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INFLUENCE OF CHEMICAL FLORAL PRESERVATIVES ON VASE LIFE OF CUT FLOWERS OF GERBERA CV. AMBRA

R. Amith[1], Ravishankar M. Patil[2]*, Prashant Paramagoudar[2]* and V. Chikkasubbanna[2]

[1]*A.H.O., Department of Horticulture, Karnataka*

[2]*University of Horticultural Sciences, Bagalkot,Karnataka, India*

**E-mail: ravishankar.horti@gmail.com; payaprashant@gmail.com*

ABSTRACT: Gerbera cv. Ambra was subjected to twelve different treatment combinations against control to study the vase life, where treatment with 300ppm Sodium benzoate + 6% sucrose + 400 ppm 8-HQS showed significant beneficial effect in extending the vase life of the cultivar to 14 days, as against 9.03 days of vase life in control. The findings provide an alternative for extending the vase life of cut gerbera flowers.

Keywords : *Gerbera, Ambra, STS, HQS, sodium benzoate, 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, colorful flower borders or beds (Thangaraj *et al.,* 5). The first scientific description of a Gerbera was made by J.D. Hooker in Curti's Botanical Magazine in 1889, when he described *Gerbera jamesonii*, a South African species also known as Barberton Daisy. 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 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. Then about an inch (2.5 cm) of basal portion of stem was cut to evaluate for presence of bacteria. Then stems were cut to a uniform length of 50cm. Then each flower stalk was placed in 500ml bottle containing 250 ml of aqueous solutions of different chemical preservatives used individually or in combination as detailed (Table 1) in each experiments or 250 ml of distilled water. Distilled water was used to increase experimental variability. Data on following parameters were observed and analysed statistically.

1. Water uptake : Difference between consecutive weights of bottle with the solution (without flower) represents water uptake in grams for the period. Cumulative water uptake was recorded for the entire period of vase life of the flower stalk.

2. Water lost due to transpiration : Difference between consecutive weights of bottle + solution + flower represents transpirational loss of water (in grams) for that period. Cumulative water loss was recorded for the entire period of vase life of the flower stalk.

3. Water balance : Water balance was calculated using the formula water balance = water uptake - transpirational loss of water.

4. Fresh weight of the flower : Fresh weight of the flower (in grams) was recorded daily by calculating the difference between weight of bottle + solution + flower and weight of bottle + solution.

5. Vase life : Vase life commenced at the onset of placing the flowers in holding solutions up to the date of discard. Vase life was decided depending upon wilting of one or two petals of outer row of ray florets.

6. Bacterial count : Plate count technique was adopted to estimate the presence of bacteria. Stem pieces of 2.5 cm 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 plated 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

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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 gerebra cv. Ambra treated with chemicals at different concentration significantly increased the cumulative water uptake compared to control. Maximum cumulative water uptake of 59.67 g/fl was recorded in 300ppm Sodium benzoate + 6%sucrose + 400 ppm 8-HQS followed by treatment with 100ppm Silver nitrate + 6%sucrose + 400 ppm 8-HQS which recorded 57.67 g/fl compared to other concentrations and control (35.33 g/fl).

A significant influence was noticed on water uptake of gerbera by Sodium benzoate with sucrose and 8-HQS as compared to control. This might be due to germicidal activity of 8-HQS, hence improving water uptake by reduceing bacterial blockage (Halvey and Mayak, 3) and also Sodium benzoate helps in minimizing loss in fresh weight.

The cut flowers of gerebra cv. Ambra treated with chemicals at different concentration significantly increased the cumulative water loss compared to control. Maximum cumulative water loss of 69.67 g/fl was recorded in 300ppm Sodium benzoate + 6%sucrose + 400 ppm 8-HQS followed by treatment with 100ppm Silver nitrate + 6%sucrose + 400 ppm 8-HQS which recorded 61.67 g/fl compared to other concentrations and control (43.67 g/fl).

Flowers treated with sodium benzoate in combination with sucrose and 8-HQS showed water loss but still recorded a long vase life compared to control. This is in accordance with results obtained by Chand *et al.* (1), and Yogitha (8).

All the treatments including control showed minimum water uptake to water loss ratio. However, among the different treatments T_{10}, recorded maximum water uptake to water loss (0.94) 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

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

Treatments	Water uptake	Water loss	Water uptake :loss ratio	Water balance	Fresh weight	Vase life
T_1 : 200ppm Aluminum sulphate +4% sucrose + 200 ppm 8-HQS	30.33	39.33	0.77	-9.0	24.00	10.00
T_2 : 400ppm Aluminum sulphate +6% sucrose + 400 ppm 8-HQS	43.00	58.00	0.74	-15.0	36.67	12.00
T_3 : T_1 + 100ppm Silver thiosulphate	37.33	41.33	0.90	-4.0	20.00	11.00
T_4 : T_2 + 150ppmSilver thiosulphate	28.67	35.33	0.81	-6.7	17.33	10.20
T_5 : 200ppm Sodium benzoate +4% sucrose + 200 ppm 8-HQS	30.00	43.00	0.70	-13.0	30.33	10.43
T_6 : 300ppm Sodium benzoate + 6%sucrose + 400 ppm 8-HQS	59.67	69.67	0.86	-10.0	39.00	14.00
T_7 : T_5 + 100ppm Silver thiosulphate	48.33	60.33	0.80	-12.0	24.00	9.70
T_8 : T_6 + 150ppm Silver thiosulphate	21.00	34.00	0.62	-13.0	24.33	9.60
T_9 : 50ppm Silver nitrate + 4%sucrose + 200 ppm 8-HQS	36.67	43.67	0.84	-7.0	24.33	12.00
T_{10} : 100ppm Silver nitrate + 6%sucrose + 400 ppm 8-HQS	57.67	61.67	0.94	-4.0	24.67	13.00
T_{11} : T_9 + 100ppm Silver thiosulphate	17.33	37.00	0.65	-13.0	28.67	10.40
T_{12} : T_{10} +150ppm Silver thiosulphate	24.00	31.33	0.55	-14.0	28.33	10.50
T_{13} : Control (Distill water)	35.33	43.67	0.81	-8.3	22.00	9.03
CD (P=0.05)	1.14	1.14	0.03	1.2	1.52	0.060

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

Treatment	*Bacillus spp.*	Pseudomonas spp.
300ppm Sodium benzoate + 6%sucrose + 400 ppm 8-HQS	+	+
Control	+++	++

compared to control. Maximum fresh weight of 39.00 g/fl was recorded in 300ppm Sodium benzoate + 6%sucrose + 400 ppm 8-HQS followed by treatment 400ppm Aluminum sulphate +6% sucrose + 400 ppm 8-HQS which recorded 36.67 g/fl compared to other concentrations and control (22.00 g/fl).

Increase in fresh weight was noticed in flowers treated with sodium benzoate as compared to control and maximum fresh weight 39.00 g/fl was recorded in cv. Ambra with 300 ppm sodium benzoate. This might be due to the improvement in water uptake of gerbera. Same results were observed by Yldrm *et al.* (7).

Significant influence was observed with sodium benzoate on vase life of gerbera flowers at 300 ppm sodium benzoate in cv.Ambra. Longevity was extended to 14 days followed by 13 days as against control. The similar results are in parallel with Vaidya and Collis (6) and Yldrm *et al.* (7).

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 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 50ppm 300ppm Sodium benzoate + 6%sucrose + 400 ppm 8-HQS (Dasgupta, 2).

CONCLUSION

The best flower longevity was recorded in the treatment of 300ppm Sodium benzoate + 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 300 ppm Sodium benzoate + 6% sucrose + 400 ppm 8-HQS preservative solution for flower longevity and maintaining post-harvest characteristics of Gerbera cv. Ambra cut flowers.

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