

EFFECT OF CHEMICAL FLORAL PRESERVATIVES ON VASE LIFE OF CUT FLOWERS OF GERBERA CV. PRESIDENT

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ABSTRACT : Gerbera cv. President was subjected to twelve different treatment combinations against control to study the vase life. Treatment with 100ppm silver nitrate + 6% sucrose + 400 ppm 8-HQS + 100ppm silver thiosulphate showed significant beneficial effect in extending the vase life of the cultivar to 9.63 days, as against 7.57 days of vase life in control. The findings provide an alternative for extending the vase life of cut gerbera flowers. Treated flower stems also showed minimum contamination of micro organisms.

Keywords : Gerbera, cut flower, STS, HQS, silver nitrate, vase life.

Gerbera is an elegant garden flower of immense value. They are a real attraction in the garden with their star like flowers of varying colour shades. Flowers borne terminally on slender long stems, they form effective, colourful flower borders or beds (Thangaraj *et al.*, 5). The first scientific description of a Gerbera was made by J.D. Hooker in Curtis's Botanical Magazine in 1889, when he described Gerbera jamesonii, a South African species also known as Barberton Daisy. Vase life of cut flowers may be extended by adding chemical preservative in holding solution (Yoo and Kim, 9). The objective of this study was to determine the effects of different chemicals in extending vase life of gerbera flowers.

MATERIALS AND METHODS

The present investigation was carried out at Division of Horticulture, UAS Bengaluru during 2009-10. Flowers selected for the experiment were harvested when their outer ray florets were completely elongated or when outer two rows of disc florets are perpendicular to the flower stalk. Flowers were carefully brought to the laboratory without causing any damage and they were kept in clean water. Then they were imposed with treatments.

Flowers were sorted out for uniform head size so as to maintain uniformity within the replication. About an inch (2.5cm) of basal portion of stem was cut to evaluate for the presence of bacteria. Then stems were cut to a uniform length of 50cm. Then each flower stalk were placed in 500ml bottle containing 250 ml of aqueous solutions of different chemical preservatives used individually or in combination as detailed

separately in each experiment (Table 1) or 250 ml of distilled water. Distilled water was used to increase experimental variability.

Observations on water uptake, water loss, water balance, fresh weight and vase life of flowers were recorded and analyzed statistically.

Plate count technique was adopted to estimate the bacterial counts. Stem pieces of 2.5cm were taken in 100ml sterile water and placed in a shaker for 10 minutes. Afterwards serial dilution was made up to 10⁻⁷. The dilutions of 10⁻⁵, 10⁻⁶ and 10⁻⁷ were placed on nutrient agar for presence or absence of bacteria. Bengal agar was used to find out the presence of different bacteria. Under each dilution, three plates were used by making with plus symbol and presence of microorganisms was recorded with plus. More plus indicates higher density of microorganisms.

The experiment was laid out in a single factorial design with three replications. The mean data on various parameters recorded during the period of study were subjected to statistical analysis as per the procedure given by Sundarraj *et al.* (4).

RESULTS AND DISCUSSION

The cut flowers of gerbera cv. President treated with chemicals at different concentration significantly increased the cumulative water uptake compared to control. Maximum cumulative water uptake of 49.33 g/fl was recorded in 100ppm Silver nitrate + 6% sucrose + 400 ppm 8-HQS followed by treatment with 200ppm Sodium benzoate + 4% sucrose + 200 ppm 8-HQS which recorded 46.67 g/fl compared to other concentrations and control (26.33 g/fl). A significant

influence was noticed on water uptake of gerbera by silver nitrate with sucrose and 8-HQS as compared to control. This might be due to germicidal activity of silver nitrate and 8-HQS, hence improving water uptake by reducing bacterial blockage (Halvey and Mayak, 2; Vaidya and Collis, 6) and minimizing loss in fresh weight.

The cut flowers of Gerbera cv. President treated with chemicals at different concentration significantly increased the cumulative water loss compared to control. Maximum cumulative water loss of 59.33 g/fl was recorded in 100 ppm silver nitrate + 6% sucrose + 400 ppm 8-HQS followed by treatment with 200ppm Sodium benzoate +4% sucrose + 200 ppm 8-HQS which recorded 55.67 g/fl compared to other concentrations and control (32.33 g/fl). Results are in agreement with Dasgupta (1) and Vaidya and Collis (7). Flowers treated with silver nitrate in combination with 8-HQS showed water loss but still recorded a long vase life compared to control. This is in accordance with results obtained by Yogitha (8).

All the treatments including control showed minimum water uptake to water loss ratio. However, among the different treatments, T₄, T₇ and T₈ recorded maximum water uptake to water loss (0.88) and it can be observed from the Table 1 that the cut flowers

recorded a negative water balance in all the treatments including control.

Cut flowers treated with chemicals at different concentration significantly increased the fresh weight compared to control. Maximum fresh weight of 39.67 g/fl was recorded in 100 ppm silver nitrate + 6% sucrose + 400 ppm 8-HQS followed by treatment 200ppm Sodium benzoate +4% sucrose + 200 ppm 8-HQS which recorded 37.33 g/fl compared to other concentrations and control (34.00 g/fl).

The significant increase in fresh weight was due to silver compounds and this is attributed to the inhibition of ethylene production during vase life and minimizing loss in fresh weight. These results are in close agreement to observation made by Han and Lee (3).

Maximum vase life of 9.63 days was recorded in 100 ppm silver nitrate + 6% sucrose + 400 ppm 8-HQS followed by treatment with 200ppm sodium benzoate +4% sucrose + 200 ppm 8-HQS which recorded 9.10 days compared to other concentrations and control (7.57 days).

Presence of bacteria in the basal stem portion of cut gerbera

Data with respect to the presence of bacterial presence in the basal stem segment of cut gerbera is

Table 1 : Effect of chemical floral preservatives on vase life of cut flowers of gerbera cv. President.

Treatment	Water uptake (ml)	Water Loss (ml)	Water uptake :loss ratio	Water balance	Fresh weight (g)	Vase life (days)
T ₁ : 200ppm Aluminum sulphate +4% sucrose + 200 ppm 8-HQS	39.00	45.00	0.87	-6.0	31.33	8.13
T ₂ : 400ppm Aluminum sulphate +6% sucrose + 400 ppm 8-HQS	37.00	43.00	0.86	-6.0	32.33	8.20
T ₃ :T ₁ + 100ppm Silver thiosulphate	36.67	45.67	0.80	-9.0	33.33	8.40
T ₄ :T ₂ + 150ppm Silver thiosulphate	44.67	50.67	0.88	-6.0	36.33	8.63
T ₅ :200ppm Sodium benzoate +4% sucrose + 200 ppm 8-HQS	46.67	55.67	0.84	-9.0	37.33	9.10
T ₆ :300ppm Sodium benzoate + 6% sucrose + 400 ppm 8-HQS	45.33	53.33	0.85	-8.0	34.33	8.70
T ₇ :T ₅ + 100ppm Silver thiosulphate	43.67	49.67	0.88	-6.0	33.33	8.83
T ₈ :T ₆ + 150ppm Silver thiosulphate	42.67	48.67	0.88	-6.0	32.67	9.03
T ₉ :50ppm Silver nitrate + 4% sucrose + 200 ppm 8-HQS	41.33	47.33	0.87	-6.0	34.33	8.50
T ₁₀ :100ppm Silver nitrate + 6% sucrose + 400 ppm 8-HQS	49.33	59.33	0.83	-10.0	39.67	9.63
T ₁₁ : T ₉ + 100ppm Silver thiosulphate	38.67	44.67	0.87	-6.0	36.33	8.20
T ₁₂ :T ₁₀ +150ppm Silver thiosulphate	38.33	44.33	0.86	-6.0	34.00	7.90
T ₁₃ : Control (Distilled water)	26.33	32.33	0.81	-6.0	34.00	7.57
CD (P=0.05)	1.01	1.01	0.06	0.003	1.14	0.066

presented in Table 2. The basal cut stems of size 2.5 cm were taken and subjected to microbial examination. From the table, it is evident that the basal stem portion recorded the presence of Pseudomonas and Bacillus. They were found more in control as compared to the treatment 100ppm Silver nitrate + 6% sucrose + 400 ppm 8-HQS which are in line of Dasgupta (1).

Table 2: Bacterial presence in the basal stem segment of cut flowers of gerbera cv. President.

Treatment	<i>Bacillus spp.</i>	<i>Pseudomonas spp.</i>
100 ppm Silver nitrate + 6% sucrose + 400 ppm 8-HQS	++	++
Control	++++	+++

Conclusion

The best flower longevity was recorded in the treatment of 100ppm Silver nitrate + 6% sucrose + 400 ppm 8-HQS preservative solution and the lowest vase life was recorded from cut flowers treated with water. Generally, it can be concluded that use of 100ppm Silver nitrate + 6% sucrose + 400 ppm 8-HQS preservative solution for flower longevity and maintaining post-harvest characteristics of Gerbera cv. President cut flowers.

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Citation : Amith R., Patil R.M., Chetan T., Katagi A. and Chikkasubbanna, V. (2015). Effect of chemical floral preservatives on vase life of cut flowers of gerbera cv. President. *HortFlora Res. Spectrum*, **4**(1) : 73-75