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## Effect of different vase solution on vase life of gladiolus (*Gladiolus grandiflorus*) CV white prosperity

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#### Abstract

The experiment entitled “Effect of different vase solutions on vase life of gladiolus (*Gladiolus grandiflorus*) cv white prosperity” in the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, during the month of December, 2021. The experiment was conducted in Complete Randomised Design replicated thrice with eleven treatments. (T<sub>0</sub>)Distilled water (control), (T<sub>1</sub>)-2% sucrose, (T<sub>2</sub>)- citric acid @ 300ppm + 2% sucrose, (T<sub>3</sub>)- salicylic acid @ 50ppm+ 2% sucrose, (T<sub>4</sub>)- salicylic acid @100ppm+ 2% sucrose, (T<sub>5</sub>)- salicylic acid @ 150ppm+ 2% sucrose, (T<sub>6</sub>)- STS @ 150ppm+ 2% sucrose, (T<sub>7</sub>)- STS @ 200ppm+ 2% sucrose, (T<sub>8</sub>)- STS @ 250ppm+ 2% sucrose, (T<sub>9</sub>)- AgNO<sub>3</sub> @ 50ppm+ 2% sucrose, (T<sub>10</sub>)- AgNO<sub>3</sub> @ 100ppm+ 2% sucrose, (T<sub>11</sub>) - AgNO<sub>3</sub>@ 150ppm+ 2% sucrose. The total number of florets opened during the vase life of gladiolus spike (10.3) in (T<sub>8</sub>)- STS @250ppm+ 2% sucrose, floret opening percentage (93.2) in (T<sub>8</sub>)- STS @ 250ppm+ 2% sucrose, floret diameters 1<sup>st</sup> (9.4cm), 3<sup>rd</sup> (8.9cm), 5<sup>th</sup> (8.2cm), solution uptake (128ml), (109.3ml), (48.3ml) in(T<sub>8</sub>)- STS @ 250ppm+ 2% sucrose, prolonged vase life (11.7) days and maximum time taken for the deterioration of the 1<sup>st</sup> floret in white prosperity variety of gladiolus is (6.2) days in (T<sub>8</sub>)- STS @ 250ppm+ 2% sucrose. Thus the best vase solution to prolong the vase life of gladiolus is found to be sodium thio sulphate @ 250 ppm because it inhibit the microbial proliferation in the solution and sodium thiosulfate also reduced the oxidative activity, hence the microorganism cannot survive in the solution which gave the best result.

**Keywords:** Gladiolus, sucrose, citric acid, florets, vase life

#### Introduction

Gladiolus (*Gladiolus grandiflorus* L.) is one of the most important ornamental and bulbous flowering plant, it has a long and noble history. It is one of the popular cut flower in the world as well as in India. The name gladiolus was derived from the Latin word “Gladius” means sword and hence it is often called as “sword lily” owing to the shape of its leaves. Therefore commonly known as “Queen of Bulbous flowers” or “sword lily” belongs to family Iridaceae being originated from South Africa and Asia Minor. Vase life is a distinguishing feature of each cut flower crop and it is highly affected by cultural practices and post-harvest handling operation. Claims have been made that from 30-70% potential lasting quality of flower crops is predetermined at harvest nearly 20-40% of the cut flowers are lost due to improper post harvest handling practices (Sangama, 1997) Cut flowers are generally treated with anionic complex STS, as inhibitor of ethylene, for increasing longevity of cut flowers. It is determined that STS could reduce the flower abscission of flowers when they subjected to ethylene. In addition, it is reported that STS provides some antimicrobial activity inside the plant tissues (Nowak and Rudnicki, 1990). However, because STS contain a heavy metal, its application as a possible environment pollutant has been banned in several countries. Nowadays, trend to application of natural materials such as salicylic acid (SA) and plant essential oils as safe preservatives for maintenance of food and agricultural products increased. SA is a simple phenolic compound involved in the regulation of many processes in plant growth and development, including stomatal movement, seed germination, ion absorption, sex polarization, and induction of disease resistance.

#### Material and Methods

##### Experimental site

The experiment was conducted at the Department of Horticulture, Sam Higginbottom University of Agriculture Technology And Sciences, Prayagraj, during December, 2020 to April 2021. The experimental field is situated on the left side of Prayagraj - Rewa Road, very

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near to the river Yamuna, and is approximately 7 km from Prayagraj city. Geographically, Prayagraj is situated in the South-Eastern part of Uttar Pradesh. It lies between the parallels of 24° 77' and 25° 47' north latitudes and 81° 19' and 82° 21' east longitudes. The area of prayagraj district comes under agro climatic zone V (Upper Gangetic Plain region) and sub-zone of Central Plains. The climate ranges from dry sub-humid to semi-arid and the soil is alluvium calcareous sandy loam. The District experiences average maximum temperature range between 43° - 47 °C which may go as high as 48°C during peak summers (May-June). The minimum average temperature is 2-4 °C, which may fall as low as 1°C during peak winter months (December-January) The average rainfall of the district is 960 mm and the monsoon season is spread between July-September.

### Experimental Design and Treatment

The design of treatment was complete randomised design (CRD) with eleven different treatments and three rows. (T<sub>0</sub>) Distilled water (control), (T<sub>1</sub>)-2% sucrose, (T<sub>2</sub>)- citric acid @ 300ppm + 2% sucrose, (T<sub>3</sub>)- salicylic acid @ 50ppm+ 2% sucrose, (T<sub>4</sub>)- salicylic acid @100ppm+ 2% sucrose, (T<sub>5</sub>)-salicylic acid @ 150ppm+ 2% sucrose, (T<sub>6</sub>)- STS @ 150ppm+ 2% sucrose, (T<sub>7</sub>)- STS @ 200ppm+ 2% sucrose, (T<sub>8</sub>)- STS @ 250ppm+ 2% sucrose, (T<sub>9</sub>)- AgNO<sub>3</sub> @ 50ppm+ 2% sucrose, (T<sub>10</sub>)- AgNO<sub>3</sub> @ 100ppm+ 2% sucrose, (T<sub>11</sub>) - AgNO<sub>3</sub>@ 150ppm + 2% sucrose.

### Data collection and analysis

Data is collected on different parameters like florets opened florets during the vase life, Total Floret opening (%), Diameter of florets(cm) 1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup>, Days taken to deterioration of 1<sup>st</sup> floret (days), Vase life of spike (days), Solution uptake (ml) on 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup> (day).

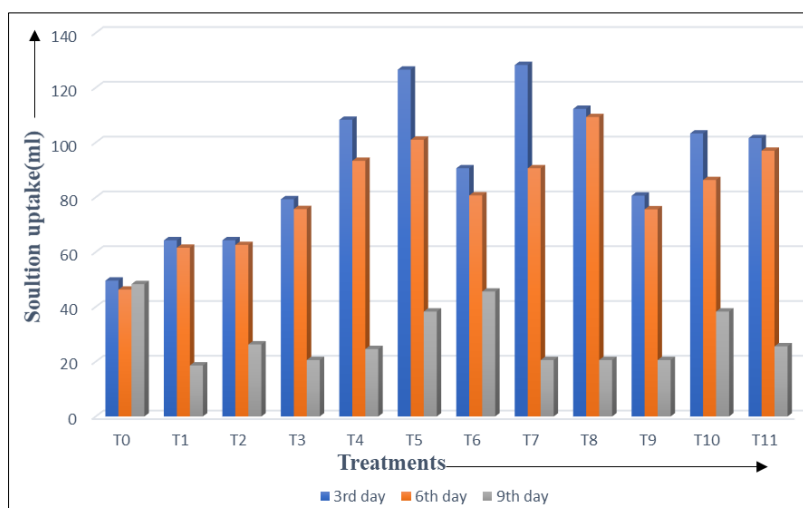
### Result and Discussion

#### Solution uptake on 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup> (day)

The solution uptake by cut gladiolus spikes declined constantly till the end of vase. The impact of different floral preservative solutions vase life of gladiolus spike, among the different treatment applied highest solution uptake on 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup> day was (128ml), (109.3ml), (48.3ml) was observed in T<sub>7</sub> (sodium thio sulphate @ 200ppm + 2% sucrose), T<sub>8</sub> (sodium thio sulphate @ 250ppm + 2% sucrose), T<sub>0</sub> (Control) which was statistically at par in 3<sup>rd</sup> day of solution uptake i.e T<sub>5</sub> (salicylic acid @ 150 + 2% sucrose, 126.6), which was show significantly difference with rest of the other treatments lowest water uptake on 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup> day was (49.6ml), (61.6ml), (18.6ml) observed in T<sub>0</sub> (Control), T<sub>1</sub> (2% sucrose), T<sub>1</sub> (2% sucrose) at the last day. Due to the effect of bacterial proliferation the xylem vessels get blocked however it will affect the water uptake due to sucrose concentration the combination of treatment with sodium thiosulfate lead to decrease microbial proliferation in the solution.

**Table 1:** Effect of different vase solution on solution uptake (ml) on 3<sup>rd</sup>, 6<sup>th</sup> & 9<sup>th</sup> day by per spike in gladiolus

Notation	Treatments	Solution uptake(ml) on		
		1 <sup>st</sup> day	3 <sup>rd</sup> day	5 <sup>th</sup> day
T <sub>0</sub>	Control (Distilled water)	49.6	46.3	40.3
T <sub>1</sub>	2% sucrose	64.3	61.6	18.6
T <sub>2</sub>	Citric acid (300ppm) +2% sucrose	64.3	62.6	26.3
T <sub>3</sub>	Salicylic acid (50ppm) +2% sucrose	79.3	75.7	20.6
T <sub>4</sub>	Salicylic acid (100ppm) +2% sucrose	108.3	93.3	24.6
T <sub>5</sub>	Salicylic acid (150ppm) +2% sucrose	126.6	101	38.3
T <sub>6</sub>	Sodium thio sulphate (150ppm) +2% sucrose	90.6	80.7	45.6
T <sub>7</sub>	Sodium thio sulphate (200ppm) +2% sucrose	128.3	90.6	20.6
T <sub>8</sub>	Sodium thio sulphate (250ppm) +2% sucrose	112.3	109.3	20.6
T <sub>9</sub>	Silver nitrate (50ppm) +2% sucrose	80.6	75.6	20.6
T <sub>10</sub>	Silver nitrate (100ppm) +2% sucrose	103.3	86.3	38.3
T <sub>11</sub>	Silver nitrate (150ppm) +2% sucrose	101.6	97	25.6
	S.E(d±)	2.09	1.28	1.02
	CD <sub>0.05</sub>	4.31	2.64	2.11



**Fig 1:** Effect of different vase solution on solution uptake (ml) on 3<sup>rd</sup>, 6<sup>th</sup> & 9<sup>th</sup> day by per spike in gladiolus

## Conclusion

It is concluded from the present investigation that most suitable treatment for vase life of gladiolus spike was T<sub>8</sub> (Sodium thio sulphate @ 250ppm + 2% sucrose) which resulted in significantly better parameters like total number of florets opened during the vase life of gladiolus spike (10.3), floret opening percentage (93.2), floret diameters 1<sup>st</sup> (9.4cm), 3<sup>rd</sup> (8.9cm), 5<sup>th</sup> (8.2cm), solution uptake (128ml), (109.3ml), (48.3ml), prolonged vase life (11.7) days and maximum time taken for the deterioration of the 1<sup>st</sup> floret in White Prosperity variety of gladiolus is (6.2 days).

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