# EFFECT OF CONTINUOUS TREATMENT WITH SUCROSE SOLUTION ON THE VASE LIFE AND QUALITY OF GERBERA FLOWERS. Cv Pink Elegance

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## ABSTRACT

Gerbera is a genus of plants in the Asteraceae family and is also commonly known as the African daisy. The plant produces spectacular flowers (capitula) of 4 to 5 cm in diameter with normally orange-red, yellow, orange, white and pink ray florets. Vase life is the period during which a cut flower or cut foliage retains its appearance in a vase. This is a major consideration in identifying plant species suitable for use in floristry, as plants with a long vase life are far more desirable than those with a short vase life. Vase life also varies across plant species and cultivars. Chemical treatments that can extend the vase life in flowers and is a major component of floriculture research. In this experiment the effect of sucrose at different concentrations in the vase solution on postharvest quality and vase life was observed. Sucrose solution significantly influenced the postharvest quality and vase life of gerbera flowers with respect to all parameters. Sucrose 12% significantly maintained best results in days taken for stem bending, days taken for petel shriveling, Stem diameter (mm), Vase life (days), drooping of flower heads, discolouration of petals, Time taken to flower opening and drooping of flower heads.

**Keywords:** Gerbera, vase life, sucrose

## INTRODUCTION

The major consideration in identifying plant species suitable for use in floristry plants with a long vase life being far more desirable than those with a short vase life. Gerbera is a genus of plants in the Asteraceae family. It was named in honour of German botanist and medical doctor Traugott Gerber. Gerbera species bear a large capitulum with striking two-lipped ray florets in yellow, orange, white, pink or red colours. The capitulum, which has the appearance of a single flower is actually composed of hundreds of individual flowers. The morphology of the flowers varies depending on their position in the capitulum. The flower heads can be as small as 7 cm in diameter or up to 12 cm. Gerbera is very popular and widely used as a decorative garden plant and

as cut flowers. It is one of the popular cut flower having short vase life and are mostly used freshly, so the improvement vase life is one the required quality to the customers. All holding solutions must contain essentially two components, sugar and germicides. The sugar provides a respiratory substrate, while the germicides control harmful bacteria and prevent plugging of the conducting tissues. Among all the different types of sugars, sucrose has been found to be the most commonly used sugar in prolonging vase life of cut flowers (Redman, *et al.*, 2002). The major reasons for less vase life of cut flowers may be due to nutrient deficiency, bacterial and fungal infection, water stress-induced wilting and vascular blockage (Alaey *et al*., 2011). Water balance in flowers also play important role in maintaining flower turgidity, freshness, petal orientation and proper bud opening. There is important role of sugars in vase solution that increase the postharvest flower quality and life of different cut flowers (Bhattacharjee and De, 2005).

## MATERIALS AND METHODS

Experiment was conducted at Department of Horticulture, Faculty of Agriculture, Annamalai University from 2017 to 2018 to find out the best suitable concentration of sucrose for extending the vase life of gerbera. The flowers were harvested at stage when two outer rows of disc florets are perpendicular to the stock and kept in bucket containing cold water to remove field heat. The preservative solution was freshly prepared by using distilled water and then flowers were placed in vase solution. Pink Elegance variety of gerbera was used for the experiment. The details of various concentrations of sucrose solution used in the experiment are described here. $T_1$-Sucrose @ 2%, $T_2$-Sucrose @ 4%, $T_3$-Sucrose @ 6%, $T_4$-Sucrose @ 8%, $T_5$-Sucrose @ 10%, $T_6$-Sucrose @ 12%, $T_7$-Sucrose 14%, $T_8$-Sucrose @ 16%, $T_9$- Control ( Distilled water), using Completely Randomized Design with three replications. The flowers were continuously held in the holding solution and the postharvest physiological characteristics of the flower were studied throughout the vase life period. Datas were recorded at $10^{th}$ day day of the experiment.

## RESULTS AND DISCUSSION

Among the various treatments the stem diameter of gerbera flowers showed variation among different vase solutions at different days after treating. Maximum stem diameter was found in $T_8$ (6.91 mm) followed by $T_7$ (6.26 mm) while minimum from $T_9$ (1.98 mm) at $6^{th}$ day. Freshness of gerbera flower showed variation among the vase solution at different days after treating. Petal shriveling conditions wrinkle and contract, especially due to loss of moisture where found late in $T_7$ (12.51 days) followed by $T_8$ (11.14 days) at $6^{th}$ days after placing in vase solutions. Early Petal shriveling was recorded in $T_9$ (5.79 days). Days to first stem bending was varied among the vase solution. Late stem bending was found from $T_7$ (11.79 days) followed by $T_8$ (10.91 days) while early stem bending was found in $T_9$ (5.22 days). Vase life of gerbera also varied among the vase solutions. Maximum vase life was found in $T_7$ (10.17 days) followed by $T_8$ (9.26 days) while minimum days flowers remain fresh in vase was in $T_9$ (4.59 days).

Table. 1 - postharvest handling of gerbera flowers with sucrose solutions

| Vase solutions | drooping of flower heads | Days taken for petal fall | Days taken for petel shriveling | Solution uptake (ml) | Stem diameter (mm) | Vase life (days) |
|---|---|---|---|---|---|---|
| $T_1$ | 7.12 | 8.22 | 10.23 | 64.55 | 4.91 | 822 |
| $T_2$ | 7.55 | 8.91 | 10.74 | 65.61 | 5.26 | 8.96 |
| $T_3$ | 7.87 | 9.47 | 11.06 | 64.93 | 5.75 | 9.13 |
| $T_4$ | 7.65 | 9,43 | 11.58 | 65.74 | 5.88 | 9.78 |
| $T_5$ | 8.15 | 10.81 | 12.06 | 66.29 | 6.07 | 9.73 |
| $T_6$ | 8.64 | 10.21 | 11.65 | 66.91 | 6.11 | 10.02 |
| $T_7$ | 9.62 | 11.23 | 12.51 | 67.54 | 6.26 | 10.17 |
| $T_8$ | 7.87 | 10.93 | 11.14 | 65.26 | 5.91 | 9.26 |
| $T_9$ | 4.23 | 5.27 | 5.79 | 48.13 | 1.98 | 4.59 |
| SE (d) | 0.17 | 1.37 | 1.64 | 0.18 | 1.40 | 0.26 |
| CD (p=0.05) | 0.35 | 2.81 | 3.38 | 0.37 | 2.89 | 0.53 |

Flower longevity and quality of cut flowers in vase solution depend on number of factors like genetical constituents, pre-harvest conditions, harvesting technique, packaging, post-harvest handling and storage. From the current study 14 % sucrose was found the best treatment for all of the studied parameters which was closely followed by 16 % sucrose. The vase life of Gerbera is mostly depends on bent neck, drooping of flower heads and discolouration of petals. The slowest stem bending was found in the gerbera kept in the treatment solution of 14 % sucrose. Sugar acts as the carbohydrate source and also makes the cells of the gerbera stem concentrated with sugars that are carried up by the phloem (Ichimura & Hisamatsu 1999). The hypertonic solutions inside the cells allow water to enter the cells by osmosis and thus make them turgid. This turgidity gives the stem a rigid, upright structure. The longest vase life was found in the treatment containing a combination of 14 % sucrose.

Fig. 2 - postharvest handling of gerbera flowers with sucrose on Days taken for stem bending

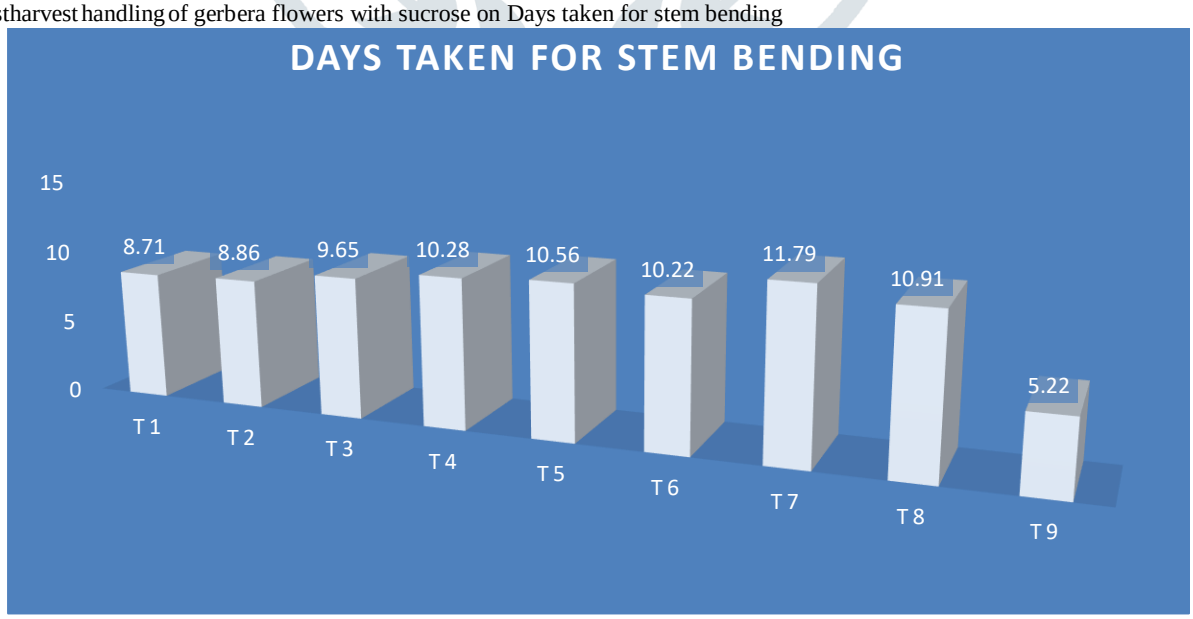
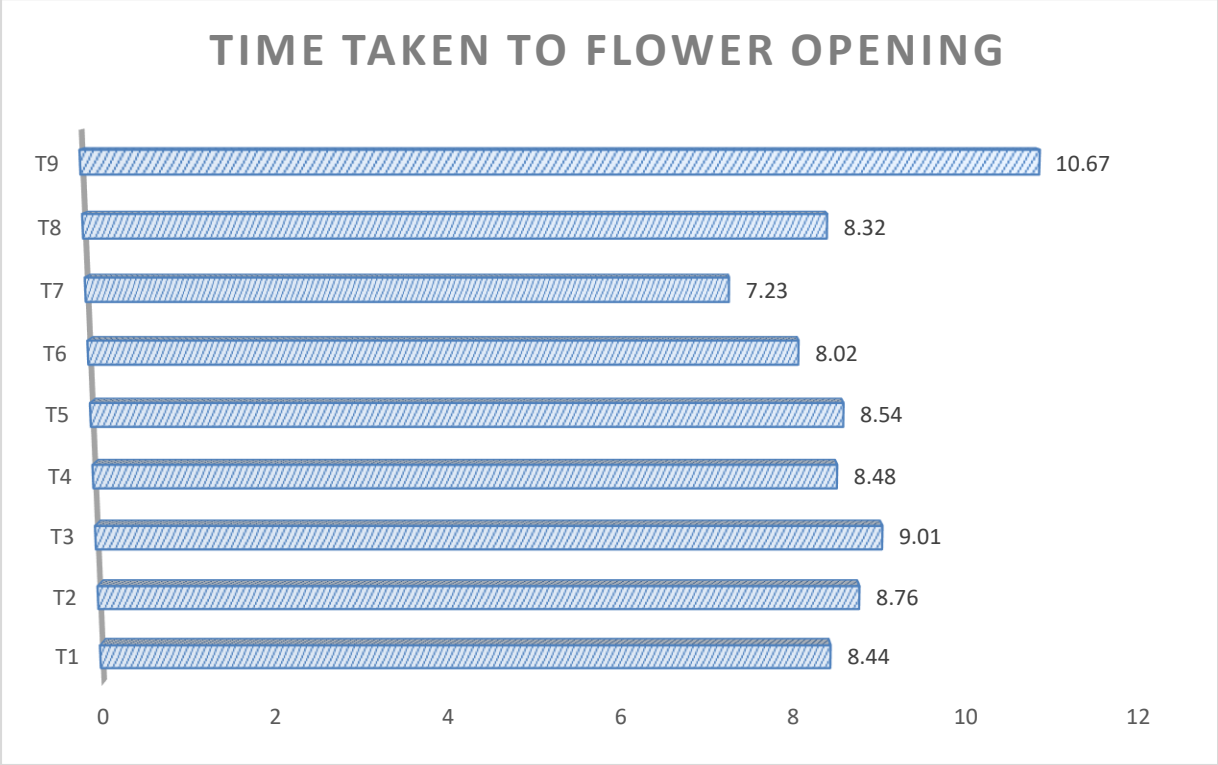
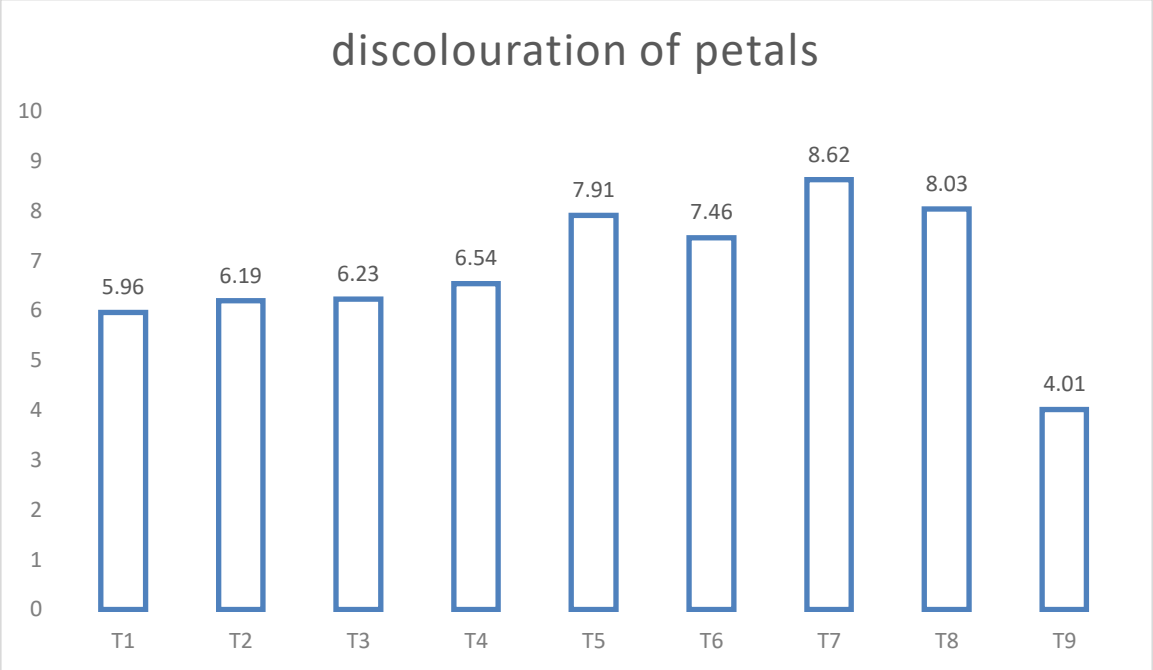


Fig. 3 - postharvest handling of gerbera flowers with sucrose on Time taken to flower opening




Sucrose serves the food for cut flowers and reduces starch degradation which is important to increase the vase life of cut flowers (Mehraj *et al*., 2013). Low carbohydrate levels in stem will reduce vase life (Hashemabadi and Gholampour, 2006) while Sugars are essential precursors for cut flower respiration. Longevity of many cut flowers is negatively influenced by the presence of ethylene by inducing various physiological responses like abscission and wilting of leaves, petals and sepals. The fungal infection was present in this optimum treatment solution as well, contrary to the theory that microbes are a major determinant of vase life (Marandi *et al*., 2011). The maximum time taken to open the disc florets was recorded in sucrose 14 % solution.

Fig. 4 - postharvest handling of gerbera flowers with sucrose on discolouration of petals




## CONCLUSION

During the present study it has been recorded that Sucrose solution significantly influenced the postharvest quality and vase life of gerbera flowers with respect to all parameters. Sucrose 14% maintained best results in days taken for stem bending, days taken for petel shriveling, Stem diameter (mm), Vase life (days), drooping of flower heads, discolouration of petals, Time taken to flower opening and drooping of flower heads.

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