Assessment of Different Preservative Solutions on Vase Life of Cut Flower Rose cv.Taj Mahal

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Abstract—*Rose is one of the nature's most beautiful creations and is universally extolled as the "Queen of Flowers". Among the reds, Taj Mahal is one of the important cultivar in India for export because it has bigger bloom, better shelf life and brighter colour. Floral preservatives are under use to increase the vase life of cut flower from many decades. Water is the most important and universal ingredients of a holding solution to which other chemical preservatives are added to increase the shelf life of the cut flowers. Marketing the flowers with guaranteed vase life being in practice in abroad and there is a need to standardize the flower vase life according to time of flowering, locality and growing conditions. To achieve this, different chemical preservatives were tested as holding solution for rose cut flowers of cv. Taj Mahal. The results demonstrated that the flowers which were treated with Aluminium sulphate (200 ppm) registered maximum fresh weight (31.24 g), transpiration loss of water (33.02 g), water uptake(34.86 g), final flower diameter(8.02 cm), vase life(11.94 days).*

Keywords: *(Rose, Vase life,Al_2So_4)*

1. INTRODUCTION

Flowers form an integral part of our rich heritage and culture as we have tradition in floriculture. Rose is one of the nature's most beautiful creations and is universally extolled as the "Queen of Flowers". It belongs to family Rosaceae and genus *Rosa*, which contains 200 species and with more than 20,000 cultivars(Ritz *et al.,* 2005). Study done by Van Doorn and De (1997) suggested that the main reason for senescence of cut flower is wilting due to which the floral axis bent just below the flower head which stops the water supply to the flowers. The most important worsening factor in cut flower is the blockage of xylem vessels by air and microorganism (Elgimabi and Ahmed, 2009). There are three parameters which will affect the flower senescence: the water balance, the supply of carbohydrates and the susceptibility towards ethylene, as ethylene shortens the vase life and leads to senescence (Michael and Wu, 1992; Kazemi, 2012). To keep the flower in fresh condition for longer period several methods have been developed and it was found that the use of preservative solution is helpful for delaying senescence and extending the postharvest life of cut flower which also controls ethylene synthesis and pathogen development (Gerailoo and Gasemnezhad, 2011). In this study, the experiment was designed to assess the effects of different preservative solutions on vase life of cut yellow rose.

2. MATERIALS AND METHODS

The harvested stems are trimmed to 40 cm in the laboratory after removing the lower leaves leaving the top two pairs of upper leaves. All the vase life studies were carried in room conditions at 28°C - 30°C temperature, 50 to 60 per cent relative humidity. A total of eight treatments with three replications were maintained in horticultural laboratory Horticultural college and research institute, Anantharajpet.

Chemicals used

Treatments:T_1- 8 HQC @ 100 ppm, T_2 - 8 HQS @ 200 ppm, T_3 - $AgNO_3$ @ 100 ppm, T_4- 4 % Sucrose, T_5-Florissant 10 ml l^{-1}, T_6 - Aluminium sulphate @ 200 ppm, T_7 - Silver thiosulfate @ 4 ppm, T_8 - Citric acid @ 200 ppm.

Fresh weight of the flowers (g). The difference between the weight of the bottle + solution + flower and the weight of the bottle + solution on the same day represent the fresh weight of the flower on that particular day in grams.

Transpiration loss of water (g).The difference between the consecutive weights of bottle + solution + flower represents the transpiration loss of water in gram for that period.

Water uptake (g).The difference between consecutive weights of the bottle with the solution (without the flowers) represents the water uptake in grams for that period.

Final flower diameter (cm).The whole flower diameter in centimeter was recorded on full expansion.

Vase life (days). The point of termination of vase life varies from the first sign of wilting or fading to the death of all flowers with all the intermediate values between these points (Halevy and Mayak, 1974).

Generally, in roses, appearances of bent neck, wilting of flower petals and drooping of leaves was considered to be the end of useful vase life of the flower and was recorded in number of days.

Table 1: Effect of vase solutions on fresh weight(g) and transpiration loss of water (g) in rose cv. Taj Mahal

Treatments	Fresh weight	Transpiration loss of water (g)
8 HQC @100 ppm	30.36	31.28
8 HQS @ 200 ppm	27.98	27.90
$AgNO_3$ @100 ppm	26.64	27.00
4% Sucrose	23.46	25.64
Florissant @10 ml l^{-1}	26.34	26.23
Al_2SO_4 @ 200 ppm	31.24	33.02
Silver thiosulfate @ 4 ppm	26.12	26.50
Citric acid @ 200 ppm	28.19	29.66
S.Em ±	0.50	0.65
C.D (P=0.05)	1.50	1.94

Table 2: Effect of vase solutions on water uptake(g), flower diameter (cm) and vase life (days) in rose cv. Taj Mahal

Treatments	Water uptake	Flower diameter	Vase life
8 HQC @100 ppm	34.29	7.00	11.24
8 HQS @ 200 ppm	33.24	6.84	9.96
$AgNO_3$ @100 ppm	31.62	6.54	9.04
4% Sucrose	25.31	6.02	7.56
Florissant @10 ml l^{-1}	29.32	6.50	8.98
Al_2SO_4 @ 200 ppm	34.86	8.02	11.94
Silver thiosulfate @ 4 ppm	28.26	6.90	8.68
Citric acid @ 200 ppm	33.94	7.45	10.26
S.Em ±	0.36	0.22	0.66
C.D (P=0.05)	1.06	0.65	1.98

Fig. 1: First day

Fig. 2: Second day

Fig. 3: Eighth day

3. 2. RESULTS AND DISCUSSION

Fresh weight (g)

When flowers are cut from the mother plant, water loss from these continues through transpiration. When cut flower absorbs water from the solution it maintains a better water balance and flower freshness is maintained for long duration increasing vase life (Reddy and Singh, 1996).Cut roses kept in aluminium sulphate (200 ppm) showed maximum fresh weight (31.24 g) than other treatments This variation in flower weight among treatments might be attributed to the aluminium in holding water besides its anti microbial action it also reduces transpiration and improved water balance of cut roses by inducing stomatal closure as reported by Schnable and Ziegler (1975).

Water uptake (g)

The results from Table. 2 indicated that the flowers which were treated with aluminium sulphate (200 ppm) registered maximum water uptake was (34.86 g) than other treatments. This variation in flower weight among treatments might be attributed to the aluminium in holding water besides its anti microbial action it also reduces transpiration and improved water balance of cut roses by inducing stomatal closure.

Transpiration loss of water (g)

The maximum transpiration loss of water was recorded from flowers treated with Al_2SO_4 (200 ppm) was (33.02 g) than other treatments, flower turgidity is the result of the balance between the rate of water uptake and water loss and gain in fresh weight can occur only when the rate of water uptake is greater than transpiration.

Final flower diameter (cm)

The flowers treated with aluminium sulphate (200 ppm) recorded higher final flower diameter (8.02 cm) followed by citric acid (200 ppm) treated flowers (7.45 cm) and are on par with each other. However, the minimum final flower diameter of 6.02 cm was noticed with sucrose (4%) treated flowers. The results are in support with the findings of Shoba and Gowda (1993); Singh *et al*. (2003); Karki *et al*. (2004) that aluminium sulphate retarding bacterial growth by preventing vascular blockage.

Vase life (days)

Roses held in Aluminium sulphate at 200 ppm remained fresh for a longer period in comparison to other treatments recording a significant higher vase life of 11.94 days over the other treatments which might be due to its better water balance and an increase in fresh weight. The germicidal and acidifying action in the holding solution by retarding bacterial growth by preventing vascular blockage might encouraged continuous water uptake through the cut stem (Karki *et al*., 2004.) .

REFERENCES

[1] Elgimabi, M.N., and Ahmed O.K. 2009. Effects of bactericides and sucrose-pulsing on vase life of rose cut flowers (Rosa hybirda). Botany Research International, 2 (3), pp.164-168.

[2] Gerailoo, S. and Ghasemnezhad, M. 2011. Effect of salicylic acid on antioxidant enzyme activity and petal senescence in 'Yellow Island' cut rose flowers. Journal of Fruit and Ornamental Plant Research, 19(1), pp.183-193.

[3] Karki, K, Santoshkumar, Srivastava, R. and Shivajauhari. 2004. Effect of floral preservatives on vase life of cut roses grown under polyhouse condition. *Journal of Ornamental Horticulture*. 7 (1) pp. 121-123.

[4] Kazemi, M. 2012. effect of cobalt, silicon, acetylsalicylic acid and sucrose as novel agents to improve vase-life of *Argyranthemun* flowers. Botany Research International, 2 (3), pp.164-168.

[5] Michael, S., and Wu, M.J. 1992. Ethylene and flower senescence. Plant Growth Regul. 11, pp. 37-43.

[6] Reddy, B.S, Singh, K. and Singh, A. 1996. Effect of sucrose, citric acid and 8-hydroxyquinoline sulphate on the postharvest physiology of tuberose (*Polianthes tuberose* L.) cv. Single. *Advances in Agriculture Research in India*. 3 (10), pp. 161–167.

[7] Ritz, C.M, Schmuths, H. and Wissemann, V. 2005. Evolution by reticulation: European dogroses originated by multiple hybridization across the genus Rosa. *Journal of Heredity*. 96 (1), pp. 4-14.

[8] Schnabl, H. and Ziegler, H. 1975. Uber die wirkung van Aluminium ionen auf die Stomatabewegung Van *Vicia faba*.

[9] Singh, K, Singh, P.J. and Arora, J.S. 2003. Effect of sucrose on vase life of cut roses. *Journal of Ornamental Horticulture*. 6 (2), pp. 145-146.

[10] Van Meetern, V. 1979. Water relations and keeping quality of cut gerbera flowers. II water content, permeability and dry weight of ageing petals. *Scientia Horticulturae*. 101,pp. 261-269.