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Vase life of *Rosa indica* as affected by different concentrations of Salicylic acid and Sucrose

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Abstract

An experiment was conducted at Agriculture Lab, Department of Agriculture, D.A.V. College, Abohar, Punjab during academic year 2018-19 to study the vase life of Rosa indica as affected by different concentration of Salicylic acid (SA) and sucrose. The different treatments were 2% Sucrose + 200 mg/L of SA, 2% Sucrose + 400 mg/L of SA, 2% Sucrose, 200 mg/L of SA, 400 mg/L of SA, Distilled water and Control (Normal Water). The effect of different treatments on vase life of flowers, change in weight of flowers and solution uptake were observed. Highest "vase life" was seen in both 2% Sucrose + 400 mg/L of SA and 200 mg/L of SA treatments. Minimum weight loss was observed in 400 mg/L of SA treatment. Maximum solution uptake was seen in 2% Sucrose, 200mg/L of SA and Control treatments.

Keywords: Vase life, *Rosa indica,* affected, salicylic acid, sucrose.

Introduction

Rose is a woody perennial plant which belongs to *Rosaceae* family and *Rosa* genus. There are 150 species and 1400 cultivators of roses. Rose is mainly used for decoration and is cherished for the beauty and aroma. There are varied colors of the Indian roses such as white, red, maroon, pink, orange, yellow etc. Many medicinal and nutritional value products are developed by roses. The roses are mainly cultivated for their quality as cut flowers. Because of this reason they are highly beneficial for generating income in floriculture business[1]. It is considered important to maintain good quality of cut flowers for their acceptability in the markets. Postharvest life of rose flowers is usually short. The blockage of vascular parts in flower is one of the extreme problems in their life. This happens due to development of bacteria in flowers which cause reduction in water uptake and ultimately resulting in blockage of vascular parts leading to "water stress". Water stress cause early wilting of flowers which is a result of loss of cell turgidity. Wilting of cut flowers is due to bending of floral axis just below the flower head[2]. The vase life of cut flowers can be extended by many ways. The "vase life" of cut flowers can be prolonged by adding chemical preservatives to them. Sugar and germicides are mainly two ingredients which are used in preservative solutions. A necessary substrate is provided by the sugars, while the bacterial growth is controlled by germicide. Thus preventing the plugging of bacterial tissue. Sucrose, Salicylic acid and their mixtures are different preservative solutions which are used for extending the "vase life" of cut flowers. Sucrose is a disaccharide sugar which is formed from two monosaccharides namely fructose and glucose. Sucrose is natural product of plants, from which table sugar is developed. Sucrose is found in many plants, mainly in their roots, fruits and nectars. The purpose of sucrose is to store energy from photosynthesis. Sucrose present in the plants acts as a main source of food for many birds, bacteria, insects and mammals. Sucrose is a sugar which occurs naturally, but due to modernization, it has been refined more and more and consumed in all types of processed foods. Sucrose acts as preservative materials and thereby increasing the "vase life" of cut flowers.

Materials and methods

An experiment was performed at Agriculture Lab, Department of Agriculture, D.A.V. College, Abohar, Punjab, India. The flowers were collected from market and then shifted to Agriculture lab, D.A.V. College, Abohar on the same day. Six treatments were applied. Six bottles were provided with six different preservative solutions. Each bottle had 400ml preservative solution. Each bottle was provided with one rose. Six additional bottles were taken with same volume of preservative solutions but without flowers. These additional bottles were used as evaporation control. So at the time of measurement of solution uptake by flower evaporation of preservative solution can be kept in mind. The number of days in which flowers wilted were used as measure of determining the "postharvest life" of rose flowers. Deterioration of flowers was checked once in a day. Individual flower weight was observed daily with the help of Electronic precision balance. Water evaporation from control bottle without cut flowers and bottles with cut flowers during experimental course were observed and used as a measure for calculating the solution uptake.

Treatments: T_a: 2% Sucrose + 200mg/L of SA, T_b: 2% Sucrose + 400mg/L of SA, T_c: 2% Sucrose, T_d: 200 mg/L of SA, T_e:

400mg/L of SA, T_f: Control (Normal Water), T_g: Distilled water.

Results and discussion

Roses kept in bottles showed bent neck just after one day of shifting them in preservative solutions. But the readings were recorded till petals of roses were completely shattered.

Vase life: As from experiment, it was observed that cut flower rose have longest postharvest life in treatment 2% Sucrose + 400mg/L of SA (9 days) and was at par with 200mg/L of SA treatment (9 days) followed by both 2% Sucrose + 200mg/L of SA treatment and Control (8 days), Distilled water (6 days), 2% Sucrose (3 days) and lowest in 400mg/L of SA treatment (2 days). Elhindi found that maximum vase life was seen in treatment pulsed with sucrose (17 days) and minimum in distilled water which is used as control (7 days)[3]. Zamani *et al* found that longest vase life was seen in 150 mg/L MA +1.5mM SA + 3% Sucrose treatment (11 days) and lowest in 3 mM SA (5.66 days)[4]. Kazemi and Ameri found that longest postharvest life was seen in SA 2mM + GLU 150mg/L + SNP 15mg/L treatment (15.4 days) and lowest in control (6.3 days)[5]. Elgimabi and Sliai found that longest vase life was seen in Sucrose 7% at 24h pulsing (13.2 days) and minimum in control (4.1 days) both at complete bud opening stage[6].

Change in flower weight (%): As from experiment, maximum weight loss was observed in rose kept in 2% Sucrose + 400 mg/L of SA solution (77.12% at 9th day) followed by 200mg/L of SA solution (72.10% at 9th day), 2% Sucrose + 200mg/L of SA solution (70.39% at 8th day), Control (69.18% at 8th day), Distilled water (59.84% at 6th day), 2% solution (49.61% at 3rd day) and minimum in 400mg/L of SA solution (35.24% at 2nd day). Asrar found that maximum weight loss was observed in 200 ppm 8-HQS + 2% sucrose solution (55.27%) and was minimum in control (29.20%)[7]. Den *et al* found that in 2007 maximum weight loss was seen in 8-HQS at 200ppm +20 g/L sucrose (34.88%) whereas minimum weight loss was seen in 20 g/L sucrose + distilled water (18.67%)[8]. Hassani and Karimi found that fresh weight was maximum in Salicylic acid 2mM + 2% Sucrose treatment (118%) and in case of calcium carbide it was maximum in calcium carbide 5 mM + 2% Sucrose (115%)[9]. Ghadimian and Danaee found that maximum flower weight was seen in case of 200mg/L Salicylic acid (82.5%) where as minimum increase in flower weight was seen in control (72.5%)[10].

Mean uptake of preservative solution (ml): As from experiment, it was observed that only 2% Sucrose, 200 mg/L of SA and Control treatments had solution uptake. All these three treatments had solution uptake of 15 ml. There was no solution uptake in remaining treatments. Roodbaraky *et al* found that most water uptake (1.59ml g^{-1}) was observed in 50mg/L SA and least was in control (1.48ml g^{-1})[11]. Bahrami *et al* found that maximum solution uptake was recorded in 100mg/L SA + 200 mg/L 8-HQS + 5% Sucrose (4.5ml g^{-1})[12]. Kazemi *et al* found that solution containing 1.5 mM salicylic acid + 3% Sucrose + 150mg/L malic acid shows maximum solution uptake of 90ml and minimum solution uptake (15ml) was found in 3mM salicylic acid[13]. Khan *et al* found that maximum vase solution was up taken by Citric acid 50 ppm (79.2ml) whereas minimum from Control (63.2ml)[14].

Table-1: Result of different treatments on Vase Life.

Treatments	Vase Life (days)
T_a	8
T_b	9
T_c	3
T_d	9
T_e	2
T_f	8
T_g	6

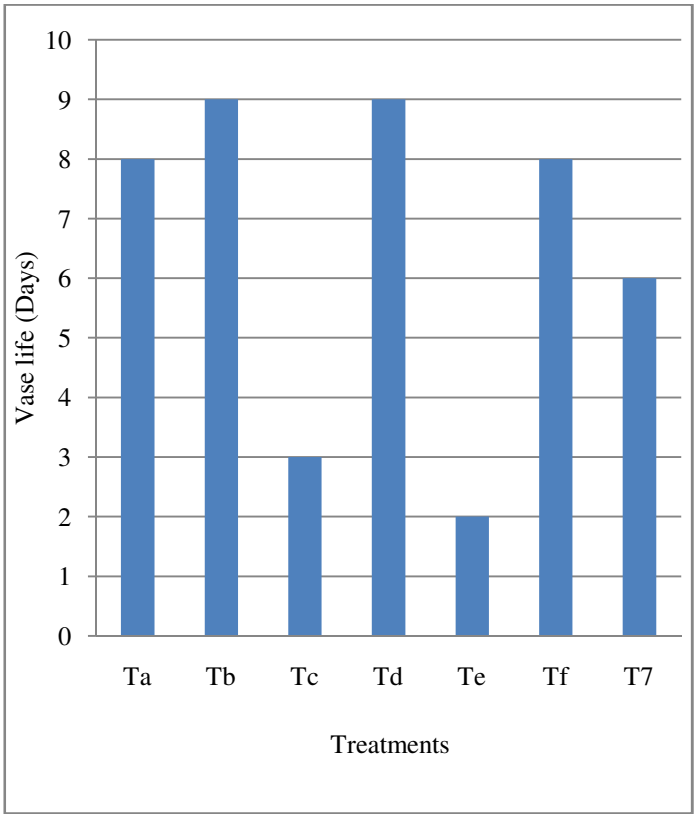

Figure-1: Result of different treatments on Vase Life.

Table-2: Result of different preservative solutions on loss in flower weight (%).

Days	Treatments						
	T_a	T_b	T_c	T_d	T_e	T_f	T_g
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	24.34	28.10	31.78	23.80	35.24	17.80	17.32
3	39.47	40.52	49.61	40.82	Petals shattered	32.19	38.58
4	48.03	49.02	Petals shattered	48.98		40.41	45.66
5	59.86	58.82		58.50		52.05	53.54
6	65.13	62.74		59.86		56.16	59.84
7	70.39	67.97		64.62		65.06	Petals shattered
8	70.39	70.58		68.02		69.18	
9	Petals shattered	77.12		72.10		Petals shattered	
10		Petals shattered		Petals shattered			

Table-3: Treatments and Mean uptake of preservative solution.

Treatments	Mean uptake of preservative solution (ml)
T_a	0
T_b	15
T_c	0
T_d	15
T_e	0
T_f	15
T_g	0

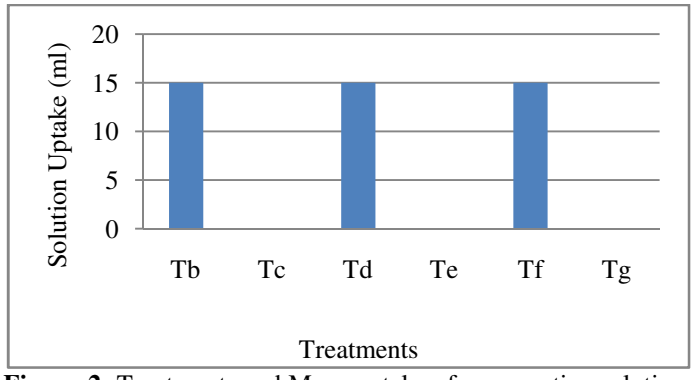

Figure-2: Treatments and Mean uptake of preservative solution.

Conclusion

From the experiment it was clear that different preservative solution has marked effect on vase life, weight loss of flowers and solution uptake. Among all preservative solutions, 2% Sucrose + 400mg/L of SA and 200mg/L of SA treatments shows longest vase life, maximum weight loss and maximum solution uptake. These two treatments show maximum weight loss because at the end of experiment their petals were completely shattered.

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