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Effect of biostimulants and micronutrients grade on growth and flowering of rose cv. top Secret under protected condition

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Abstract
The present investigation on "Effect of biostimulants and micronutrient grade on growth and flowering of rose cv. Top Secret under protected condition", was carried out at Hi-tech Horticulture park, Department of Horticulture, College of Agriculture, Junagadh Agricultural University, Junagadh (Gujarat) during the year 2018. The experiment laid out in Factorial Completely Randomized Design (FCRD), consisting two factors with three replication and nine treatment combinations. The treatment comprised of three different levels of Biostimulants (B) *viz.*, B_1: Banana enrich sap 1% (10ml/lit.), B_2: Panchgavya 3% (30 ml/lit.), B_3: Humic acid 0.2% (2ml/lit.) and Three different levels of Grade of Micronutrient IV (M) *viz.*, M_1: 0.5% grade-IV micronutrient formulation, M_2: 1% grade-IV micronutrient formulation and M_3: 1.5% grade-IV micronutrient formulation. The result indicated that application of Panchgavya 3% with 1.5% grade IV micronutrient formulation, first spray at 15 Days after pruning and second spray at 30 Days after first spray give higher vegetative growth and flowering parameters in rose.

Keywords: Rose, top secret, biostimulants, micronutrient grade IV

Introduction
Rose (*Rosa hybrida* L.) belongs to the family Rosaceae and is one of the most important woody perennials including shrubs, bushes of various size ramblers and climbers as well as very small plants known as miniatures (Encyclopedia Americana, 1984) [3]. There is a tremendous diversity of growth habit, flower form and colour among roses. Rose is the most popular of all the flowers because of its beauty and fragrance and is called the "Queen of Flowers" (Schneider and Dewolf, 1995) [13]. Roses are immensely important for landscaping and no garden is considered complete without roses (Gibson, 1984) [4]. Biostimulants are akin to biofertilizers as they also promote crop growth and yield. Biostimulants aid in improved microbial activity in soil and improve soil tilt, thereby also enhancing the effect of biofertilizers. These biostimulants affect different parameters such as: root and shoot development, flowering, fruiting, stomatal opening elongation, stress tolerance and yield parameters such as grain size and grain weight. Floriculture is a fast emerging and highly competitive industry. The importance of micronutrients in Indian agriculture is truly well recognized and their use had significantly contributed to the increased productivity of several crops. The nutrient elements which are required comparatively in small quantities are called as micro or minor nutrients or trace elements. In the past, there was no need of micronutrients because these trace elements were naturally supplied by soil. But due to intensive cultivation, increase in salinity and soil pH in most of soils, these nutrients are present but are not available to plants.

Micronutrients are involved in all metabolic and cellular functions. Plants differ in their need for micronutrients; boron (B), iron (Fe), zinc (Zn), copper (Cu), chloride (Cl), manganese (Mn), molybdenum (Mo) and nickel (Ni). These elements are active that makes them essential as catalytically active cofactors of enzymes, others have enzyme-activating functions, and yet others fulfil a structural role in stabilizing proteins. Nowadays, micronutrients are gradually gaining momentum among the flower growers because of their beneficial nutritional support and at the same time ensure better harvest and returns. Proper plant nutrition is essential for successful production of floricultural crops in open and also under protected conditions.

Integrated supply of micronutrients with macronutrients in adequate amount and suitable proportions is one of the most important factors that control the plant growth in flower crops. Micronutrients are involved in all metabolic and cellular functions. Plants differ in their need for micronutrients, and we will focus here only on those elements that are generally accepted as essential for all higher plants: Boron (B), Chloride (Cl), Copper (Cu), Iron (Fe), Zinc (Zn), Manganese (Mn), Molybdenum (Mo) and Nickel (Ni) (Edmond *et al.*, 1997) [2].

Materials and Methods

The experiment entitled "Effect of biostimulants and micronutrient grade on growth and flowering of rose cv. Top Secret under protected condition" during the year 2018, at Hi-tech Horticulture park, College of Agriculture, Junagadh Agricultural University, Junagadh (Gujarat). The trial laid out in Factorial Completely Randomized Design (FCRD), consisting two factors with three replication and nine treatment combinations. The different treatments were T_1: Banana enrich sap 1% (10ml/lit.) + 0.5% grade-IV micronutrient formulation, T_2 : Banana enrich sap 1% (10ml/lit.) + 1% grade-IV micronutrient formulation, T_3: Banana enrich sap 1% (10ml/lit.) + 1.5% grade-IV micronutrient formulation, T_4: Panchgavya 3% (30 ml/lit.) + 0.5% grade-IV micronutrient formulation, T_5: Panchgavya 3% (30 ml/lit.) + 1% grade-IV micronutrient formulation, T_6: Panchgavya 3% (30 ml/lit.) + 1.5% grade-IV micronutrient formulation, T_7: Humic acid 0.2% (2ml/lit.) + 0.5% grade-IV micronutrient formulation, T_8: Humic acid 0.2% (2ml/lit.) + 1% grade-IV micronutrient formulation, T_9: Humic acid 0.2% (2ml/lit.) + 1.5% grade-IV micronutrient formulation.

Results and discussion

Growth parameters

The Treatment B_2 (Panchgavya 3%), recorded significantly the maximum plant height (61.12 cm), plant spread N-S (22.71 cm), plant spread E-W (38.00 cm), number of branches per plant (5.29) and stem diameter (1.03 cm). While, significantly the lowest values were recorded, under treatment B_1 (Banana enrich sap 1%). Panchagavya plays important role in all the vegetative growth and flowering parameters of rose. Plant growth is also improved by the ability of the plant to uptake and receive more nutrients. Biostimulants sprayed on the foliage, resulted in the increased absorption of nutrients, as foliar application can reduce the log time between application and uptake by the plant, which could be important during a phase of rapid growth. These results are in conformity with the results, reported by Selvi *et al.* (2002) [14] in rose; Bhalla *et al*. (2006) [1] in carnation and Mahawer *et al*. (2010) [9] in tuberose.

The Treatment M_3 (1.5% grade-IV micronutrient formulation), recorded significantly the maximum plant height (62.27 cm), plant spread N-S (22.89 cm), plant spread E-W (38.50 cm), number of branches per plant (5.28) and stem diameter (1.02 cm). While, significantly the lowest values were recorded under treatment M_1 (0.5% grade-IV micronutrient formulation). Suarastra soil usually suffer from a lack of micronutrients, especially Zinc and Iron. Supply of essential micronutrients in the form of foliar spray, can easily absorbed by plant tissue and correct the deficiency quickly. Iron is great importance for life of plant (Hansch and Mendel, 2009) [5]. Zinc helps in translocation of plant constituents from one part to another (Lal and Mourya, 1981) [8].

Flowering parameters

The Treatment B_2 (Panchgavya 3%), recorded significantly the minimum required days to first flower bud emergence (17.61 Days) and days to first flower opening (25.83 Days), maximum number of petals per flower (52.62). While, significantly maximum required days to first flower bud emergence and days to first flower opening and the minimum values, recorded under treatment B_1 (Banana enrich sap 1%). Panchagavya, an organic product, has the potential to play the role of promoting growth and providing immunity in plant system. It contain macro nutrients, essential micro nutrients, many vitamins, essential amino acids. Flowering and yield of plant increase may be due to the increased availability and uptake of nutrients, water and also increased activity of GA, IAA and cytokinins in Panchgavya. The results of present study are in close conformity with findings of Raushan (2008) [12] in gladiolus; Singh *et al*. (2007) [15] in tuberose and Renukaradya *et al.* (2011) [10] in carnation.

The Treatment M_3 (1.5% grade-IV micronutrient formulation), recorded significantly the minimum required days to first flower bud emergence (17.94 Days), days to first flower opening (26.14 Days), maximum Number of petals per flower (52.63). While, significantly maximum days required to first flower bud emergence and days to first flower opening and the minimum values were recorded under treatment M_1 (0.5% grade-IV micronutrient formulation). Singh and Bhattacharjee (1997) [16] reported in rose that, the foliar spray of 2 per cent ferrous sulphate, was best for promoting early flowering and increased flower diameter and longevity. This results are in agreement with the reports of Rao (2005) [11] in gladiolus; Kumar *et al.* (2009) [7] in chrysanthemum and Jauhari *et al.* (2005) [6] in gladiolus.

Conclusion

From the foregoing discussion it can be concluded that for getting higher vegetative growth and flowering in rose cv. Top Secret should be sprayed with combine application of Panchgavya 3% with 1.5% grade IV micronutrient formulation, first spray at 15 Days after pruning and second spray at 30 Days after first spray.

Table 1: Effect of biostimulants and micronutrient grade on growth parameters in rose.

Treatment	Plant height (cm)	Plant spread N-S (cm)	Plant spread E-W (cm)	No. of branches per plant	Stem diameter (cm)
Biostimulants (B)					
B_1 - Banana enrich sap 1%	58.17	20.17	36.19	4.41	0.96
B_2 - Panchgavya 3%	61.12	22.71	38.00	5.29	1.03
B_3 - Humic acid 0.2%	59.97	21.94	36.89	4.98	1.01
S.Em.±	0.68	0.26	0.40	0.07	0.01
C.D. at 5%	2.02	0.76	1.19	0.22	0.03
Micronutrient grade IV (M)					
M_1 - 0.5% grade-IV micronutrient formulation	59.94	20.43	35.48	4.69	0.99

M_2 - 1% grade-IV micronutrient formulation	60.04	21.50	37.10	4.71	1.00
M_3 - 1.5% grade-IV micronutrient formulation	62.27	22.89	38.50	5.28	1.02
S.Em.±	0.68	0.26	0.40	0.07	0.01
C.D. at 5%	2.02	0.76	1.19	0.22	0.03
Interaction (B X M)					
S.Em.±	1.18	0.44	0.69	0.13	0.02
C.D. at 5%	NS	NS	NS	NS	NS
C.V. %	3.41	3.54	3.25	4.54	2.76

Table 2: Effect of biostimulants and micronutrient grade on flowering parameters in rose.

Treatment	Days to first flower bud emergence	Days to first flower opening	Number of petals per flower
Biostimulants (B)			
B_1 - Banana enrich sap 1%	19.00	29.40	49.49
B_2 - Panchgavya 3%	17.61	25.83	52.62
B_3 - Humic acid 0.2%	18.44	27.79	50.75
S.Em.±	0.24	0.37	0.79
C.D. at 5%	0.71	1.11	2.34
Micronutrient grade IV (M)			
M_1 - 0.5% grade-IV micronutrient formulation	18.94	30.10	49.49
M_2 - 1% grade-IV micronutrient formulation	18.17	26.78	52.62
M_3 - 1.5% grade-IV micronutrient formulation	17.94	26.14	50.75
S.Em.±	0.24	0.37	0.79
C.D. at 5%	0.71	1.11	2.34
Interaction (B X M)			
S.Em.±	0.41	0.65	1.36
C.D. at 5%	NS	NS	NS
C.V. %	3.89	4.06	4.63

References

1. Bhalla R, Dharma S, Dhiman SR, Jain R. Effect of biofertilizers and biostimulants on growth and flowering in standard Carnation (*Dianthus caryophyllus* Linn.). J Orna. Hort. 2006; 9(4):282-285.
2. Edmond JB, Sen TL, Andrews FS, Holfacre RG. Fundamentals of Horticulture, 4th edition, McGraw Hill Book Co., New York, 1997.
3. Encyclopedia Americana. International Inc., Danjbury, Connecticut. 1984; 23:788-789.
4. Gibson M. Growing roses. Croom Helm Ltd., Provident House, Burrell Row, Beckenham, Kent, England, 1984.
5. Hansch R, Mendel RR. Physiological functions of mineral micronutrients (Cu, Zn, Mn, Fe, Ni, Mo, B, Cl). Curr. Opinion Pl. Bio. 2009; 12(4):259-266.
6. Jauhari S, Srivastava R, Srivastava PC. Effect of zinc on growth, flowering, corm attributes, post-harvest life and leaf and corm nutrient status in gladiolus cv. Red Beauty. Progr. Hort. 2005; 37(2):423-428.
7. Kumar PN, Mishra RL, Dhiman SR, Ganga M, Lalitha K. Effect of micronutrient spray on growth and flowering of Chrysanthemum. Indian J Agri. Sci. 2009; 79(6):426-428.
8. Lal S, Mourya AN. Effect of copper on the growth characters of onion. Haryana. J Hort. Sci. 1981; 10(3/4):225-230.
9. Mahawer LN, Bairwa HL, Shukla A. Response of bio stimulants as pre harvest management of tuberose cut spike (*Polianthes tuberosa* L.) cv. Phule Rajani. Progre. Hort. 2010; 42(1):54-57.
10. Ranukaradya S, Pradeepkumar CM, Santoshkumar HM, Dronachari M, Sashikumar RS. Effect of integrated system of plant management on growth, yield and flower quality of carnation (*Dianthus caryophyllus* L.) under greenhouse. Asian J Hort. 2011; 6(1):106-112.
11. Rao KPS. Influence of iron nutrition on growth, flowering, and corm yield in gladiolus. J Orna. Hort. 2005; 8(4):293-295.
12. Raushan Kumar. Effect of organic culture on growth and post harvest life of galdious (*Gladious hybrida*) cv. Peter Pears. M.Sc (Agri.) thesis submitted to G.B.P.A.U., Pantnagar, 2008.
13. Schneider P, Dewolf GP. Taylor's Guide to Roses. Houghton Mifflin Co. 215 Park Avenue South, New York, USA, 1995.
14. Selvi SPT, Chezhiyan N, Ramar A. Studies on the effect of growth regulators, calcium, boron and oraganics on rose. South Indian Horticulture. 2002; 50(4):430-436.
15. Singh B, Srivastava R, Chandra R. Response of panchgavya and manchurian mushroom tea on floral characters in tuberose (*Polianthes tuberosa* L.) cv. Pearl Double. J Orna. Hort. 2007; 10(4):250-254.
16. Singh VC, Bhattacharjee SK. Effect of pre-harvest micronutrient treatments on post - harvest life of Raktagandha roses. Ann Agrl Res. 1997; 18(3):357-360.