

**Full Length Research Paper****Effect of AgNO₃ and Sucrose Application of Preservatives on Gladiolus (*Gladiolus grandiflorus*) Cv. "Yellow Stone"****Amit Kumar Awasthi¹, P.K. Karhana^b, Pallavi^c, Alankar Singh^d and Krishna Kumar Pandey^e**¹Department of Agriculture Statistics, VCSG College of Horticulture, Uttarakhand University of Horticulture and Forestry, Bharsar, Pauri-Garhwal, Uttarakhand, India**Corresponding Author: Krishna Kumar Pandey****Abstract**

In the present study attempts has been made to effect of two preservatives along with their chemical combination on gladiolus for western Uttar Pradesh. The lab of department of horticulture in RB (PG) College, Agra (UP) has been used for the experimentation in 2011. The CRD with four treatments and three replications has been used under the study. The preservatives has been taken AgNO₃ (50ppm), sucrose 4% AgNO₃ (50 ppm) + sucrose 4% and distil water (control) denoted as T₁, T₂, T₃ and T₄ respectively, for flower treatment. The result indicates that T₂ taken minimum day for basal floret open followed by T₃. Floret open (%) has been found maximum in T₃ followed by T₂. The T₃ indicates as best preservatives in diameter of florets and fresh weight of flower. Our conclusion has been drawn that the T₂ found as a best preservatives followed by T₁ for the western U.P. during the season.

Key words: AgNO₃, Gladiolus, Preservative, Distilled water, Sucrose.**Introduction**

In India, most of the hybrids were also developed by the Raja Bhadri, Governor of Himachal Pradesh from 1956-63 by collecting open pollinated seeds from different varieties recommended for that state. Similarly in Kartain (Kullu Valley), the work on assessment was also taken up from 1962. The cultivars were also collected from India and abroad at IARI, New Delhi. These were assessed and grown under plain conditions. Later the work was also started at IIHR at Hassaraghatta Bangalore. Similarly planned breeding was started in 1970 on wards, New Delhi, and later on IIHR, Bangalore, National Botanical Research Institute (N.B.R.I.) Lucknow (U.P.), Horticulture experiment and Training centre, Chaubattia, Ranikhet (Uttarakhand) etc.

In northern plains of U.P. its commercial cultivation is gaining popularity due to prevailing congenial climatic conditions for planting form August to December and spikes are available from 1st week of November to end of April. In India most of the cultivars of the gladiolus were introduced from abroad except a few like Ratna's Butterfly, which were developed naturally by a nursery in Kalimpong.

The use of floral preservatives is he most economical practical methods for extending post harvest life of gladiolus cut flower. The vase life of cut flower is influenced by constant water supply, checking of microbial growth prevention of ethylene formation and energy source. Several types of floral preservatives in form of germicides, ethylene antagonistic and source of energy (Sucrose) are in use to preserve the flower quality and extending post harvest longevity of cut flowers Shukla et.al.

A lot of works have been done for the study of Gladiolus with the different chemicals in different part of India, but no work has been done in this direction for the Western Uttar Pradesh for Gladiolus. In the present study, an attempt has been made for the chemical effect as a growth regulator on Gladiolus cut spike for Agra district.

Materials and Methods

The present study has been carried out in of department of in horticulture laboratory of the R.B.(PG) College, Agra (U.P.) during the February 2011. The experimental flowers were held in the laboratory at about $22 \pm 2^\circ\text{C}$ ambient room temperature and $80 \pm 5\%$ percent relative humidity (RH). Under the study 3 replication for each 4 treatments like T1, T2, T3 and T4 has been taken as AgNO₃ (50ppm), Sucrose (4%), AgNO₃ (50ppm) + Sucrose(4%) and Distilled water (control) respectively, under layout of CRD. Total 12 treatments and 2 flower scales per treatment has been taken for the study. The cut spikes have been harvested in the morning between 8 to 9 am. 5 gram of HgCl₂ was dissolved in 500 ml distilled water for disinfectant. Thereafter, in laboratory the spikes have cut to a constant length of 45 cm each and the fresh weight of cut spike for each treatment and replication has been recorded.

Preparation of Floral Preservative Solution:

Two chemicals viz. AgNO₃ and Sucrose have used alone and combination of sucrose and AgNO₃ for quality parameter (preservatives) of cut gladiolus flower. The stock solution of silver nitrate (AgNO₃) and sucrose made on 1000 ppm prepared by dissolving proportionate weight in gram of individual chemical in distilled water and then final volume make up to 500 ml.

All the holding solution has been store in 500 ml flask. The cotton plug has putted in the 500 ml flask to avoid contamination, evaporation for further use formula used $01 \text{ f} = 1000 \text{ ppm} = 1000 \text{ mg/l}$.

Days to Basal Florets Open:

Days to basal florets open has been recorded from date of placing to spike in holding solution to complete opening of basal florets.

Percentage of Florets Opened:

The total numbers of florets on each spike have counted on the day of harvest and the total numbers of fully opened florets on each spike have counted florets.

$$\text{Percent of opened florets/spike} = \frac{\text{No. of Opened florets / spike}}{\text{Total number of florets / spike}}$$

Flower Diameter:

Diameter of the floret has been measured on two perpendicular axis of the first, third and last fully opened pair of florets.

Fresh Weight change:

Weight of spike has been measured on the day of experimental setup and at senescence. The difference between the weight of the container + solution + flower and the weight of container + solution recorded at every alternate day to measure the fresh weight change of flower during that particular period duration of time. The weight of the flower stems on the first day of each experiment has assumed to be 100 per cent. Subsequent weights have referred to as percentage of the initial value.

Statistical Analysis:

The data were statistically analyzed with the help of computer using 'completely randomized design'. The treatments were compared with the help of critical difference suggested by Fisher (1924) at 5% level significantly and the results thus obtained are presented with the help to tables.

$$\text{C.D.} = \sqrt{\frac{2\text{SE}}{r}} \times t_{\text{at } 5\%}$$

Where –

C.D. = Critical Difference.

SE = Standard Error.

r = number of total treatments.

t at 5% = t value of error degree of freedom at 5% level of significant.

Results

The result pertaining to the number of days required for first flower opening under the influence of various treatments has been presented in Table-1. The results shows that number of days required for first flower opening has been lowest in T₂ Sucrose4% being 2.68 days followed by T₃(AgNO₃50 ppm+Sucrose4%) 2.78 days,.

The result of present study presented has show maximum fully opened florets per spike were recorded in by (AgNO₃50 ppm+Sucrose4%) (92.30) and followed by Sucrose4% (91.58). However, the minimum percentage of fully opened floret have recorded (80.56) in control (Distilled water), (Table-2).

All the records three case first fully opened, third fully opened & last fully opened. The (AgNO₃50 ppm+Sucrose4%) found best as 9.20 cm, 9.23 cm, 9.24 cm respectively. Followed by T₂ (sucrose 4%) as 8.60cm, 9.23cm and 8.23cm respectively, (Table-3).

The data related to fresh weight of spike has shown the weight has taken at experiment set up. The observation shows that which are deep in silver nitrate (AgNO₃) and sucrose. Solutions have gain weight the holing solution containing the sucrose 4% was being (20.00) and followed by control and rest have low performance of flower after harvest, (Table-4).

Table-1: Effect of various treatments on the days of basal floret open

T ₁	3.48
T ₂	2.68
T ₃	2.78
T ₄	2.74
SEm±	0.321
CD at 5%	0.962

Table-2: Effect of different treatment on open Florets in percentage

Treatments		Opened florets (%)
AgNO ₃ 50 PPM	T ₂	90.17 ± 5.56
Sucrose 4%	T ₄	91.58 ± 1.60
AgNO ₃ 50 PPM + Sucrose 4%	T ₈	92.30 ± 3.26
Distilled Water	T ₉	80.56 ± 3.44
SEm±		0.172
CD at 5%		0.516

Table-3: Effect of various treatments on diameter of different fully opened Pair.

Treatments	First fully opened florets Diameter (cm)	Third fully opened florets Diameter (cm)	Last fully opened florets Diameter (cm)
T ₁	8.80	7.32	7.26
T ₂	8.60	9.14	8.23
T ₃	9.20	9.23	9.24
T ₄	7.20	7.01	6.23
SEm±	0.117		
CD at 5%	0.351		

Table-4: Effect of various treatments on fresh weight of spike

Treatment	Spike weight at harvest	Flower weight after vase life	Loss weight of spike
T ₁	68.66	55.5	13.16
T ₂	74.83	54.83	20.00
T ₃	67.00	60.00	7.00
T ₄	73.33	49.50	23.83
SEm±	1.411	1.155	4.810
CD at 5%	NA	3.461	14.421

Discussion

Almost similar result has been found by Mishra (1996) reported that fresh mass and volume of water uptake in spike were improved with sucrose application to vase solution. However, a significant increase in fresh weight was observed due to holding solution containing sucrose 5%+*HQC 200ppm in Cv. 'Hunting Song', 'Song', and "Spike span" Song *et. al.*(1992). Marousky(1969) reported the maximum increase in fresh weight was also reported by Al₂(SO₄)₃ Gowda and Murthy (1993), Murali and Reddy (1993), Zhou *et. al.* (1993). The basic requirement to maintain growth area preservations fulfills by these two biocides, firstly by supplying the tissue with carbohydrate and secondly by decreasing the water uptake of spike. Which accelerate floret opening. Wang and Gu (1985) reported that gladiolus spike held in vase solution containing 5% sucrose + AgNO₃ (50 ppm) + 8-HQC (300 ppm) + acidifier had highest fully opened florets as compared to other treatments and control. According to Chopde (2011),GA-3150 ppm has found a good growth regulator for Akola in Maharashtra during ravi season. Emami *et. al.* (2011), reported that different solution acid and Benzyladenin was a good growth regulator for flowering in lily for Rasht. Sudhakar and Kumar (2012) reported that the effect of different growth regulator in different solution for Tamilnadu, India.

Conclusion

The maximum day taken for opening of Basal floret has been recorded in Sucrose4% followed by (AgNO₃50 ppm+Sucrose4%). The maximum floret opening has recorded under the treatment (AgNO₃50 ppm+Sucrose4%)and followed by Sucrose4% and minimum under control (Distilled water). However, the maximum floret size of first third and last fully opened pair has been recorded under the treatment T₁ AgNO₃50 ppm+Sucrose4%) and followed by control (distilled water). All floral preservatives significantly affected the fresh weight. Among all the floral preservatives tested maximum and minimum loss in fresh weight has noted with treatments T₂ and T₁, respectively. The cut gladiolus treated with AgNO₃ and sucrose. However, the effect of preservatives like AgNO₃ is best for the future case study on gladiolus, in Western U.P.

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