Plant Archives Vol. 15 No. 1, 2015 pp. 471-473 *ISSN 0972-5210*

EFFECT OF MINERAL SALT SOLUTIONS ON POST –HARVEST LIFE OF CUT GERBERA (*GERBERA JAMESONII* BOLUS EX. HOOK) cv. LOMBORGINI

M. R. Bhanushree* and N. Hariprasad Rao

Department of Horticulture, College of Horticulture, Venkataramannagudem, Distt.-West Godavari-534 101 (A.P.), India.

Abstract

Mineral salts in vase solution significantly influenced the water relations associated with water uptake, transpirational loss of water and fresh weight in cut gerbera (*Gerbera jamisonii* Bolus ex. Hook.) cv. Lamborgini and extended the vase life and was studied in ambient conditions during the month of March. There were nine treatments with different mineral salts (Silver nitrate, Aluminium sulphate, Potassium chloride and Calcium nitrate) at varied concentrations. The cut gerbera flowers with vase solution containing silver nitrate ($AgNO_3$) 20 ppm registered longer vase life (9.06 days) with higher values in water uptake (6.25 g/f), transpirational loss of water (6.66 g/f), fresh weight (86.38), total sugars (3.64 mg/g f wt), reducing sugars (2.42 mg/g f wt). The flowers held in distilled water (control) recorded the lowest vase life (4.57 days).

Key words : Water uptake, transpirational loss of water, water balance, fresh weight change and vase life.

Introduction

Gerbera (*Gerbera jamisonii* Bolus Ex. Hook.) CV. Lamborgini is an important cut flower grown under a wide range of climatic conditions the world. The export oriented production of gerbera is rapidly increasing in India with some foreign collaborations recently. The flowers grow in a broad spectrum of colours including various intermediate shades. The flower steams are long, thin and leafless. The post -harvest life of cut blooms is an important criteria for judging the flower quality. The cut steams remain fresh for a reasonable period of time when placed in water. Generally it has a vase life of 4-5 days. Dipping in the floral preservatives just after harvesting the cut steams can improve the vase life of the flower remarkably. The mineral salt solutions help in maintaining turgidity and act as source of energy.

The present investigation was taken up to study the effect of different mineral on the post harvest life of cut gerbera.

Materials and Methods

The experiment was carried out on 'Lomborgini' variety with nine treatments *i.e*. details of the nine treatments are: $\mathbf{T_1}$ – Sliver nitrate 20 ppm ($AgNO_3$ 20), $\mathbf{T_2}$– Sliver nitrate 30 ppm ($AgNO_3$ 30), $\mathbf{T_3}$– Aluminum sulphate 150 ppm ($Al_2(SO_4)_3$ 150), $\mathbf{T_4}$ – Aluminum sulphate 200 ppm ($Al_2(S0_4)_3$ 200), $\mathbf{T_5}$ – Potassium chloride 150 ppm (KCl 150), $\mathbf{T_6}$ – Potassium chloride 200 ppm (KCl 200), $\mathbf{T_7}$ – Calcium nitrate 300 ppm (Ca $(NO_3)_2$ 300), $\mathbf{T_8}$ – Calcium nitrate 400 ppm (Ca $(NO_3)_2$ 400), $\mathbf{T_9}$ – Control (distilled water) and each treatment replicated three times. The length of flower stem was kept 50 cm in each case. The initial volume of preservative solution taken for each treatment was 250 ml.

The flowers were harvested when fully open and disc florets in the outer rows shed pollens. The flowers were cut at the ground level and placed immediately in clean water. The steams were harvested in the late afternoon hours and placed in the vase solution within three hours.

The experiment was carried out during the month of march, when maximum and minimum temperature & relative humidity were 30.7^{0}C & 15.5^{0}C and 86% & 35%, respectively.

Results and Discussion

Steams of gerbera are highly prone to water stress. The study water uptake helps in maintaining turgidity of the stem and improves the vase life.

With the use of mineral salts an increase in the rate of water uptake was observed in comparison with control.

***Author for correspondence:** E-mail-bhanusree.horti@gmail.com

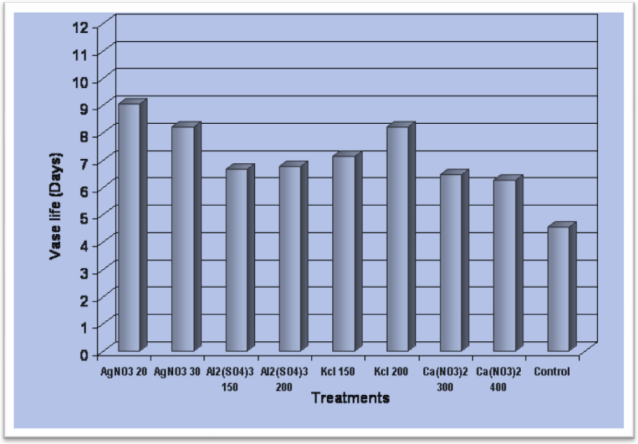

Fig. 1 : Effect of post harvest application of mineral salts on vase life (days) in cut gerbera cv. Lamborgini.

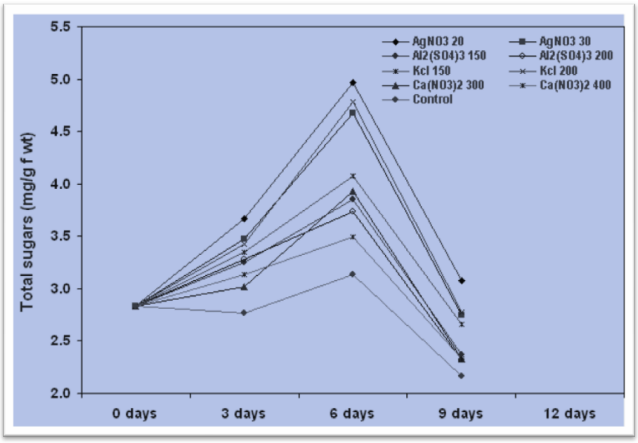

Fig. 2 : Effect of post harvest application of mineral salts on total sugars (g/f) during vase life period of cut gerbera cv. Lamborgini.

Table 1 : Effect of post-harvest application of mineral salts on vase life period of cut gerbera cv. Lamborgini.

Treatments	Water uptake (g/f)	Transperational loss of water (g/f)	Fresh weight (%)	Total sugars (Mg/g f wt)	Reducing sugars (Mg/g f wt)	Vase life days
$AgNO_3$ 20 ppm	6.25	6.66	85.24	3.60	2.44	9.60
$AgNO_3$ 30 ppm	5.54	6.09	84.10	3.40	2.43	8.22
$Al_2(SO_4)_3$ 150ppm	5.37	5.60	80.68	3.03	2.11	6.68
$Al_2(SO_4)_3$ 200ppm	5.06	5.86	78.79	3.05	3.04	6.76
KCl 150ppm	5.06	5.58	82.09	3.15	2.16	7.13
KCl 200ppm	5.55	6.06	82.70	3.29	2.27	8.23
$Ca(NO_3)_2$ 300ppm	4.73	5.55	81.33	3.03	2.09	6.47
$Ca(NO_3)_2$ 400ppm	4.18	5.23	79.30	2.94	2.00	6.26
Control (DW)	3.87	5.40	77.09	2.72	1.94	4.57
S.Em	0.11	0.12	1.43	0.08	0.07	0.34
CD 5%	0.31	0.33	4.02	0.17	0.19	1.02

The treatment, $AgNO_3$ 20 ppm recorded the highest WU (6.25 g/f), followed by KCl 200 ppm (5.55 g/f), which was on par with $AgNO_3$ 30 ppm (5.54 g/f). The increased WU with addition of these mineral salts in vase solution could be attributed to reduced physiological stem plugging in cut flowers (Aarts, 1957). The results of cut gerbera treated with different concentrations of mineral salts were in accordance with the reports given by Halevy (1976) in cut flowers, Mayak and Dilley (1976) in cut carnation and Van Meeteren (1980) in cut gerbera.

Water deficit has direct effect on turgour of cut flowers, which accelerates wilting and senescence (Halevy *et al*., 1974). Among the different mineral salt treatments, the highest TLW was recorded with $AgNO_3$ 20 ppm (6.66 g/f), followed by $AgNO_3$ 30 ppm (6.09g/f), which was on par with KCl 200 ppm (6.06 g/f) the treatment, control (5.40 g/f) was observed with significantly lowest TLW (table 1). The higher water uptake might be due to higher TLW to avoid temporary water stress (Halevy *et al*., 1974). This phenomenon was supported by Laurie (1936). Minimum TLW in control was due to reduced water uptake (Balakrishna *et al*., 1989).

The treatment, $AgNO_3$ 20 ppm recorded significantly highest FW (85.24), which was on par with $AgNO_3$30 ppm (84.10) (table 1). With $AgNO_3$, the water absorption capacity of cut flowers was higher, which resulted in improved equilibrium in the flower scapes and prolonged vase life. These results were in accordance with Bhattacharjee (1998) in cut roses, Yoo and Kim (2003) in cut gerbera.

Cut gerbera held in different mineral salt solutions also showed marked difference in biochemical parameters. Among the different mineral salt treatments,

the highest total sugars (3.60) and reducing sugars (2.44) was recorded with $AgNO_3$ 20ppm. From the data of the experiment, it could be seen that the total sugars and reducing sugars content in gerbera flower scapes decreased to termination of vase life. This might be due to high activity of invertase, an enzyme that converts sucrose in to sugars, in scapes of freshly cut flowers, which gradually decreases in flowers stored in vase solution for few days (Halaba and Rudqiocki, 1983).

All the mineral salts significantly increased the vase life of cut gerberas than the control. Highest vase life was recorded in $AgNO_3$ 20 ppm (9.06 days), which was on par with $AgNO_3$ 30ppm (8.23 days) and KCl 200 ppm (8.22 days) and lowest was with control (4.57 days) (table 1). Disturbed water relations in flower tissues held in control led to decrease in vase life, whereas, better water relations in the flowers treated with $AgNO_3$ increased vase life (Halevy and Mayak, 1979). As a result of better water relations and higher water potential, the vase life of cut gerbera scapes held in these treatments was highest compared to other treatments similar findings were reported by Li *et al*. (2003) in cut roses, Prashanth and Chandrasekhar (2007) in cut gerberas.

The above results clearly revealed that the vase solution containing silver nitrate is effective in increasing vase life, water uptake and transpirational loss of water, fresh weight, total sugars and reducing sugars compared to control.

References

Aarts, J. F. T. H. (1957). Over de houdbaarheid van snibloeen (on the keepability of cut flowers). *Meded van de Land bouwhogeschoolte Wageningen*, **57** : 1-62.

Bhattacharjee, S. K. (1998). Effect of different chemicals in the holding solution on post-harvest life and quality of cut roses. *Annals of Plant Physiology*, **12** : 161-163.

Balakrishna, H. V., R. T. Venkatedh and R. B. G. Muthappa (1989). Postharvest physiology of cut tuberose as influenced by some metal salts. *Mysore Journal of Agricultural Sciences*, **23** : 344-348.

Halevy, A. H. (1976). Treatments to improve water balance of cut flowers. *Acta Horticulture*, **64** : 223-226.

Halevy, A. H. and S. Mayak (1979). Senescence and postharvest physiology of cut flowers-Part 1, p.204-236. In: J Janick (ed.) *Horticultural Reviews*. Vol. **I**, A VI Pubilishing, Westport, Conn.

Halaba, J. and Rudnicki (1983). An invertase inhibitor as sffecting wilting of carnation petals. *Acta Horticulturae*, **138** : 261-267.

Halevy, A. H., T. G. Byrne, A. M. Kofranek, D. S. Farnham, J. F. Thompson and R. C. Hardenburg (1978). Evaluation of post harvest handling methods for transcontinental truck shipments of cut carnations, chrysanthemums and roses. *Journal of American Society for Horticultural Science*, **103** : 151-156.

Lauric, A. (1936). Studies on the Keeping qualities of cut flowers. *Proceedings of the American Society for Horticultural Science*, **34** : 595-597.

Li, Y. H., C. Q. Zhang, H. Tan, J. Jin and J. P. Gao (2003). Effect of anti-oxidents on tolerance to water deficit stress and activities of SOD and POD in cut rose. *Journal of China Agricultural University*, **8** : 14-17.

Mayak, S. and D. R. Dilley (1976). Effect of sucrose on response of cut carnation to kinetin, ethylene and abscisic acid. *Journal of American Society of Horticultural Science*, **101** : 583-585.

Prashant, P. and R. Chandrasekhar (2007). Studies on postharvest application of mineral salts on scape bending, peroxidase activity and biochemical components of cut gerbera. *Asian Journal of Horticulture*, **2** : 239-244.

Van meeteren, U. (1980). Water relations and keeping quality of cut gerbera. VI. Role of pressure potential. *Scientia Horticulture*, **12** : 282-292.

Yoo, Y. K. and W. S. Kim (2003). Storage solution and temperature affect the vase life and quality of cut gerbera flowers. *Korean Journal of Horticultural Science and Technology*, **21** : 386-392.