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# Effect of different vase solutions on vase life of gerbera (*Gerbera jamesonii*) var. orange classic

**Ravneet Singh and Dr. Jujhar Singh**

**Abstract**
The research on "Effect of different vase solutions on vase life of gerbera (*Gerbera jamesonii*) var. Orange Classic was conducted in Mata Gujri College, Fatehgarh Sahib during the educational year 2022-2023 inside the laboratory of Department of Agriculture, to determine the best vase solution for vase life of gerbera. The experiment was laid out in Completely Randomized Design (CRD) with three replications comprising of seven treatment combinations. The treatments for Gerbera. $T_1$: Control (Tap water), $T_2$: Distilled water, $T_3$: Distilled water + 4% Sucrose, $T_4$: 200 ppm Salicylic acid, $T_5$: 200 ppm citric acid, $T_6$: 200 ppm Salicylic acid + 4% Sucrose, $T_7$: 200 ppm citric acid + 4% Sucrose. It was concluded that in case of vase life, non-significant difference was found among Gerbera treatments. Treatment $T_6$ i.e. 200 ppm Salicylic acid + 4% Sucrose was found best vase solution for increasing vase life of gerbera cut flower which was found at par with treatment $T_7$: 200 ppm citric acid + 4% Sucrose.

**Keywords:** *Gerbera jamesonii*, cut flower, vase life, sucrose, salicylic acid, citric acid

## Introduction
Flowers, the crowning glory of God's creation are inseparable part of human life. They are part of age-old tradition and culture of Indian society, symbolizing purity, beauty, peace, love and passion. The cut flower and stalk are both living things. In global market demand of cut flowers increases day by day at the rate of 10-15% yearly (Muhammad *et al.* 2017) [17]. Nearly 30% of flowers are thought to have died during post-harvest handling (Singh *et al.* 2020) [18]. The ability of cut flowers to last for a long period in a vase is now given a lot of attention (Hassan *et al.* 2018) [19]. Biocides are the chemicals used to inhibit growth in the vase water as well as on the stem surface. Important biocides used for treating cut flowers are citric acid, salicylic acid, silver nitrate, ethanol, slow release chlorine, sucrose and ammonium compounds (Fairman *et al.* 2017) [6]. Cut gerbera are used in bouquets to convey our emotions or when it comes to special occasions like Valentine's Day, Christmas Day, Mother's Day etc. because they may be used in floral arrangements. Miniature gerbera are becoming more and more popular (Amariutei *et al.* 2021) [20]. Sucrose treatment encouraged the opening of the petals reduces the fresh dry weight loss in cut flowers and inhibits the senescence of the petals (Ichmura *et al.* 2015) [11]. The vase life of gerbera species is increased when flowers are treated with solutions containing sucrose (5-15%). Some organic acids such as salicylic acid (SA), citric acid, malic acid, and ascorbic acid play important roles in extending the postharvest longevity of cut flowers (Jin *et al.* 2016). The demand for flowers, both cut and loose on the domestic market and for export, is rising quickly. India is 14$^{th}$ largest exporters of floricultural products in the world (Singhal *et al.* 2022) [14]. Present experiment was conducted in order to find out the effect of concentration of different vase solutions on vase life of gerbera (*Gerbera jamesonii*) var. Orange Classic.

## Material and Methods
The experiment was carried out in floriculture lab at Mata Gujri College, Sri Fatehgarh Sahib, and Punjab during 2022-2023. The treatments for Gerbera. $T_1$: Control (Tap water), $T_2$: Distilled water, $T_3$: Distilled water + 4% Sucrose, $T_4$: 200 ppm Salicylic acid, $T_5$: 200 ppm citric acid, $T_6$: 200 ppm Salicylic acid + 4% Sucrose, $T_7$: 200 ppm citric acid + 4% Sucrose. The stems of gerbera were dipped in water immediately after harvest to reduce the field heat. The gerbera flowers were harvested when the outer one to two petals unfurled from the tip. The stems were cut into a uniform length of 45 cm and all leaves were stripped except 2-3 leaflet leaves along the tip of the stem. Initial weight was taken by using weighing balance.

Then these cut flower stems of gerbera were kept in glass bottles and 300 ml preservative solution prepared in the laboratory was filled in each bottle and only one stem of each flower was kept in each glass bottle. In case of gerbera flowers, 21 flowers were kept in 21 bottles. Any changes in the gerbera stem was regularly evaluated at regular intervals. Parameters like weight loss (g), Days taken to bud opening, Days taken for flower dropping, Days taken for petal discoloration, Days taken for petal shriveling, Water uptake and Vase life (Days) were taken into consideration and accordingly the results were obtained. The treatment means were compared by the Least Significant Difference (LSD) test at 5% level (Gomez & Gomez, 1984) [7]. The chemicals used in the study are as follows:

**Sucrose solution:** Sucrose solution of 4.0%, 10% and 15% for gerbera and carnation respectively were prepared by dissolving 40 g, 100 g and 150 g sucrose in one litre of distilled water.

**Salicylic acid:** For gerbera 200 ppm solution of salicylic acid were prepared by dissolving 200 mg of salicylic acid in one liter of distilled water.

**Citric acid:** For gerbera 200 ppm solution of citric acid were prepared by dissolving 200 mg of citric acid in one liter of distilled water.

## Results and Discussion

### Weight loss (g)

Mean data regarding the fresh weight of gerbera (*Gerbera jamesonii*) measured in grams, is presented in Table. In gerbera, among different treatments, minimum weight loss (8.05 g) was recorded in treatment $T_1$ (Control) which was followed by treatment $T_5$ (200 ppm citric acid) with value (9.00 g) and treatment $T_4$ (200 ppm Salicylic acid) with value (9.20 g). Maximum weight loss (10.75) was recorded in treatment $T_6$ (200 ppm Salicylic acid + 4% Sucrose) which was followed by treatment $T_3$ (200 ppm citric acid) with value (9.75 g).

### Solution uptake (ml)

In gerbera, the data pertaining to solution uptake was found to be non-significant whereas among different treatments, maximum solution uptake (29.76) was observed in treatment $T_6$ (200 ppm Salicylic acid + 4% Sucrose). Minimum solution uptake (26.67) was obtained in treatment $T_1$ (Control). The findings also be supported by Chand *et al.* 2012 [21] in Gerbera and Liho *et al.* 2014 [22] in carnation.

### Bud opening (Days)

In gerbera, among different treatments, maximum number of days (6.75) for bud opening were taken by treatment $T_6$ (200 ppm Salicylic acid + 4% Sucrose). Least number of days (3.84) for bud opening were recorded in treatment $T_1$ (Control) which was followed by treatment $T_2$ (Distilled water) with value (4.00) and treatment $T_4$ (200 ppm Salicylic acid) with value (4.67).

In gerbera flower stalks tend to have soft stems, they required preservation solutions. This may be because sucrose gives plants the energy they need to grow and hastens the opening of flower buds. The sugar concentration in preservative treatments speed up bud's opening (Singh and Tiwari, 2012) [23]. Our findings also get supported from the findings of Elgimabi, (2011) [5] in gerbera, Sharma and Bhardwaj (2020) [13] in carnation.

### Petal discoloration and shrivelling

In gerbera, among different treatments, maximum number of days for petal discoloration and shriveling was recorded in treatment $T_6$ (200 ppm Salicylic acid + 4% Sucrose) which was followed by treatment $T_7$ (200 ppm citric acid + 4% Sucrose). Minimum number of days in petal discoloration and shriveling were obtained in treatment $T_1$ (Control) which was followed by treatment $T_2$ (Distilled water). Similar results were obtained by Reddy and Singh (1996) [12] in gladiolus, Khader *et al.* in tuberose.

### Vase life

In gerbera, among different treatments, maximum vase life (10.33) was observed in treatment $T_6$ (200 ppm Salicylic acid + 4% Sucrose) which was followed by treatment $T_7$ (200 ppm citric acid + 4% Sucrose) with value (9.67) and treatment $T_3$ (15% Sucrose + 5% ethanol) with value (9.33). Minimum vase life (6.67) was obtained in treatment $T_1$ (Control) which was followed by treatment $T_2$ (Distilled water) with value (7.33).

The main cause of degradation in cut flowers is xylem occlusion, which is caused by air and microbes blocking xylem channels (Hardenburg, 2009) [8]. Salicylic acid and citric acid when applied to cut flowers as a preservation solution it decreased the rate of respiration and ethylene evolution, delayed the occurrence of the respiration and ethylene peak levels, and inhibited the degradation of chlorophyll in leaves, resulting in an extended vase life and the longevity of individual flowers (Singh *et al.* 2021) [24].

### Flower dropping

In gerbera, the data pertaining to flower dropping was found to be non-significant whereas among highest days (18.68) for flower dropping was noticed in treatment $T_6$ (200 ppm Salicylic acid + 4% Sucrose). Minimum days (14.52) for flower dropping was obtained in treatment $T_1$ (Control).

It may be because sucrose, salicylic acid and citric acid boosted solution intake while decreasing ethylene production and microbial activity that might clog xylems, delaying flower senescence. As a consequence, the bloom's delayed senescence phase lasted longer until the flower dropping. The findings are closely related to the earlier findings of Sharma and Bhardwaj, (2018) [25] and Naire *et al.* (2017) [10] in carnation. The findings of Elgimabi, (2011) [5] and Butt, (2003) [4] in gerbera also support the results.

**Table 1:** Effect of different vase solutions on vase life of gerbera (*Gerbera jamesonii*) var. Orange Classic

| Treatments | Weight loss (g) | Solution uptake (ml) | Bud opening (Days) | Petal discoloration (Days) | Petal shriveling (Days) | Vase life (Days) | Flower dropping (Days) |
|---|---|---|---|---|---|---|---|
| $T_1$ | 8.05 | 26.67 | 3.84 | 7.77 | 10.00 | 6.67 | 14.52 |
| $T_2$ | 9.32 | 27.49 | 4.00 | 8.33 | 10.23 | 7.33 | 15.00 |
| $T_3$ | 9.75 | 28.33 | 5.35 | 9.00 | 12.45 | 9.33 | 16.57 |
| $T_4$ | 9.20 | 27.00 | 4.67 | 8.15 | 11.69 | 7.00 | 15.33 |
| $T_5$ | 9.00 | 27.67 | 5.00 | 8.62 | 13.00 | 7.67 | 17.00 |
| $T_6$ | 10.75 | 29.76 | 6.75 | 10.68 | 13.67 | 10.33 | 18.68 |
| $T_7$ | 10.61 | 28.52 | 5.68 | 9.31 | 12.52 | 9.67 | 17.45 |
| SE (m) ± | 0.40 | 1.03 | 0.34 | 0.46 | 0.46 | 0.37 | 2.33 |
| $CD_{0.05\%}$ | 1.20 | NS | 1.04 | 1.37 | 1.37 | 1.10 | NS |

## Conclusion

From the present studies, it can be concluded that for vase life of gerbera there was non-significant difference observed among gerbera treatments. Salicylic acid + 4% Sucrose was found best vase solution for Gerbera cut flower.

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## Conflict of Interest

I have no personal motivation to have my paper published. For professional reasons, I wish to publicize it.

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