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RESPONSE OF GERBERA FLOWERS TO DIFFERENT CHEMICALS USED FOR INCREASING THE VASE LIFE

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Abstract

To increase the post harvest shelf life of gerbera flowers, experiments were conducted by using Preservative solutions viz. Silvar Thiosulphate (50-ppm), Citric Acid (50-ppm), Silver nitrate (50-ppm), 8-HQS and Distilled water. These five preservative solutions were used in 5 treatments and treatment combination made with 5% sucrose and used in another 5 treatments. The experiment was conducted with total ten treatments. 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. Stem bending, and petal shriveling were also found to be delay in the treatment combination of 5% sucrose +8-HQS (T_8). Maximum vase life was also found in T_8 treatment followed by T_7. Treatment combination of 5% sucrose + 8 HQS 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*:** Gerbera, vase life, preservatives

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. 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 Method

Experiment was conducted at Department of Horticulture, Faculty of Agriculture, Annamalai University from September 2016 to February 2017 to find out the appropriate preservative solution for extending the vase life of gerbera. Ten chemical preservative solutions were used for extending the vase life, and the treatments are T_1 Silvar Thiosulphate (50-ppm), T_2 Citric Acid (50-ppm), T_3 Silver nitrate (50-ppm), T_4 8-HQS, T_5 5% sucrose + Silvar Thiosulphate (50-ppm), T_6 5% sucrose + Citric Acid (50-ppm) T_7 5% sucrose + Silver nitrate, T_8 5% sucrose +8-HQS, T_9 Distilled water and T_{10} 5% sucrose + Distilled water using Completely Randomized Design with three replications. Data were recorded at 6^{th} day of the experiment on stem bending, days taken for first petal shriveling, solution uptake, and vase life.

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 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_8 (13.54 days) followed by T_7 (12.51 days) at 6th 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_8 (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_8 (11.34 days) followed by T_7 (10.17 days) while minimum days flowers remain fresh in vase was in T_9 (4.59 days).

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 5% sucrose + 8-HQS (50-ppm) was found the best treatment for all of the studied parameters which was closely followed by 5% sucrose + Silver nitrate (50-ppm). The vase life of Gerbera is mostly depends on "bent neck." The slowest stem bending was found in the gerbera kept in the treatment solution of 5% sucrose +8-HQS (50-ppm). 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 5% sucrose +8-HQS (50-ppm). 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). In this study treatment combination of 5% sucrose +8- Hydro Qunine Sulphate (50-ppm) 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.

Table : Effect of gerbera flowers to different chemicals used and data recorded on 6th day of the experiment.

Vase solutions	Days taken for stem bending	Days taken for petel shriveling	Solution uptake (ml)	Stem diameter (mm)	Vase life (days)
T_1	8.71	10.23	64.55	4.91	822
T_2	8.86	10.74	65.61	5.26	8.96
T_3	9.65	11.06	64.93	5.75	9.13
T_4	10.28	11.58	65.74	5.88	9.78
T_5	10.56	12.06	66.29	6.07	9.73
T_6	10.22	11.65	66.91	6.11	10.02
T_7	11.79	12.51	67.54	6.26	10.17
T_8	12.91	13.54	68.26	6.91	11.34
T_9	5.22	5.79	48.13	1.98	4.59
T_{10}	6.97	6.21	50.58	2.19	4.85

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