



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2021; 10 (5): 824-826

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www.thepharmajournal.com

Received: 11-02-2021

Accepted: 28-03-2021

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Influences of different pulsing treatments on the vase life of oriental hybrid cut lily

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Abstract

An investigation was carried out to study the effects of different pulsing treatment on the vase life quality of cut Oriental hybrid lily. The cut Asiatic lilies were subjected with 7 different pulsing treatments. The pulsing solution used for treatments were T₀ = Controlled (tap water), T₁ = Sucrose solution (5%), T₂ = Silver Nitrate (AgNO₃) (50ppm), T₃ = Citric Acid (CA) 50ppm, T₄ = Gibberellic Acid (GA₃) (50ppm), T₅ = CA + GA₃, T₆ = Hydro Quinoline Citrate (8HQC) (200ppm). The results showed that the longest Vase life (15 days) of lily was recorded under 8HQC and GA₃. Conclusively, the cut stems treated with pulsing solution showed better vase life quality.

Keywords: Influences, pulsing treatments, vase, oriental

Introduction

Lily (*Lilium* spp.) flower is a monocotyledonous, branchless perennial growing up to 2-8 feet height and is propagated through bulbs and bulblets. Genus *Lilium* belongs to the family *liliaceae*, native to temperate areas of northern hemisphere and Asia. Because of its size, sweet fragrant and varying color, lily has gained popularity worldwide and it stands in 4th most important cut flower (Narendra Chaudhary *et al.*, 2016). Presently lily at global as well in domestic market is in great demand (Sunita *et al.*, 2017). Vase life of the cut lily is considered as one of the most important factor for a consumer. Therefore, it is important to maintain the freshness of the cut lilies as long as possible for both in market as well for consumer satisfaction (Sunita *et al.*, 2018; Rabiza-Swida *et al.*, 2015) [9, 11]. Hybrid lilies depending on the cultivar, post-harvest handling and environmental conditions can last for 10-16 days. Other factors that determine the post-harvest quality of cut lily are pre harvest, stage of harvest, appearance of foliage, longevity of flowers, opening of buds (Ranwala and Miller., 2000) [5]. The harvested cut flowers are very much prone to rapid deterioration due to increase in rate of respiration, rise in temperature and becomes easy target for microbial attacks, excessive water loss attacks (Santos *et al.*, 2018) [6]. There has been loss of about 35% of all cut flowers in market due to the inadequate post-harvest handling technology. The flowers start wilting resulting in the bent stem where the floral axis get just below the flower head. Such development occurs due to the vascular occlusions on the stem leading to the insufficiency or prevents the flow of water to the flower (Elgimabi *et al.*, 2011) [7]. In lily the post-harvest use is limited by 2 main physiological disorder, they are: leaf chlorosis and bud necrosis (Miller., 2014) [8]. An ideal cut flower should remain fresh with respect to its appearance, color and fragrance for a longer time. Several studies have conducted to obtain the best quality flowers and to improve the vase life of cut flowers by treating the stems with certain pulsing solutions (Wani *et al.*, 2009; Rabiza *et al.*, 2015; Narendra Chaudhary *et al.*, 2016; Sunita *et al.*, 2017) [9-11]. The present study has been conducted with the objective to find the best pulsing solution to improve the vase life and freshness of cut Oriental hybrid lily.

Materials and Methods

Freshly harvested Oriental hybrid lilies of uniform stem length having 2-3 buds in each stem were brought from the shade net house of Lovely Professional University Agri-farm. The cut stems were harvested in the morning when the first bud of the stem started showing distinct colour. The stems were then pre cooled by keeping in refrigerator with temperature 3°C for 45 minutes. The stems were then trimmed to 45cm and then placed in 5 different pulsing treatments for 12 hours. The pulsing solution used for treatments were T₀ = Controlled (tap water), T₁ = Sucrose solution (5%), T₂ = Silver Nitrate (AgNO₃) (50ppm), T₃ = Citric Acid

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(CA) 50ppm, T₄ = Gibberellic Acid (GA₃) (50ppm), T₅ = CA + GA₃, T₆ = Hydro Quinoline Citrate (8HQC) (200ppm). After pulsing each cut stems were placed in tape water in different containers. All treatments were replicated four times in Completely Randomized Design (CRD). The observations recorded were vase life, days taken for opening of florets, floral diameter, days taken for second bloom and water uptake.

Results and Discussion

The given table shows that the vase life was significantly affected by pulsing treatment. The vase life of cut stems treated with GA₃ and 8HQC were the longest compared to other pulsing treatments and lasted for 15 days. 8HQC act as biocides, preventing the attacks from microbes and blockage of cut stems (Tsegaw *et al.*, 2011) [12], thus helps in water uptake and keeping the flowers fresh for longer duration. Whereas, the cut stems kept in control had the shortest vase life. The stems kept in control started losing its freshness after the 10th day from its harvest. The cut stems treated with GA₃ (50ppm) remained fresh for a longer time compared to other

treatments but it didn't show any improvement on floral diameter, the reason may be due to the inconvenient environmental factors. The leaves and buds of the cut stems treated with GA₃ remained fresh for longer duration showing that GA₃ as pulsing solution delays the senescence (Saeed *et al.*, 2014) [13], which be the reason to failure of some buds to open. It was shown that the earliest bud opening was found in cut stems pulsed in control treatment. Not every buds of the stem reached blooming stage. These may be due to the insufficient concentration of treatment or other environmental factors. The cut stems treated with 8HQC and GA₃ took close to 10 days for opening of the flower. As the delay in bud opening leads to the longer vase life and delay in senescence. During the investigation, it has been found that the stem treated with 200ppm 8HQC records the largest flower diameter i.e., 13.63cm, while of cut stems treated with tape water and sucrose showed very close floral diameter to each other. The cut stems treated with tape water showed early blooming but also to show the earliest wilting and yellowing of leaves. During whole experiment, cut flowers treated with GA₃ fail to give full floral bloom but prevented wilting.

Table 1: Effect of various pulsing treatments on oriental hybrid lilies

Treatments	Flower diameter (cm)	Days to opening of 1st flower (days)	Days to opening of 2nd flower (days)	Vase life (days)
Control (Tape water)	12.93	7.25	8.50	10.50
Sucrose	12.63	8.00	9.00	11.00
AgNO ₃	11.08	8.75	10.00	11.75
Citric acid (CA)	11.38	9.50	10.75	12.25
GA ₃	6.13	10.25	11.50	15.00
CA + GA ₃	8.38	9.50	10.75	12.75
8HQC	13.63	10.00	11.25	15.00
SEM	0.38	0.35	0.30	0.38
CD (p = 0.05)	0.80	0.74	0.64	0.81

Conclusion

The cut liliams when treated with pulsing solution shows significant improvement in their vase life. The vase life and floral. Compared to all the taken chemicals used for pulsing, 8HQC showed the best result by maximum floral diameter and vase life. The quality parameters of the cut flowers are also affected by various other environmental factors (Priyanshu and Neelum., 2020) such as temperature, humidity, pre-harvest, harvesting factor etc.

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