



## EXTENDING THE STORAGE-LIFE OF GERBERA FLOWERS CV. 'LEXINGTON' USING COLD STORAGE

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### ABSTRACT

The experiment was conducted at Ecofrost Technologies Pvt. Ltd., Pune, Maharashtra, to study the effects of tap water, Sucrose, and Sucrose + Citric acid solution treatments on the post-harvest storage-life of cut flowers of Gerbera cv. 'Lexington' inside cold storage as well as at room conditions. Gerbera flowers treated with (2% Sucrose + Citric acid 0.2%) (T4) holding solution resulted in the longest storage-life of the cut flowers (13.3 days). Optimum weight of the cut flower (g) on the 3rd, 6th and 10th days was best maintained using treatment i.e. Sucrose 2% (T3).

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### INTRODUCTION

Gerbera (*Gerbera jamesonii* L.) is an important ornamental plant with beautiful colourful flowers used as cut, pot and garden flowers. It belongs to the *Asteraceae* family, originating in Southern Africa and Asia. It is a herbaceous, vivacious plant that grows to a height of approximately 45 cm. The elongated leaves are arranged in rosettes, reaching up to 40 cm in length. Furthermore, its leaf blades exhibit variations in size and colour depending on the cultivar. The flower buds originate in the axils of some leaves, develop large scapes, and exhibit a terminal inflorescence known as a capitulum. The floral stem is slightly hairy, and its length and diameter vary depending on the cultivar, plant age and growth conditions. Some long-stem cultivars grow up to above 40cm in height and are appropriate for use as cut flowers, whereas the most compact cultivars are used as pot flowers. Normally, Gerbera plant starts flowering about three months after planting. Harvesting is done when flowers open completely or when 2 or 3 rows of disc florets are perpendicular to the stalks.

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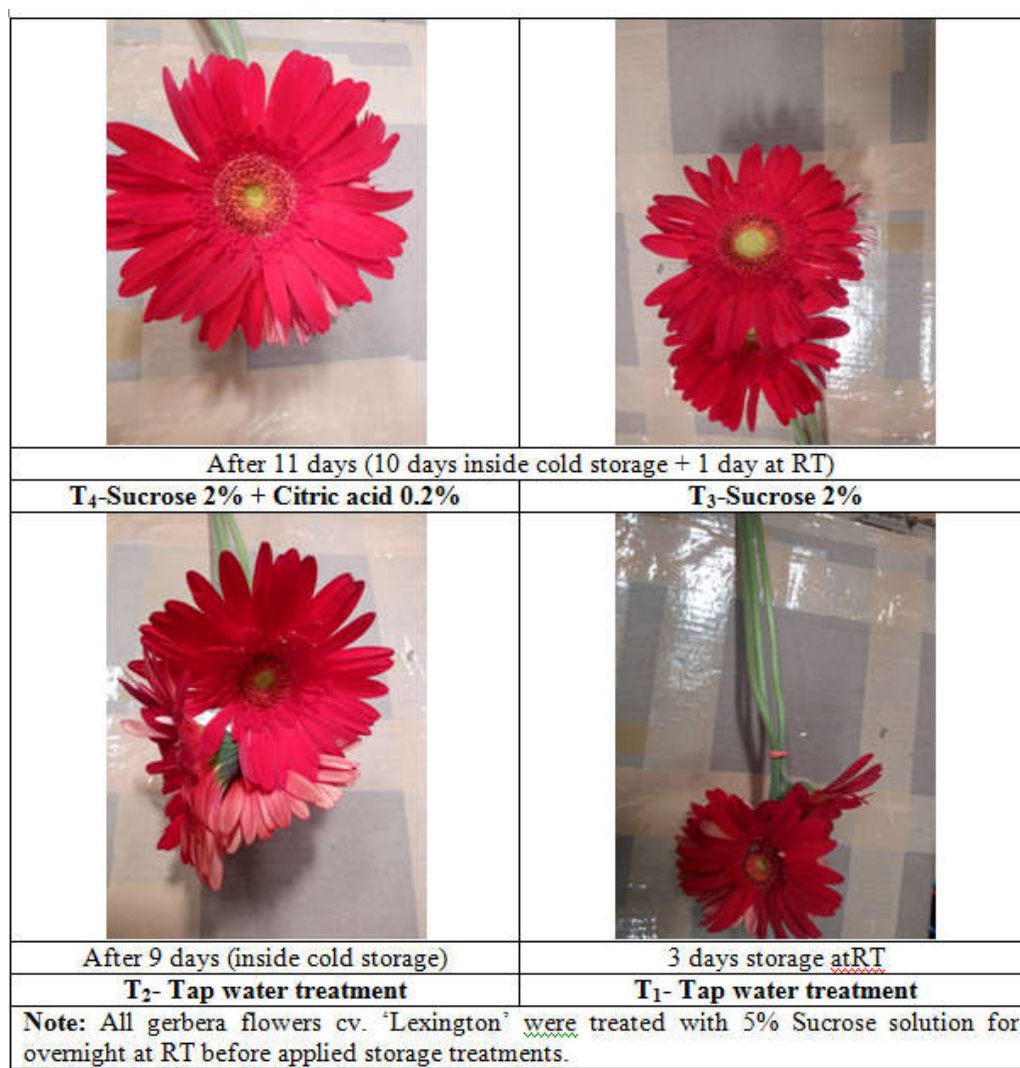
For marketing of cut flowers, the gerbera is harvested by cutting the stem from the base, leaving 1-2 cm stalk of flower to the main plant stem. The cut stem of flowers treated with different flower preservatives will extend the longevity of the flowers. The stage of cutting of the flowers depends on the distance of the market where the flowers are to be sold.

### MATERIALS AND METHODS

The experiment was carried out at the Agricultural Laboratory of Ecofrost Technologies Pvt. Ltd., Pune during September 2016. The aim of this study was to examine the effect of the combination of Sucrose + Citric acid as well as the individual effect of Sucrose in vase solutions on post-harvest storage-life of Gerbera cv. 'Lexington' flowers. Flowers were harvested in the morning before sunrise by clipping with a sharp knife that gives a clean cut. The ends of the flower-stalk were treated with 5% Sucrose solution for 24 hrs before cold storage. There were 4 treatments consisting of tap water (T<sub>2</sub>), Sucrose 2% (T<sub>3</sub>) and Sucrose 2% + Citric acid 0.2% (T<sub>4</sub>) along with control (tap water treatment) (T<sub>1</sub>) and replicated five times. In the last three treatments, treated flowers were kept in cold storage at 4°C and 93% RH for 10 days in the Agricultural Lab of Ecofrost Technologies Pvt. Ltd.

**Table 1. Effects of different chemical treatments on weight (g) of cut flowers of gerbera cv. 'Lexington' after 3<sup>rd</sup>, 6<sup>th</sup> and 10<sup>th</sup> days storage inside cold storage for T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and normal room conditions for T<sub>1</sub>**

Treat. No	After 3 days storage	After 6 days storage	After 10 days storage	Storage-life (Days)	Post-storage life (Days)	
	Weight of three flowers (g) (n=3)					
	Stored at RT			RT		
T <sub>1</sub>	83.3	85.4	56.23	3.44	--	
		Stored at 4°C and 93% RH				At RT
T <sub>2</sub>	56.83	70.32	68.2	10	1.9	
T <sub>3</sub>	87.19	84.84	81.21	10	2.8	
T <sub>4</sub>	85.4	74.61	72.3	10	3.3	
CD @ 0.05	3.87	3.96	4.93			

**Photo 1. General view of treatments****Observations to be recorded**

Post-harvest storage-life (days) was measured for the last three treatments in cold storage. The observations were measured around 5.00PM on the ends of the 3<sup>rd</sup>, 6<sup>th</sup> and 10<sup>th</sup> days after storage. Similarly, post-storage shelf-life at normal room conditions was also measured for flowers subjected to the last three treatments and taken out of cold storage. The storage-life of gerbera cv. 'Lexington' was recorded at each treatment replication wise and cumulative data was subjected to statistical analysis. The experiment was replicated five times using completely randomized design (Panse and Sukhatme 1985). Data was compiled and analysed statistically using appropriate statistical tools.

**RESULTS AND DISCUSSION**

Maximum extension of storage life of cut flowers (Table 1, Photo 1) of Gerbera cv. 'Lexington' was recorded for T<sub>4</sub> (Sucrose 2% + 0.2% Citric Acid) at the end of experimentation, followed by T<sub>3</sub> (Sucrose 2%), T<sub>2</sub> and T<sub>1</sub> (control). The best weight retention of three flowers (g) (n=3) was recorded for T<sub>3</sub> (Sucrose 2% inside cold storage), followed by T<sub>4</sub> (Sucrose 2% and 0.2% Citric Acid), T<sub>2</sub> (tap water) and T<sub>1</sub> (control with normal room storage conditions). Thus, the treatment presumably results in accumulation of adequate Sucrose in the flower stem to aid the development of flowers. When Gerbera are pulsed overnight, flowers open faster, leading to the maximum number of open florets per spike, minimum number of unopened florets per spike and longer

vase-life of the stem (Mayak *et al.* 1973 and Anonymous 2014). We added Sucrose because the addition of Sugars in pre-holding solutions is essential for good flower development (Paulin, 1986). The development of buds was more suppressed when treated with just a Sucrose solution which might be due to the growth of some micro-organisms. This contributed to increase in amylase activity and proline content established in a late senescence phase. Recently it has been suggested that in stress situations, cells require more Sugars to fulfil their energy and carbon needs for defensive responses to stresses (Koizuka *et al.* 1995). Since the cut flowers suffer from an energy deficiency, and are susceptible to different stresses, the demand for hexoses in petals might be satisfied partially by the hydrolysis of starch. Moreover, according to Hammond (1982) and Tirosh and Mayak (1988) the activity of  $\alpha$ -amylase plays an important role in the mechanism of petal-opening and regulates the appearance of senescence.

### Conclusion

In conclusion, chemical compounds can extend the longevity of Gerbera flowers cv. 'Lexington', but their effects can vary. In this study, combined Sucrose 2% + Citric Acid 0.2% treatment was noticed to be the best treatment to extend storage life of Gerbera cv. 'Lexington' flowers when compared with 2% Sucrose treatment.

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