUBEROSE CUT FLOWERS

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ABSTRACT: Using neem oil at 1ml/l as pulsing solution for 24 hrs. for tuberose cut spikes, then placing them in preservative solution of 200 mg/l of 8-HQS+ 150 mg/l citric acid proved its efficiency for increasing longevity period. Obtained results was similar to those obtained by using silver thio-sulphate (STS) 1-4 mM for 10 minutes, and then followed by dipping them in Kinetin at 5 ppm for one night. High early opening percentage of florets was clear with neem oil pulsing solution after placing the flower stalkes in the preservative solution. Increasing neem oil concentration to 2 or 3 ml/l was effective in increasing floret diameter.

Key words: Neem oil, hydroxyl quinoline sulphate, silver thio sulphate, kinetin, longevity, tuberose.

INTRODUCTION

Polianthes tuberosa Fam: Amaryllidaceae cv. Double represents one of the most important crops in the horticulture exports of flowers which grow in Egypt for local markets and export due to their importance as a source of personal and national income. Tuberose is planted for cut flowers, volatile oil and corms.

Several chemicals solutions were used as pulsing or preservative solutions for increasing the longevity and floret diameter of cut flowers. Among these chemicals silver thio sulphate (STS), and 8-hydroxyquinoline sulphate (8-HQS). Using natural products did not have large attentions as save materials. Neem oil was found to enhance the longevity of carnation flowers

(Chandrashekhar and Gopinath, 2004).So, the present work aimed to investigate the effect of neem oil as pulsing solution comparing to the ordinary used pulsing solutions on the longevity of tuberose cut flowers.

MATERIALS AND METHODS

This work was conducted at postharvest laboratory of the Department of Floriculture Research, Horticultural Research Institute, Agricultural Research Center, Giza, Egypt for two successive seasons of 2001 and 2002 . Tuberose cut spikes were obtained from commercial farm at El-Kanater El-Khaireia. The flower spikes about 80 cm length were cut in the early morning at the white buds stage with one open flower. They had the same average length and number of leaves.

This experiment depended on different pulsing and holding solutions as flowers treatments at room temperature .

A. Pulsing solution:

1. Pulsing solution 1: dipping cut flower spikes bases in solution containing sucrose 100g/l + 8-hydroxy quinoline sulphate (8-HQS) 200mg/l + citric acid 150 mg/l for 24 hours.

2.Pulsing solution 2: Pulsing the spike bases in silver thio sulphate (STS) at 1-4 mM concentration for 10 min., after that dipping them in kinetin (Ki) solution at 5 ppm concentration for one night.

3.Pulsing solution3(NeemAzal/T): dipping cut flower spike bases in different concentrations of neem oil at 0.5, 1, 2 and 3 ml/l for 24 hours. Neem Azal/T (5.0% Azadirachtin) is formulation natural and biological extracts from neem oil which is found in neem kernels. It is produced by Trifolia-M-Gumbh, Germany.

B. Holding solution treatments:

After pulsing treatments, tuberose cut spikes were hold till the end of the experiment in Jars with 500ml. Holding solution contained 8-HQS +citric acid at 200 mg/l and 150 mg/l. concentration under lab conditions (19°C ± 2, 50-60% RH and fluorescent light at 1000 lux for the whole day).

Data recorded:

1.The longevity of tuberose cut flower spikes (days) was determined

2.Flower diameter (cm) was measured by vernier caliper during shelf life periods.

3.Floret opening percentage was calculated as a percentage of opend florets to all the florets on the cut spike.

4.Preservation solution absorption (ml/flower) was measured every two days during the shelf life periods.

The experimental design was complete randomized block design with three replicates (Jars), ever Jar contained three cut spikes.

The data were statistically analyzed according to Thomas and Hill (1978) and the differences between the means of the treatments were considered significant when they were equal or more than the least significant difference (L.S.D.) at the 5% and 1% levels.

RESULTS AND DISCUSSION

Effect of Pulsing Solutions on Flower Longevity and Floret Diameter

Data in Table 1 indicate that pulsing tuberose cut flowers for 24 hours with pulsing solution 1 (100 g/l. sucrose + 200 mg/l. 8-HQS + 150 mg/l. citric acid) or pulsing solution 2 (STS 1-4 mM + 5 ppm Ki), resulted in the highest longevity periods (12-19 days). The differences between the two treatments were not significant.

Using neem oil as pulsing solution at 1 ml/l resulted in similar effect to the above mentioned solutions, where increasing neem oil to 2 or 3 ml/l appeared to be less effective during the two seasons. On the contrary, neem oil pulsing showed enhancing effect on floret diameter at 1-3 ml/l. concentration and the highest diameter (5.03-5.12 cm.) was obtained at 3 ml/l. The least floret diameter was obtained by either 0.5 ml/l neem oil or pulsing solution 1 (100 g/l. sucrose + 200 mg/l. 8-HQS + 150 mg/l. citric acid).

The above mentioned findings concerning the longevity which proved the efficiency of pulsing with sucrose + 8-HQS + citric acid are in harmony with Das and Barman (1990), De-LC and Barman (1998) and Nagaraju *et al.* (2002) on tuberose plants. They pointed that sucrose was effective as pulsing or holding solution for increasing tuberose longevity.

Using 8-HQS and citric acid in addition to sucrose in the herein work were effective factors as participating agents for enhancing sugar absorption through inhibiting microorganisms blockage of spike vessels, so utilization of sucrose as improving agent of water balance and osmotic potential in addition to its role as needed respiratory material for metabolic processes took place which reflected in increasing of flower longevity.

The second pulsing solution in the herein work (STS 1-4 mM+ Ki at 5ppm)may exerted its effect on

Table 1: Effect of pulsing solution treatments on the longevity (days) and floret diameter (cm) of tuberose cut flower spikes during the two seasons of 2001and 2002

Treatments	Longevity (days)		Floret diameter (cm)	
	1st season	2nd season	1st season	2nd season
Pulsing 1*	12.33	18.88	3.65	3.66
Pulsing 2**	17.33	19.33	4.15	4.10
0.5ml/l Neem Azal	11.67	16.87	3.43	3.65
1 ml/l Neem Azal	12.33	18.11	4.49	4.68
2 ml/l Neem Azal	11.00	17.67	4.62	4.74
3 ml/l Neem Azal	11.67	16.88	5.03	5.12
L.S.D. at 5%	3.16	1.24	0.51	0.19
L.S.D. at 1%	6.42	1.27	0.72	0.27

*Sucrose 100gm/l + 8-HQS 200mg/l + citric acid 150 mg/l for 24 hrs.

** STS(1-4mM) for 10 min, after that dipping in kinetin at 5ppm for one night.

increasing tuberose longevity through the role of STS in inhibting micro-organisms activity and blocking ethylene synthesis (Nowak and Rudnicki, 1990). Also, kinetin might decrease the sensitivity of flowers to ethylene and inhibited ethylene production. The enhanced longevity of tuberose in the herein work due to 1 ml/l. pulsing solution of neem oil may be explained as it may has antiseptic action on micro-organisms, so prevented vessels blockage and mentained the water absorption and metabolic functioning processes. In this regard, Chandra shekhar and Gopinath (2004) mentioned that application of neem extracts showed longer vase life of carnation cultivars Acapalca and Pink Dona.s

Effect of Pulsing Solutions on Floret Opening Percentage

Data in Table 2 show that all pulsing treatments show gradual increase in opening percentage up to 12 days reaching its maximum value at the 12th day in the holding solution.

High early opening percentage was clear with neem pulsing solution. The significant increase in opening percentage was clear after placing stalks in holding solution for four days and six days in the first and second season, respectively. The higher concentrations of neem oil (2 and 3 ml/l) were the most effective in this respect. As the time advanced to 10 and 12 days the significancy among all pulsing solutions on opening percentage was diminished.

Effect of Pulsing Solutions on Preservative Solution Uptake

Data in Table 3 show gradual increase in the absorbed solution amount for all pulsing solutions up to 12 days. The magnitude of increase was high up to 10 days, then was less between 10 and 12 days. The data of the first season indicate that (STS + Ki) pulsing solution 2 recorded the highest absorbed solution amount where neem oil pulsing treatment was less efficient comparing to (STS+Ki) pulsing solution in this regard. On the other side, Pulsing the spike with pulsing 1 contain (100g/l. sucrose+200 mg./l. 8-HQS + 150 mg/l. citric acid) was nearly similar to neem oil pulsing and less efficient than STS + Ki pulsing solution. The efficiency of STS + Ki pulsing solution, in this regard, may be due to the effect of STS as it have germicide effect which prevent the effect of microbial contaminate ion in blocking xylem vessel. So, maintained the absorbing process

Table 2 :Effect of pulsing solution treatments on floret opening percentage of tuberose cut flower spikes during the two seasons of 2001and 2002

Treatments	Shelf life periods (days)					
	2	4	6	8	10	12
	First season					
Pulsing 1*	5.14	5.14	13.37	16.16	23.75	25.42
Pulsing 2**	4.34	5.42	14.75	19.58	27.03	32.31
0.5 ml/l Neem Azal	6.73	7.90	22.55	26.33	30.86	31.86
1.0 ml/l Neem Azal	5.36	8.82	23.32	29.66	31.32	31.92
2.0 ml/l Neem Azal	5.73	11.21	20.32	21.71	25.52	25.52
3.0 ml/l Neem Azal	5.10	13.88	18.24	23.81	27.82	27.82
Mean	5.35	8.20	16.28	21.86	26.46	27.69
L.S.D. at 5%	N.S	4.86	N.S	N.S	N.S	N.S
L.S.D. at 1%	N.S	6.89	N.S	N.S	N.S	N.S
	Second season					
Pulsing 1	4.11	9.78	13.13	17.19	19.49	26.22
Pulsing 2	6.66	8.01	15.29	16.78	22.83	23.31
0.5 ml/l Neem Azal	3.33	7.77	10.59	13.90	22.09	31.42
1.0 ml/l Neem Azal	3.48	7.61	11.89	14.52	22.94	25.62
2.0 ml/l Neem Azal	3.57	7.55	18.04	17.91	25.15	25.15
3.0 ml/l Neem Azal	5.83	10.06	15.85	17.94	25.22	25.22
Mean	4.41	7.52	13.47	15.76	21.60	25.99
L.S.D. at 5%	N.S	1.86	3.52	2.22	N.S	N.S
L.S.D. at 1%	N.S	N.S	4.99	3.16	N.S	N.S

*Sucrose 100gm/l + 8-HQS 200mg/l + citric acid 150 mg/l for 24 hrs.

** STS(1-4mM) for 10 min, after that dipping in kinetin at 5ppm for one night.

Table 3 : Effect of pulsing solution treatments on absorbed solution (cm3/spike) of tuberose cut flower spikes during the two seasons of 2001and 2002

First season Shelf life periods (days)	Shelf life periods (days)					
	2	4	6	8	10	12
	First season					
Pulsing 1	15.00	32.77	12.21	49.43	56.09	57.09
Pulsing 2	21.67	52.55	71.44	87.77	100.43	102.81
0.5 ml/l Neem Azal	16.67	39.44	48.33	51.77	53.55	54.59
1.0 ml/l Neem Azal	16.67	42.00	54.33	59.33	62.44	63.44
2.0 ml/l Neem Azal	16.67	42.93	51.60	57.60	61.60	62.60
3.0 ml/l Neem Azal	16.67	45.33	57.33	63.66	66.77	67.77
Mean	17.14	40.78	52.43	59.77	64.96	66.15
L.S.D. at 5%	N.S	9.31	10.40	13.59	16.53	15.36
L.S.D. at 1%	N.S	13.25	14.78	19.33	23.51	21.86
	Second season					
Pulsing 1	24.44	46.66	65.92	77.69	87.69	92.62
Pulsing 2	23.33	45.04	63.92	76.63	84.40	89.95
0.5 ml/l Neem Azal	21.33	40.44	57.66	70.47	74.92	76.58
1.0 ml/l Neem Azal	22.96	44.07	61.29	69.81	71.48	73.15
2.0 ml/l Neem Azal	22.96	44.63	64.63	80.52	86.37	88.59
3.0 ml/l Neem Azal	19.85	35.07	43.40	46.21	47.32	48.32
Mean	22.18	41.53	57.35	67.88	73.36	76.26
L.S.D. at 5%	N.S	N.S	14.27	N.S	23.36	N.S
L.S.D. at 1%	N.S	N.S	N.S	N.S	33.38	N.S

*Sucrose 100gm/l + 8-HQS 200mg/l + citric acid 150 mg/l for 24 hrs.

** STS(1-4mM) for 10 min, after that dipping in kinetin at 5ppm for one night.

active. In this regard, Gendy (2000) mentioned that Ki or STS pulsing solutions each alone were effective in enhancing the absorption of holding solution of gladiolus spikes.

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تأثير زيت النيم كمحلول دافع على حيوية أزهار التيوبيروز المقطوفة

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استخدام زيت النيم بتركيز ١مل / لتر كمحلول دافع لمدة ٢٤ ساعة ، ثم وضع الأزهار فى محلول حفظ مكون من ٢٠٠ ملليجرام / لتر هيدروكسي كينولين سلفات+ ١٥٠ ملليجرام /لتر حمض ستريك ، برهن على فاعليته فى زيادة عمر الأزهار المقطوفة. وكانت النتائج المتحصل عليها مشابهة لاستخدام ثيوسلفات الفضة بتركيز ١- ٤ ملليمول لمدة ١٠ دقائق متبوعة باستخدام الكينتين بتركيز ٥ جزء فى المليون لمدة ليلة واحدة، لوحظ تفتح مبكر وزيادة فى النسبة المئوية لتفتح الأزهار باستخدام زيت النيم كمحلول دافع، وكان لزيادة تركيز زيت النيم إلى ٣ ملى / لتر تأثير جيد فى زيادة قطر الأزهار.