VASE LIFE ANALYSIS OF GERBERA (*Gerbera jamesonii*.) CUT FLOWERS USING DIFFERENT VASE SOLUTIONS var. Arka krishika

Ajish Muraleedharan[1] and J. L. Joshi[2]*

[1]Department of Horticulture, Faculty of Agriculture, Annamalai University.

[2]Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University, Annamalai nagar, Tamil Nadu, 608002

ABSTRACT

Gerbera is a genus of plants in the Asteraceae family and is also commonly known as the African daisy. Gerbera widely used as a decorative garden plant. Due to high temperatures and humidity, the post-harvest vase-life of gerbera is very less. Keeping quality is an important parameter for evaluation of cut flower quality so the addition of chemical preservatives to the holding solution is recommended to prolong the vase-life.Vase life is the period during which a cut flower or cut foliage retains its appearance in a vase. Chemical treatments that can extend the vase life in flowers and is a major component of floriculture research. The major reasons for less vase life of cut flowers may be due to nutrient deficiency, bacterial and fungal contaminations, water stress and vascular blockage. To increase the post harvest shelf life of gerbera flowers, the present experiment "Influence of floral preservatives on stem bending, floral, biochemical changes and post harvest vase life of cut gerbera (*gerbera jamesonii*.)" was conducted by using Preservative solutions. Among the treatment combination made with 10% sucrose. Stem bending, and petal shriveling were also found to be delay in the treatment combination of T_8 8 HQC 100 ppm + 10% sucrose. Maximum vase life was also found in T_8 treatment followed by T_7. Treatment combination of T_8 8 HQC 100 ppm + 10% sucrose can extend the vase life of harvested gerbera flowers by reducing the fungal infection, increase the solution uptake and by supplementing carbohydrate for harvested flowers.

Key words: preservatives, gerbera cut flower, sucrose

INTRODUCTION

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.

Keeping quality of flowers is affected by internal and external factors. The internal factors which are responsible for the keeping quality of cut blooms, are the rate of water absorption and transpiration. Both these factors again depend on the relative area of absorption and the total water holding capacity of the tissues. After the flower is detached, the area of absorption is reduced drastically, whereas the rate of proportionate area for transpiration is much higher. Therefore, unless something is done to reduce transpiration, the cut flower will wither in less time. Respiration is another internal factor that affects the life of the cut flower. Besides, some environmental factors also affect cut flower life. These are temperature, relative humidity and wind velocity. Postharvest handling plays an important role in enhancing keeping quality of flowers wherein efforts are made to reduce stem plugging, restrict microbial activity, delay flower senescence through provision of external source of water and nutrients as required by the flower. Balestra *et al.,* (2005) reported that blockage of xylem due to bacterial plugging is the main reason of stem break and bending. The postharvest longevity of cut flowers can often be improved by the use of different preservative solution (Prashanth, 2006). A preservative solution contains three components i.e. sucrose that provide carbohydrate to the flower, biocide which helps in killing the population of microbes and an acidifier which lower down the pH of vase solution which helps in improving vase life of flower. Therefore, the techniques of prolonging the vase life of flower will be great assets to the grower and uses.

Adding chemical preservatives to the holding solution is recommended to prolong the vase life of the cut flowers. 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). Application of various chemicals could alter the post-harvest life of cut flowers (Prashanth *et al*., 2010). Different chemicals have been used in vase solution to extend vase life of cut flowers mainly by improving their water uptake and reducing transpiration, thereby promoting the vase life of cut flowers (Amariutei *et al*.,1986).

MATERIALS AND METHODS

Experiment was conducted at Department of Horticulture, Faculty of Agriculture, Annamalai University during september 2016 to find out the vase life analysis of gerbera (*gerbera jamesonii*.) cut flowers using different vase solutions of var. arka krishika**.** The flowers were harvested and immediately placed in water and

transported to the experimental location without any delay. Flowers in the same size were selected for the experiment and the stems were re-cut leaving about 30 cm from the flower head prior to placing them in the treatment solutions . Glass test tubes were used for the experiment. The solutions were renewed once in three days. Flowers were kept in an air conditioned room at 20 °C with a continuous uniform light intensity of two fluorescent bulbs (cool white), each of 40 watts for 12 hrs per day. . The treatment combinations are T_1 BA 50 ppm + 10% sucrose, T_2 BA 100 ppm + 10% sucrose, T_3 BA 150 ppm + 10% sucrose, T_4 BA 200 ppm + 10% sucrose, T_5 8 HQC 50 ppm + 10% sucrose, T_6 8 HQC 100 ppm + 10% sucrose, T_7 8 HQC 150 ppm + 10% sucrose, T_8 8 HQC 200 ppm + 10% sucrose and T_9 Distilled water + 10% sucrose using Completely Randomized Design with three replications. Vase life and stem bending percentage were recorded daily. Fresh weight of flower heads and fresh weight of stems were measured after 12 days. The overall appearance and the quality of flowers were recorded after 12 days.

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_6 (6.91 mm) followed by T_7 (6.26 mm) while minimum from T_9 (1.98 mm) at 6th 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_6 (13.14 days) followed by T_7 (12.51 days) at 12th 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_6 (12.91 days) followed by T_7 (11.79 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_6 (13.26 days) followed by T_7 (10.17 days) while minimum days flowers remain fresh in vase was in T_9 (4.59 days).

Table. 1 – Effect of gerbera (g*erbera jamesonii*.) cut flowers to different vase solutions var.Arka krishika

Vase solutions	Days taken for stem bending	Days taken for petel shriveling	Solution uptake (ml)	Stem diameter (mm)	Stalk length cm	Vase life (days)
T_1	8.71	10.23	64.55	4.91	29.34	822
T_2	8.86	10.74	65.61	5.26	27.42	8.96
T_3	9.65	11.06	64.93	5.75	29.61	9.13
T_4	10.28	11.58	65.74	5.88	30.45	9.78
T_5	10.56	12.06	66.29	6.07	29.12	9.73
T_6	12.91	13.14	68.26	6.91	31.74	13.26
T_7	11.79	12.51	67.54	6.26	30.10	10.17
T_8	10.22	11.65	66.91	6.11	25.23	10.02
T_9	5.22	5.79	48.13	1.98	14.97	4.59
SE (d)	1.43	1.64	0.18	1.40	1.12	0.26
CD (p=0.05)	2.96	3.38	0.37	2.89	2.33	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. For the post harvesting storage different chemicals influences the vase life and floral quality of cut flowers (Accati & Jona, 1989), (Da Silva, 2003). From the current study 8 HQC 100 ppm + 10% sucrose was found the best treatment for all of the studied parameters which was closely followed by 10 % sucrose + Silver nitrate (100-ppm). 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 8 HQC 100 ppm + 10% 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). This turgidity gives the stem a rigid, upright structure. The longest vase life was found in the treatment containing a combination of 8 HQC 100 ppm + 10% sucrose. 8 Hydro Qunine Sulphate has certain antimicrobial properties, which reduce the degree of vascular blockage, thus allowing for optimum solution uptake and reducing stem bending. (Abdel-Kader & Rogers, 1986).

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). Addition of 8 Hydro Qunine Sulphate in holding solution had beneficial effect on vase life and quality of cut flowers. 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. Pathogens also affect vase life due to vascular blockage (Van Dome *et al*., 1994). 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). Results revealed that time taken for opening of the disc florets was significantly influenced by chemicals and stalk lengths individually as well as by their combination. The maximum time taken to open the disc florets was recorded in 8 HQC 100 ppm + 10% sucrose solution. Larsen and Cromorty (1967) and Burdett (1970) reported that the microbialgrowth are checked by the germicidal and bactericidal properties of these chemical substances and thereby were found effective for gladiolus (Lal *et al.*, 1990 and Murali and Reddy, 1991). The treatment combination of T_6 8 HQC 100 ppm + 10% sucrose positively influenced the cut flowers in vase solution by providing food and also minimised the antimicrobial activity in the holding solution and also reduced the bacterial population in the vase solution, as a result increase the vessels conductivity, water uptake and increased vaselife of cut gerbera flowers.

REFERENCES

Abdel-Kader, H. & Rogers, M. N. (1986). Postharvest treatment of Gerbera jamesonii. Acta Horticulturae, 181: 169–176. DOI: 10.17660/ActaHortic.1986.181.20.

Accati, E. G. & Jona, R. (1989). Parameters influencing gerbera cut flower longevity. Acta Horticulturae, 261: 63–68. DOI: 10.17660/ActaHortic.1989.261.7.

Alaey, M., Babalar, M., Naderi, R. & Kafi, M. (2011). Effect of pre- and post-harvest salicylic acid treatment on physio-chemical attributes in relation to vase-life of rose cut flowers. Postharvest Biology and Technology, 61:91-94.

Amariutei, A., Burzo, I. & Alexe, C. (1986). Researches concerning some metabolism aspects of cut gerbera flowers. Acta Horticulturae, 181: 331–337. DOI: 10.17660/ActaHortic.1986.181.41.

Burdett, A.N. 1970. The cause of bent neck in cut roses. J. Amer. Soc.Hort. Sci., 95(4): 427-431.

Da Silva, J. A. T. (2003). The cut flower: Postharvest considerations. J. Biol. Sci., 3: 406-442.

Hashemabadi, D. & Gholampour, A. (2006). The effective factors on postharvest life of cut flowers (Carnation). In: Papers of National Symposium for Improving Ornamental Plant and Flower Production and Export Development of Iran. Iran, 131-139.

Ichimura, K. & Hisamatsu, T. (1999). Effects of continuous treatments with sucrose on the vase life, soluble carbohydrate concentrations, and ethylene production of cut snapdragon flowers. Journal of the Japanese Society for Horticultural Science, 68: 61-66.

Larsen, F.E. and R.S. Cromotry, 1967. Micro-organism inhibition by 8-HQC as related to cut flower senescence. Proc. Amer. Soc. Hort. Sci., 90: 546-549.

Larsen, F.E. and R.S. Cromotry, 1967. Micro-organism inhibition by 8-HQC as related to cut flower senescence. Proc. Amer. Soc. Hort. Sci., 90: 546-549.

Marandi, R., Hassani, A., Abdollahiand, A. & Hanafi, S. (2011). Improvement of the vase life of cut gladiolus flowers by essential oils, salicylic acid and silver thiosulphate. Journal of Medicinal Plants Research, 5(20): 5039-5043.

Mehraj, H., Mahasen, M., Taufique, T., Shiam, I. H. and Jamal Uddin, A. F. M. (2013). Vase life analysis of yellow gladiolus using different vase solution. Journal of Experimental Biosciences, 4(2): 23-26.

Murali, T.P and T.V. Reddy, 1991. Post-harvest physiology of gladiolus flowers as influenced by cobalt and sucrose. Horticulture, New Technology and applications, 63: 12.

Prashanth, P., Chandra Sekhar, R. & Chandra Sekhar Reddy, K. (2010). Influence of floral preservatives on scape bending, biochemical changes and post harvest vase life of cut gerbera (Gerbera jamesonii bolus ex. Hook.). Asian Journal of Horticulture, 5(1): 1-6.

Redman, P. B, Dole, J. M, Maness, N. O. & Anderson, J. A. (2002). Postharvest Handling of Nine Specialty Cut Flower Species. Scientia Horticulturae, 92(3-4): 293-303. DOI: 10.1016/S0304- 4238(01)00294-1.