International Journal of Agriculture and Food Science 2025; 7(4): 318-320

ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating: 4.97
IJAFS 2025; 7(4): 318-320
www.agriculturaljournals.com
Received: 16-03-2025
Accepted: 18-04-2025

Atul Kumar Mishra
Department of Horticultur, Kamla Nehru Institute of Physical and Social Sciences, (An Autonomous Institute) Faculty of Agriculture, Faridipur, Sultanpur, Uttar Pradesh, India

Navaldey Bharti
Department of Horticultur, Kamla Nehru Institute of Physical and Social Sciences, (An Autonomous Institute) Faculty of Agriculture, Faridipur, Sultanpur, Uttar Pradesh, India

Corresponding Author:
Atul Kumar Mishra
Department of Horticultur, Kamla Nehru Institute of Physical and Social Sciences, (An Autonomous Institute) Faculty of Agriculture, Faridipur, Sultanpur, Uttar Pradesh, India

Studies on the post-harvest life of dahlia under different vase solutions

Atul Kumar Mishra and Navaldey Bharti

DOI: https://www.doi.org/10.33545/2664844X.2025.v7.i4e.368

Abstract
A field experiment was conducted to assess the response of different vase solutions on the post-harvest life of Dahlia during the month of February 2025. The experiment comprises different concentrations and combinations of vase solution. The treatments were: T_1 (Distilled water), T_2 (2% Sucrose), T_3 (4% Sucrose), T_4 (6% Sucrose), T_5 (8% Sucrose), T_6 (2% Sucrose + 15 ppm Citric acid), T_7 (4% Sucrose + 30 ppm Citric acid), T_8 (6% Sucrose + 45 ppm Citric acid) and T_9 (8% Sucrose + 60 ppm Citric acid). The experiment was outlined in nine treatments and three replications. The data revealed that flowers kept in 2% Sucrose + 15 ppm Citric acid has showed maximum flower weight, water uptake, days to start florets senescence and longevity in days.

Keywords: Dahlia, sucrose, citric acid, vase life, post-harvest life

Introduction
Though dahlias are perennials with tuberous roots, they are typically grown as annuals in cold-winter regions. While some varieties have herbaceous stems, others develop lignified stems lacking secondary tissue, which enables them to resprout after winter dormancy and continue growing in subsequent seasons (Saar *et al*., 2003) [7]. Dahlias exhibit a wide variety of flower shapes, including straight, cactus, semi-cactus, anemone, pompom, ball, water lily, decorative, orchid, and peony types. They are widely used as cut flowers, contributing to their growing popularity in recent years. Photoperiod and average temperature play a critical role in Dahlia cultivation as it significantly influences flower size, quality, and bud count. In combination with temperature, it also affects tuber development, shoot growth, and flowering (Romet, 2008) [6]. Dahlias require minimum 5 to 10 hours of sunlight per day to produce abundant, high-quality blooms. Optimal temperatures are also essential for successful growth and flowering. Zencirkanan (2011) reported flowering durations of approximately nine days under specific temperature and photoperiod conditions. This study aims to evaluate the effect of different vase solutions on post-harvest life of Dahlia cv. Sunset, a variety with strong potential as a cut flower and increasing popularity in the floriculture industry.

Materials and Methods
The experiment was conducted to assess the effect of different vase solutions on the vase life of Dahlia at Horticulture Research Laboratory, Kamla Nehru Institute of Physical and Social Sciences, Faridipur, Sultanpur District, Uttar Pradesh, India. The area is situated on the north of Prayagraj on the right bank of Gomti River at Rewa Road at a distance of about 5 km from Sultanpur city. It is situated at 26^0 15' N Latitude and 85^0 05'E Longitude. This region has sub-tropical climate with extreme of summer and winter the temperature down to as low as 10 - 12^0C during winter season especially in the month of December and January. The temperature rises up to 40- 43^0C during summer season. The average rainfall in this area is around 800-1200mm annually. The experiment was laid out in a complete randomized design with nine treatments and three replications. The different treatments that were used in the experiment are as follows: T_1 (Distilled water), T_2 (2% Sucrose), T_3 (4% Sucrose), T_4 (6% Sucrose), T_5 (8% Sucrose), T_6 (2% Sucrose + 15 ppm Citric acid), T_7 (4% Sucrose + 30 ppm Citric acid) and T_8 (6% Sucrose + 45 ppm Citric acid) and T_9 (8% Sucrose + 60 ppm Citric acid).

Flowers on vase solution were examined as and when necessary and continued up to the end of vase life of flower. Initial flower weight of dahlia was measured before keeping in vase solution. Observations were recorded on flower weight (g) at 3rd, 6th and 9th day, water uptake (ml) at 3rd, 6th and 9th day, days to start florets senescence and longevity of flowers in days.

Results and Discussion

Data recorded on post-harvest parameters, such as initial flower weight (g), flower weight (g) at 3rd, 6th and 9th day, water uptake (ml) at 3rd, 6th and 9th day, days to start florets senescence and longevity of flowers in days. The data pertaining to above parameters are displayed in Table-1. The maximum initial flower weight 18.32 g was noted in T_6 (2% Sucrose + 15 ppm Citric acid) which is at par with 15.82 g in T_7 (4% Sucrose + 30 ppm Citric acid) while the minimum initial flower weight 09.17 g was observed in T_9 (8% Sucrose + 60 ppm Citric acid) (Table-1). The maximum flower weight 20.16 g at 3rd day was found in T_6 (2% Sucrose + 15 ppm Citric acid) followed by 16.16 g in T_7 (4% Sucrose + 30 ppm Citric acid) while minimum flower weight 09.06 g was recorded in T_9 (8% Sucrose + 60 ppm Citric acid) (Table-1) then a gradual increase in flower weight was observed up to 6th day. After that there is a gradual decrease in flower weight was observed. At 9th day maximum flower weight 15.70 g was noticed in T_6 (2% Sucrose + 15 ppm Citric acid) which is at par with 13.53 g in T_4 (6% Sucrose) Table-1. The water uptake of flowers exhibited a continuous decline until the end of their vase life. Among the different treatments, the highest water uptake was noted at 3nd day (02.77 ml) and 9th day (05.05 ml) in T_6 (2% Sucrose + 15 ppm Citric acid) and the lowest water uptake on 3rd day (00.53 ml) and at 9th day (00.00 ml) in T_9 (8% Sucrose + 60 ppm Citric acid). The data related to the number of days until floret senescence are presented in Table 1. The maximum days to start florets senescence 08.00 days was observed in T_6 (2% Sucrose + 15 ppm Citric acid) followed by 07.00 days in T_2 (2% Sucrose). The minimum days to start florets senescence 05.00 days was noted in T_9 (8% Sucrose + 60 ppm Citric acid). The longevity of dahlia in a vase depends on the various factor, including harvest stage, water uptake, microbial growth and different treatments. The highest longevity of 11.00 days was recorded in T_6 (2% Sucrose + 15 ppm Citric acid) which is at par with 10.00 days in T_7 (4% Sucrose + 30 ppm Citric acid). The lowest longevity of 06.00 days was observed in T_9 (8% Sucrose + 60 ppm Citric acid). This effect may be attributed to the optimal uptake of water and reserved food from the treatment T_6 (2% Sucrose + 15 ppm Citric acid). The T_6 (2% Sucrose + 15 ppm Citric acid) solution contains sucrose and citric acid (Penniston *et al*., 2008) [4]; citric acid acts as a germicide in the vase solution, while sucrose acts as a source of stored energy, while citric acid helps reduce bacterial proliferation in the vase solution and improves water conductivity in the xylem of cut flowers. As a result, vase solution uptake is generally higher in treatments containing optimum concentration of citric acid. Furthermore, studies have demonstrated that vase solutions enriched with sugar result in significantly higher uptake compared to those without sugar (Mohd Rafdi *et al.*, 2018) [3]. Sugar-containing solutions contribute to maintaining water balance in plants by accumulating in floral tissues, which increases the concentration of osmotically active solutes and helps maintain petal turgidity and swelling (Pivetta *et al*., 2019) [5]. As a result, these solutions enhance the daily uptake of vase solution. Further findings by Aryal *et al*. (2019) [1] and Kshirsagar *et al.* (2021) [2] support that sucrose-enriched solutions effectively promote water uptake in roses.

Table 1: Effect of different vase solutions on the vase life of Dahlia

Treatments	Treatment Details	Initial Flower Weight (g)	Flower Weight (g)			Water Uptake (ml)			Days to Start Florets Senescence	Longevity in days
			3rd day	6th day	9th day	3rd day	6th day	9th day		
T_1	Distilled Water	11.17	12.50	11.30	09.23	00.73	01.83	03.00	05.00	08.00
T_2	2% Sucrose	12.17	13.33	12.40	10.30	01.50	02.50	03.50	07.00	09.00
T_3	4% Sucrose	13.13	14.06	13.20	12.50	00.80	01.50	02.86	06.00	08.00
T_4	6% Sucrose	15.30	16.16	15.30	13.53	01.23	01.50	03.43	07.00	09.00
T_5	8% Sucrose	14.33	15.16	14.50	11.20	00.90	01.50	03.76	05.00	08.00
T_6	2% Sucrose +15 ppm Citric Acid	18.32	20.16	17.70	15.70	02.77	04.50	05.50	08.00	11.00
T_7	4% Sucrose + 30 ppm Citric Acid	15.82	16.16	15.20	13.20	01.13	01.50	02.30	06.00	10.00
T_8	6% Sucrose + 45 ppm Citric Acid	12.73	13.50	12.10	11.43	00.87	01.67	03.66	07.00	09.00
T_9	8% Sucrose + 60 ppm Citric Acid	09.17	09.60	09.50	00.00	00.53	01.53	00.00	05.00	06.00
C.D		01.37	01.67	01.80	01.48	00.57	00.94	01.26	01.72	01.72
SE (m)		00.46	00.55	00.60	00.60	00.19	00.32	00.42	00.57	00.57

Conclusion

The present study concludes that the most effective treatment for extending the vase life of gladiolus spikes was T_6 (2% Sucrose + 15 ppm Citric acid). This treatment resulted in significantly better post-harvest performance as evidenced by water uptake 05.50 ml, days to start floret senescence 08.00 days and longevity 11.00 days.

References

1. Aryal P, Adhikari A, Pathak R, Pudasaini R. Effects of different concentrations of sucrose and citric acid on vase life of rose. *J Agric Nat Resour*. 2019;2:127-134.
2. Kshirsagar S, Kumar A, Singh O, Gallani R, Parmar R. Effect of post-harvest preservatives on vase life of cut rose (Rosa hybrida L.) cv. Top secret. *J Pharmacogn Phytochem*. 2021;10:1056-1060.
3. Mohd Rafdi HH, Joycen DC, Irving DE, Gantait SS. Citric acid, sucrose and Cu^{2+} as potential vase treatments for cut *Acacia holosericea* G. Don foliage stems. *J Hortic Sci Biotechnol*. 2018;93:73-80.
4. Penniston KL, Nakada SY, Holmes RP, Assimos DG. Quantitative assessment of citric acid in lemon juice, lime juice, and commercially-available fruit juice products. *J Endourol*. 2008;22(3):567-570.
5. Pivetta KFL, Mattiuz CFM, Melo RFD, Gimenes R, Romani GDN, Batista GS. Post-harvest quality of *Aster ericoides* after treatment with silver thiosulphate and sucrose. *Cienc Rural*. 2019;48:1-8.

6. Romet J. *Growing dahlias*. Iowa: Iowa State University; 2008. 2 p.
7. Saar DE, Polans NO, Sorensen PD. A phylogenetic analysis of the genus *Dahlia* (Asteraceae) based on internal and external transcribed spacer regions of nuclear ribosomal DNA. *Syst Bot*. 2003;28(3):627-639.
8. Zencirkiran M. Effects of 1-MCP (1-methylcyclopropane) and STS (silver thiosulphate) on the vase life of cut *Freesia* flowers. *Sci Res Essays*. 2010;5(17):2409-2412.