

Original Research Article

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Effect of Pre Harvest Treatment on Flower Quality and Vase Life of *Asiatic liliium* cv. Arcachon

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ABSTRACT

Keywords

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An experiment was conducted at Modern Floriculture Centre, G.B. Pant University Agriculture and Technology, Pantnagar to study the effect of pre harvest sprays on flower quality and vase life of *Asiatic liliium* cv. Arcachon with nine treatments and three replications. The results of the study revealed that two pre harvest foliar sprays of Benzyl adenine @ 100 μ M significant in basal bud length (107.72 mm) and bud diameter (32.95 mm), upper bud length (73.33 mm) and bud diameter (22.78 mm), basal flower diameter (192.80 mm), upper flower diameter (134.36 mm). The maximum vase life (14.83 days) and water uptake was found GA₃@ 250ppm/L (142.83 ml).

Introduction

Lilies are great economic important flowering plant that belongs to the genus *Lilium* can be grown under diverse climatic conditions. They are monocotyledonous, perennial, herbaceous, often bulbous geophytes. During the last decade the lily has gained popularity worldwide among cut flowers and potted flowering plants (Younis *et al.*, 2014). Lilies are used as cut flower, pot plant and plant material used for park, garden and landscape decoration. As a cut flower, the lily is now the fourth most important crop in the world. In India it is used as cut flower and pot plant. In India lilies are grown in the temperate regions of the northern hemisphere and lilies is an export flower crop along with rose,

chrysanthemum, carnation, and tulip in Korea. Maintaining the freshness and extending the vase life of cut lilies are very important to the success of this export crop. (Bose, 2003)

A global scale of flower trade demands that cut flowers should preserve their postharvest quality as long as possible, both during the market chain and at the consumer's (Rabiza-Świda *et al.*, 2015). Tepal wilting, change in colour and sometimes abscission are the common symptoms that limit the length of vase life of cut lilies (Van and Han, 2011). Another major problem in postharvest life of lilies is early leaf yellowing (Han, 2001).

There are about 10-30 per cent losses due to post harvest damage in cut flowers. The major problem of the horticulture sector in general and the floriculture industry in particular is the postharvest loss.

Hence the crops are being alive for a certain period but they are liable to deteriorate and loss. It is clear that unless they are preserved the ultimate fate of such produce is senescence and/or death.

However, it is possible to extend the postharvest life of flowers by sprays of different hormones.

Materials and Methods

The present investigation was carried out at Modern Floriculture Centre of the University G.B. Pant University of Agriculture and Technology; Pantnagar located at 29°N latitude, 79.3°E longitude in the Tarai belt of Himalayas. The experiment was laid out in completely random block design. The crop was raised under shade net house with uniform standard cultural practices.

Two foliar sprays were done three and two week before the spike harvesting and the bud length 5-7 cm. The pre harvest foliar spray were Control (T₁) (without any Spray), Benzyl Adenine @ 50 µM (T₂), Benzyl Adenine @ 100 µM (T₃), salicylic acid @ 50 µM/L (T₄), salicylic acid @ 100 µM/L (T₅), NAA @ 10 ppm/L (T₆), NAA @ 20 ppm/L (T₇), GA₃ @ 250 ppm/L (T₈) and GA₃ @ 500 ppm/L (T₉) with three replication. The spikes were harvested at fully color develop stage in the early morning and put in distilled water. The spikes were harvested with the help of sharp secateurs above ground level 8-9 inch. The spikes length was uniformly maintained i.e. 75 cm. Observations like bud length, bud diameter, flower diameter, vase life and water uptake were recorded.

Results and Discussion

Number of bud per spike

The results indicated that the pre harvest foliar spray of BA @100 µM/L increased no of bud (4.40) per spike had highest as compare to control (4.05). However, there were no significant differences between the treatments.

Length of basal bud and diameter at spike harvesting stage (mm)

According to this study the maximum length of basal bud (107.72 mm) and bud diameter (32.95 mm) were found pre harvest foliar spray of Benzyl adenine@100 µM/L. The minimum basal bud length (98.60 mm) and basal bud diameter (30.22 mm) were found control. Significant increase the diameter of basal bud length was found higher treatments BA@50 µM/L (104.56 mm) and SA@100 µM/L (105.44 mm). However, basal bud diameter was higher found treatment GA₃@ 500ppm/L (31.79 mm) (Table 1).

Length of upper bud and diameter at spike harvesting stage (mm)

According to this study the maximum length of upper bud (73.33 mm) and bud diameter (22.78 mm) were found pre harvest foliar spray of Benzyla adenine@100 µM/L. The minimum length of basal bud (52.55 mm) and diameter of bud (16.82 mm) were found control. Significant increase the diameter of basal bud length was found higher treatments SA@ 100 µM/L (71.63 mm), GA₃@ 500ppm/L (65.92 mm) and NAA@20 ppm (62.54 mm). However, diameter of upper bud was higher found treatment GA₃@ 250ppm/L (16.57 mm). The exogenous cytokinins effectively induced floral initiation and development, especially at the early floral initiation and flower development stages.

Table.1 Effect of preharvest treatment on flower quality and vase life of *Asiatic liliium cv. Arcachon*

Treatments	Length of basal bud at spike harvesting stage (mm)	Diameter of basal bud at spike harvesting stage (mm)	Length of upper bud at spike harvesting stage (mm)	Diameter of upper bud at spike harvesting stage (mm)	Diameter of basal flower (mm)	Diameter of upper flower (mm)	Vase life (days)	Water uptake (ml)
Control	98.60	30.22	52.55	16.82	169.08	95.07	11.66	106.50
BA@50 µM/L	104.56	31.50	62.12	17.67	174.89	112.97	12.66	124.83
BA@100 µM/L	107.72	32.95	73.33	22.78	192.80	134.36	12.83	119.83
SA@50 µM/L	100.83	30.62	65.40	16.65	176.85	107.37	11.66	117.83
SA@100 µM/L	105.44	31.37	71.63	18.03	190.83	112.99	14.33	139.82
NAA@10 ppm/L	102.74	30.40	56.33	17.62	183.78	108.25	12.33	121.83
NAA @20 ppm/L	102.90	31.27	62.54	17.56	180.51	108.20	13.00	126.00
GA3@ 250ppm/L	101.43	30.87	61.83	19.04	180.76	115.19	14.83	142.83
GA3@ 500ppm/L	105.84	31.79	65.92	16.57	186.15	112.68	11.66	114.66
S Em +	1.475	0.494	2.905	0.723	0.723	2.571	0.565	2.183
CD	4.421	1.481	8.711	2.169	2.169	7.709	1.694	6.545
CV%	2.472	2.74	7.923	6.931	6.931	3.980	7.661	3.054

Endogenous cytokinins were higher in early floral initiation and development stages in comparison to the vegetative stage. These results indicate that cytokinins seem to promote the development of flower buds rather than inducing flowering in tuberose (Shuo-Tsang Chang *et al.*, 1999) (Table 1).

Diameter of upper and basal flower (mm)

According to this study the maximum basal flower diameter was found BA@100 μ M/L (192.80 mm) as compare to control (169.08 mm). The Significant increase in diameter of basal flower was found higher treatments SA@100 μ M/L (190.83 mm), NAA@10 ppm/L (183.78 mm), NAA@20 ppm/L (180.52 mm), GA₃@ 250ppm/L (180.76 mm) and GA₃@ 500ppm/L (186.15 mm) (Table 1).

According to this study the maximum upper flower diameter (134.36 mm) was found BA @100 μ M/L (T₃) as compared to control (T₁) (95.07 mm). The significance increase in upper flower diameter was found BA @ 50 μ M/L (112.97 mm), SA@50 μ M/L (107.37 mm), SA@100 μ M/L (112.99 mm), NAA@10 ppm/L (108.25 mm), NAA@20 ppm/L (108.20 mm), GA₃@ 250ppm/L (115.19 mm) and GA₃@ 500 ppm/L (112.68 mm (Wawrzynczak and Goszczynska, 2000) improved the length and diameter of carnation cut flower by application of 0.05 and 0.1 mM Kinetin. (Kim and Miller, 2008) reported that simultaneous using of GA 4+7 and BA causes an increase in diameter of Tulip flowers.

Hamidimoghadam *et al.*, (2014) reported that GA₃ had a positive effect on qualitative characteristics and longevity of cut flowers. Ramtin *et al.*, (2015) reported that BA@50 μ M/L increase the floret length and flower diameter in carnation. Ramtin *et al.*, (2016) showed that salicylic acid 100 μ M, and benzyl adenine 100 μ M had more effects than other plant growth hormones (Table 1).

Vase life (Days)

According to this study the significant maximum vase life was found treatment GA₃@ 250ppm/L (14.83 days) as compare to control (11.66 days).The result suggested that preharvest foliar spray of treatment SA@100 μ M/L (14.33 days) was found positive effect on vase life of Asiatic lily cv. Eye Linar. Singh (2005) reported that use of antioxidants in retaining membrane turgidity and for anti-senescence effects during aging has been earlier known. Thus antioxidant property of GA₃ contributed to enhance vase life. The similar effect was reported (Kumar and Gupta, 2014) that foliar spray of gibberellic acid 100ppm (16.70 days) over control (12.28 days) in gladiolus. Bharathi and Kumar (2009) reported the similar findings for prolonging vase life of cut tuberose spikes and Umrao *et al.*, (2007) for spike durability in gladiolus. The improvement in vase life may also be due to the translocation of sugar from vase solution via cut spike stem and accumulation in the florets, increases their osmotic concentration and improve their ability to absorb water and maintain turgidity (Halevy, 1976). The maximum vase life (9.33 day) was recorded with bulb dip plus foliar spray of 100 ppm of GA₃ followed by the foliar spray of 100 ppm GA₃ Alone Khan *et al.*, (2007). Similar results were reported by Dutta *et al.*, (1993) in chrysanthemum, Ichimura and Goto (2000) in narcissus and Gaur *et al.*, (2003) in gladiolus. All the mentioned studies have reported that the beneficial effects of plant growth regulators depend on various parameters such as: cultivar, harvest season, hormone type and applied hormone concentration (Table 1).

Water uptake (ml)

According to this study the maximum water uptake was found treatment GA₃@ 250ppm/L (142.83 ml) as compare to control (106.50

ml). The positive effect gibberellin hormone has been seen in keeping quality and increasing length of age of antherium flowers and miniature roses through increasing water absorption rate. Hence, vase life and water uptake was accompanied by ion leakage percentage (Table 1).

Finally it was concluded that maximum basal bud length (107.72 mm), basal bud diameter (32.95 mm), upper bud length (73.33 mm), upper bud diameter (22.78 mm), basal flower diameter (192.80 mm) and upper flower diameter (134.36 mm) was obtained in pre-harvest spray of Benzyladenine @ 100 µM/L. The maximum vase life (14.83 days) and maximum water uptake was (142.83 ml) were found pre harvest spray of GA₃@ 250ppm/L in Asiatic lily cv. Eye Linar.

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