International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(6): 2052-2054

Received: 05-09-2020
Accepted: 15-11-2020

KS Hadiya
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

VR Malam
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

SM Makwana
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

DR Kanzaria
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

KV Malam
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

Corresponding Author:
KS Hadiya
Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh, Gujarat, India

Effect of pre-plant soaking of corms in bio-regulators on corms and cormels Producation in gladiolus (*Gladiolus grandiflorus* L.) Cv. Rani

KS Hadiya, VR Malam, SM Makwana, DR Kanzaria and KV Malam

DOI: https://doi.org/10.22271/chemi.2020.v8.i6ac.11074

Abstract
The present experiment entitled "Effect of pre-plant soaking of corms in bio- regulators on corms and cormels production in gladiolus (*Gladiolus grandiflorus* L.) cv. Rani." was carried out at the Jambuvadi Farm, Department of Horticulture, J. A.U., Junagadh (Gujarat) during 2019 to 2020. The results of the study indicated that, the pre-plant soaking of corms in bio- regulator BA @ 50 ppm was found effective for maximum corms yield (4.27 t/ha). The maximum cormels yield (2.13 t/ha) was found in pre-plant soaking of corms in bio- regulator of thiourea @ 3%. While maximum corm average weight (47.91 g) and diameter of largest corm (5.76 cm) was found in pre-plant soaking of corms in bio- regulator of GA_3 @ 150 ppm.

Keywords: Gladiolus, bio regulators, GA_3

Introduction
Gladiolus (*Gladiolus grandiflorus* L.) is one of the important bulbous flower crops. It belongs to the family Iridaceae and native to Cape region in South Africa. The word "gladiolus" is derived from the Latin word "gladius" meaning 'a sword' shape like leaves of the plants. It occupies fourth place of world bulbous flower plants area and is referred to as the queen of bulbous flowers. Gladiolus is highly priced in India and abroad for bright, beautiful and differently coloured flowers and is use in cut flower, herbaceous borders, beddings, rockeries, pots. It is also used in bouquet and flower arrangement having excellent keeping quality. Freshly harvested corm and cormels of gladiolus do not sprout immediately even it's placing in favorable growing conditions because of a period of dormancy which is regulated by changes in the stages of endogenous promotory or inhibitory substances. The physiological functions inside the corms are controlled by plant bio-regulators. Plant bio-regulators are the organic chemical compounds which modify or regulate physiological processes in an appreciable measure by breaking dormancy of gladiolus corms and stimulating cell division and cell elongation in plants.

Materials and Methodology
The present investigation was carried out at the Jambuvadi farm, Department of Horticulture, Junagadh Agricultural University, Junagadh (Gujarat) during 2019-2020. Junagadh is situated in Saurashtra region of Gujarat state. Geographically, this place is situated at 21.50 N latitude and 70.50 E longitudes with an altitude of 60 meters above the mean sea level and 80 kilometers away from Arabian sea. The soil of this region is classified as Vertic Ustochrepts. Physical and chemical properties of the soil of the experimental field were determined with pH 7.85. Medium sized gladiolus (4-6 cm diameter) corms were selected for the experimental purpose. These corms were soaked in the fungicide solutions (Carbendazim @ 0.2 per cent) for 30 min and kept for drying in shade for 24 hrs. Then these corms were soaked for 24 hrs in water (as control) and different solutions of bio-regulators [gibberellic acid (GA_3), benzyl adenine (BA), ethrel and thiourea] as per treatment requirement. These treated corms were further drying for another 24 hrs and finally these were planted in the experimental plots. Planting was carried out randomly in respective plots at a spacing of 30 cm X 20 cm with a depth of 5 cm.

Moderate irrigation was given to the plots a day before planting to keep the plots moist. The experiments were planted on 3rd November 2019. Investigation was laid out in randomized block design (RBD) comprising thirteen treatments including; Gibberellic acid @ 50 ppm (T_1), Gibberellic acid @ 100 ppm (T_2), Gibberellic acid @ 150 ppm (T_3), Benzyl adenine @ 50 ppm (T_4), Benzyl adenine @ 100 ppm (T_5), Benzyl adenine @ 150 ppm (T_6), Ethrel @ 250 ppm (T_7), Ethrel @ 500 ppm (T_8), Ethrel @ 750 ppm (T_9), Thiourea @ 1% (T_{10}), Thiourea @ 2% (T_{11}), Thiourea @ 3% (T_{12}) and Control (T_{13}).

Results and Discussion

Effect of plant bio-regulators on corm and cormels production

The result indicates that the pre plant soaking of different solutions of bio-regulators had produced significant effect on corm and cormels production *viz*., Average weight of corm (g), diameter of largest corm (cm), yield of cormels (tons/ha) and corms yield (tons/ha).

Average weight of corm (g): The effect of different bio-regulators on average weight of corm was presented in Table-1. The maximum average weight of corm (47.91 g) in treatment T_3 (GA_3 @ 150 ppm). The minimum average weight of corm (24.53 g) in treatment T_{13} (control). GA_3 showed significant variation in respect of single corm weight due to its ability to increase the number of leaves which in turn increased the photosynthesis and photosynthetic assimilates. These assimilates were transported to the daughter corms, thereby, increasing their size and weight. Supportively, lowest values for corm weight were recorded in control (Reddy *et al*., 2013) [11]. The early sprouting of corms resulted into longer period of growth phase and untimely production of favorable conditions to produce more number of cormels (Padmalatha *et al*., 2013) [8]. Mukhopadhyay and Bankar (1986) [7], represented that the maximum weight of corms was recorded in GA_3 at 150 ppm and lowest weight of corms was recorded in control.

Diameter of largest corm (cm): Pre-planting soaking of corm in different bio regulators solution had significant effect on diameter of largest corm is presented in Table-1. In all treatment the maximum diameter of largest corm (6.22 cm) was obtained in T_3 (GA_3 @ 150 ppm). While, T_{13} (control) registered in minimum diameter of largest corm (4.47 cm). In case of corm weight, which was significantly affected by gibberellic acid as compared to other treatments, diameter of corms increased proportionately with increasing corm weight in GA_3 treatments. Gibberellins lead to increased cell division and cell growth apparently which lead to increased elongation of root and enhances corm diameter (Stewart and Jones, 1977) [13]. According to Kumar *et al*. (2009) [5] GA_3 increases more vegetative growth like leaves which increased the photosynthetic assimilates which is directly responsible to corm characters like increasing corm size as well as their diameter. The findings of Bhalla and Kumar (2007) [2] and Dogra *et al*. (2012) [3] are in conformity with the present findings. Baskaran *et al*. (2009) [1], Kumar and Singh (2005) also reported GA_3 produces better quality of corms in gladiolus as compared to their control treatment.

Yield of cormels (tons/ha): Higher concentration of T_{12} (thiourea @ 3%) was found effective in increasing the yield of cormels (2.13 t/ha). While, the minimum yield of cormels (0.34 t/ha) was observed in treatment T_{13} (control). This may be because ability of GA_3 to increase the number of leaves which increased the photosynthetic assimilates and these assimilates are transported to the resulting cormels, thereby increasing their weight. The result is in conformity with the work of Kumar *et al*. (2009) [5].

Corms yield (tons/ha): The effect of various plant bio regulators on corms yield was presented in Table-1. The results of the experiment revealed that variation in corms yield due to the various plant bio regulators were statistically significant. Plants from T_4 (BA @ 50 ppm) produced the maximum corms yield (4.27 t/ha). Whereas, the minimum corms yield (1.13 t/ha) was produced in plant grown from without bio regulator treatment of T_{13} (control). Pre-plant soaking of corms in solutions of PGRs altered the interested variables in gladiolus plants. Application of benzyl adenine induced the multiple shoots and also increased the yield of corms which actually enhanced the multiplication rate of corms more than twice, compared to non-treated corms (Yasar *et al*., 2015) [14]. The positive effect of cytokinins in increasing the yield of underground structures has been reported by Pogroszewska *et al*. (2007) [9] in Allium. It also promoted cell division and anabolism, which might have been resulted into an increase in number of daughter corms which ultimately increases corms production. The result is in conformity with the work of Ram *et al*. (2002) [10], Sharma *et al*. (2006) [12], Baskaran *et al*. (2009) [1] and Khan *et al*. (2013) [4] in gladiolus.

Table 1: Effect of plant bio-regulators on vegetative growth parameters

Treatment	Treatment details	Average weight of corm (g)	Diameter of largest corm (cm)	Yield of cormels (tons/ha)	Corm yield (tons/ha)
T_1	GA_3 @ 50 ppm	41.42	5.39	0.86	3.03
T_2	GA_3 @ 100 ppm	41.24	5.19	1.32	4.12
T_3	GA_3 @ 150 ppm	47.91	6.22	1.92	4.04
T_4	BA @ 50 ppm	31.56	5.56	1.02	4.27
T_5	BA @ 100 ppm	32.20	5.39	0.71	3.16
T_6	BA @ 150 ppm	35.20	5.42	1.08	3.15
T_7	Ethrel @ 250 ppm	33.01	6.01	0.97	2.81
T_8	Ethrel @ 500 ppm	30.58	5.74	0.94	2.93
T_9	Ethrel @ 750 ppm	36.09	5.60	0.99	3.02
T_{10}	Thiourea @ 1%	35.68	5.44	1.19	2.81
T_{11}	Thiourea @ 2%	41.28	5.70	1.46	3.05
T_{12}	Thiourea @ 3%	40.34	5.29	2.13	4.11
T_{13}	Control	24.53	4.47	0.34	1.13
S.Em.±		2.504	0.104	0.076	0.176
C.D. at 5%		7.30	0.30	0.22	0.50
C.V.%		11.97	3.28	11.55	9.27

Conclusions

On the basis of results obtained in the present investigation, it can be concluded that the higher concentration of thiourea @ 3% was most effective in increased yield of cormel. While, lower concentration of benzyl adenine @ 50 ppm was the most effective to increased yield of corms.

References

1. Baskaran V, Misra RL, Abirami K. Effect of plant growth regulators on corm production in gladiolus. J. Hortl. Sci 2009;4(1):78-80.
2. Bhalla R, Kumar A. Response of plant bio-regulators on dormancy breaking in gladiolus. J. Orna, Horti 2007;10(4):215-221.
3. Dogra S, Pandey RK, Bhat D.. Influence of gibberellic acid and plant geometry on growth, flowering and corm production in gladiolus under jammuagroclimate. Int. J. Pharm. Bio. Sci., 2012;3(4):1083-1090.
4. Khan FN, Rahman MM, Hossain MM. Effect of benzyladenine and gibberellic acid on dormancy breaking, growth and yield of gladiolus cormsover different storage periods. J. Orn. and Horti. Plants 2013;3(1):59-71.
5. Kumar K, Chandra SR, Padma M, Siva SA. Effect of plant growth regulators on dormancy, corm and cormel production in gladiolus (*Gladiolus x grandiflorus* L.) J Orna. Hort. 2009;12(3):182-187.
6. Kumar V, Singh RP. Effect of soaking of mother corms with plant growth regulators on vegetative growth, flowering and corm production in gladiolus. J Orna. Hort., 2005;8(4):306-308.
7. Mukhopadhyay A, Bankar GJ. Pre-planting soaking of corm with gibberellic acid modified growth and flowering of gladiolus cv. Friendship. Indian Agric., 1986;30(4):317-319.
8. Padmalatha T, Reddy GS, Chandrasekhar R, Siva SA, Chaturvedi A. Effect of pre planting soaking of corms with chemicals and plant growth regulators on dormancy breaking and corm and cormel production in gladiolus. Int. J. Pl. Anim. Env. Sci. 2013;3(1):28-33.
9. Pogroszewska E, Laskowska H, Durlak W. The effect of gibberellic acid and benzyladenine on the yield of (*Allium karatavienseregel*.) 'ivory queen'. Acta Sci. Polonorum-Hortorum Cultus 2007;6:15-19.
10. Ram R, Mukherjee D, Manuja S. Plant growth regulators affect the development of both corms and cormels in gladiolus. Hort. Sci 2002;37(2):343–344.
11. Reddy GVS, Nageswararao MB, Umajyothi K, Sasikala K. Studies on the effect of plant growth regulators on flowering, corm and cormel production in gladiolus (*Gladiolus grandiflorus* L.) cv. White Prosperity. J Res Angrau 2013;41(2):11-15.
12. Sharma DP, Chattar YK, Gupta N. Effect of gibberelic acid on growth, flowering and corm yield in three cultivars of gladiolus. J Orna. Hort 2006;9(2):106-109.
13. Stewart DA, Jones RI. The role of extensibility and turgor in gibberellins and dark stimulated growth. Plant Physiology 1977;59:61-68.
14. Yasar SM, Jaskani J, Qasim M, Mehmood A, Ahmad N, Akhtar G. Pre-plant soaking of corms in growth regulators influences the multiple sprouting, floral and corm associated traits in *Gladiolus grandiflorus* L. J Agri. Sci 2015;7(9):173-181.